Parks Canada Agency

PEI National Park Gulf Shore Parkway Renovation and Embankment Protection Project

Technical Specifications

ISSUED FOR TENDER

December 2022

WSP Project #: 221-10459-00

END OF SECTION

Part 1 General

1.1 PROJECT LOCATION

.1 The project is located in Prince Edward Island National Park, Prince Edward Island. The work is located on, or adjacent to, Gulf Shore Parkway at the Dalvay, Stanhope and Covehead Bridge areas.

1.2 DESCRIPTION OF WORK

.1 The work at this location includes the provision of all materials, labour, equipment, and ancillaries, all as necessary for the completion of the work as indicated on the drawings and as described in the specifications and notes. Work on this section consists generally of, but not limited to, the following:

.1 Supply and operate traffic control, signage, environmental protection and temporary structures for the duration of the project. Maintain traffic flow at the work site for the full duration of construction. Supply and maintain traffic lights for single lane closure at Covehead Bridge.

.2 Excavate and grade slopes as indicated on the contract drawings.

.3 Remove asphalt to extents shown on the plans.

.4 Mill asphalt keys as shown.

.5 Install geotextile fabric, filter layer, and armour stone/rip rap as indicated.

.6 Redeposit excavated material as indicated.

.7 Hauling and installation of beach sand at Dalvay Beach.

.8 Supply, place and compacting new granular subbase and base for road construction.

.9 Supply, place and compact asphalt for roadway and bike path as shown on drawing.

.10 Supply and place topsoil and hydroseed.

.11 Supply and install new guiderail system.

.12 Reinstate existing wood fence posts.

1.3 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

.1 An optional bidders conference will be held. This visit is scheduled for January 05, 2023 at 11:00AM. Contractors are to meet at the Dalvay Administration Office. Bidders shall be responsible for their own transportation to the sites noted in the drawings.

.2 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

.3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the Work.

.4 Bidders are required to wear all appropriate personal protective equipment and take all precautionary measures necessary to ensure their safety during any pre-tender site visits.

1.4 TENDER CLOSING

.1 The closing date for this tender is **January 12, 2023.**

1.5 CODES

.1 Perform work in accordance with National Parks Act, Code of Practice of the Department of Labour, as it pertains to the Temporary Workplace Traffic Control Manual (Department of Transportation and Infrastructure) and any other code of federal, provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

.2 Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGBS), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM) and other standards organizations.

.3 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

1.6 WORK WITHIN PARK BOUNDARIES

.1 The project is within a National Park, and it is essential that all lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.

- .1 If any damage occurs during construction, bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.
- .2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may complete repairs at the Contractor's expense.
- .3 Confirm that contracted Work meets the standards outlined in the contract specification and drawings.
- .4 Confirm that no damage will be done to aerial or underground electrical/ communications cables.

1.7 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of following:

- .1 Contract drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 Change orders.
- .6 Other modifications to Contract.

.7 Field Test Reports.

.8 Copy of Approved Work Schedule.

.9 Health and Safety Plan and Other Safety Related Documents.

.10 Plan Locating Underground Utilities.

.11 Other Documents as Specified.

.12 Environmental Control Plan.

.13 Record drawings (kept up to date on a daily basis).

1.8 SITE CONDITIONS

.1 The Contractor will be responsible to visit the various sites and review existing site conditions.

.2 Promptly notify Departmental Representative if subsurface conditions differ materially from those indicated in Contract Documents or a reasonable assumption of probable conditions based on thereon.

1.9 WASTE DISPOSAL

.1 All waste generated from this project will be disposed of outside of Park boundaries in accordance with all applicable codes and standards.

1.10 WORK SCHEDULE

.1 Provide to the Departmental Representative in writing and within 5 working days after Contract award, a detailed construction schedule, traffic control plan, safety plan and environmental protection plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work in the Unit Price Table.

.2 After receiving the Contractor's plan and prior to start of construction, a meeting involving Contractor, Departmental Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work, methods of construction, environment protection methods and traffic control.

.3 All armourstone work at shall be completed by **May 15, 2023**.

.4 Paving work shall be completed by **May 31, 2023**.

.5 The final completion date shall be **June 7, 2023**.

.6 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

.7 **No work will begin until the pre-construction meeting is held**.

.8 No work will begin until an Environmental Protection Plan, Traffic Control Plan and Occupational Health and Safety Plan is submitted and approved.

.9 Following the pre-construction meeting and approval of the schedule and traffic control plan and other plans, the work will be so scheduled to meet the time restraints and have the project completed on time.

1.11 PARTIAL OCCUPANCY OR USE

.1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Departmental Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes and authorities.

1.12 CONTRACTOR'S USE OF SITE

.1 Use of site: for execution of work within roadway right of way, project limits and those areas specified by the Departmental Representative

.2 The Contractor shall maintain the site in a tidy condition free from the accumulation of waste products and debris. Upon substantial performance of the work, remove surplus products, tools, machinery and equipment from the site. Completion of clean-up is required for total performance of the work.

.3 Contractor shall provide any and all traffic control services required for the project. One lane closures will be considered for short term requirements only and are to be approved by the Departmental Representative. Traffic lights will not be permitted.

.4 Contractor to obtain all necessary permits to perform work and to comply with all permit requirements and conditions.

.5 The Departmental Representative will specify the areas for work and storage.

1.13 PROJECT MEETINGS

.1 The Contractor will arrange project meetings at the call of the Departmental Representative and assume responsibility for setting times and recording and distributing minutes in accordance with Section 01 31 19 – Project Meetings.

1.14 SETTING OUT OF WORK

.1 Contractor shall carry out all layouts.

.2 Contractor shall assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.3 Contractor shall supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative

.5 Contractor shall supply pre and post construction cross sections at 20m intervals to ensure that lines and grades of the project can be checked by the Departmental Representative including centreline offset, edge of pave, rounding, etc.

1.15 EXISTING SERVICES

.1 The Contractor shall confirm all inverts and critical elevations in the field prior to construction.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.3 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.

.4 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.7 Record locations of maintained, re-routed and abandoned service lines.

.8 Short duration lane closures are permitted for overloading of materials and equipment. Ensure pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or existence of work or plant.

.9 Maintain existing signs at all times. **When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area.** The work is considered to be incidental and no separate payment will be made for maintaining or moving signs.

1.16 EXISTING ROADWAY SIGNS

.1 The Contractor shall note that existing warning, regulatory and information signs exist along the roadway within the project limits.

.2 These signs shall be protected from damage.

.1 If any damage occurs during construction, the Contractor shall bear the expense to immediately replace such damaged signs and/or posts to the satisfaction of the Departmental Representative.

.3 If the Contractor needs to temporarily remove the existing signs in order to complete their work, the removal and reinstatement shall be considered incidental.

1.17 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in Contract documents.

1.18 STANDARD HOURS

.1 The Contractor must maintain existing site hours for the work unless otherwise authorized by Departmental Representative.

.2 Site hours to be 8am to 8pm, 7 days a week. No holiday restrictions.

.3 Work that involves temporary disruption of services will be scheduled through the Departmental Representative. Give Departmental Representative minimum 72 hours notice of any disruption of services.

1.19 RELICS, ANTIQUES & WILDLIFE HABITAT

.1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

1.20 MEASUREMENT OF QUANTITIES

.1 Linear: Items which are measured by metre or kilometre, such as pipe culverts will be measured along centreline of installation unless otherwise shown on plans.

.2 Area:

.1 Longitudinal and transverse measurements for areas to be measured horizontally.

.2 Longitudinal and transverse measurements for such items as clearing to be made on actual flat or sloped surface.

.3 Volume:

.1 In computing volumes of excavation, average end area method will be used unless otherwise directed by Departmental Representative in writing.

.2 Term: Litre shall mean 1000 mL or L.

.4 All volume measurements refer to in place measure unless specified elsewhere in specification.

.5 Mass:

.1 Term "tonne" shall mean 1000 kg.

.2 Materials which are specified for measurement by mass shall be weighed on scales at a location determined by the Contractor. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale-house.

.6 Time:

.1 Unless otherwise provided for elsewhere or by written authority of Departmental Representative, hourly rental of equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to register hours of operation. Devices which only measure hours of running of motor will not be accepted.

1.21 PERMITS/AUTHORITIES

.1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Departmental Representative prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all changes in connection therewith.

1.22 EQUIPMENT RENTAL RATES

.1 Upon written request, the Contractor will supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the Prince Edward Island Builders Association.

1.23 WORK SEQUENCE

.1 Provide to the Departmental Representative, in writing, and within 5 working days after contract award, a detailed Construction Schedule and Traffic Control Plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work.

1.24 TRUCK MANAGEMENT PLAN

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Truck Management Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Truck Management Plan shall include, but not limited to:

.1 Speed and Unsafe Driving: Contractor shall outline how they will monitor and discipline trucks for violations. The Plan must indicate the progressive steps that will be followed should violations occur.

.2 Overweight Loads: Departmental Representative may periodically spot check and divert loads (i.e. any material without weigh slips) to scales for random compliance check.

.3 Tarping: All loads delivered to site shall be tarped. Loads delivered to site not tarped will not be paid for.

.3 The Contractor shall be responsible to provide a Daily Weighers Report to the Departmental Representative to cross reference delivered materials. The Report shall include, but not limited to:

.1 Driver name;

.2 Company;

.3 License plate number;

.4 Tare, including gross and net weight.

.4 Any work days with missing Daily Weighers Reports or weigh slips will not be paid for.

.5 Submit other data, information and documentation upon request as stipulated elsewhere in this Section.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, haul roads, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services and provide for vehicle access at all times.

.3 All site activities related to construction are to be confined within the defined project boundaries.

.4 Water: in accordance with Departmental Representative's approval.

.1 All water for cold milling, dust control and any other work to be obtained outside of the Park Boundaries.

.5 Temporary storage parking areas and turn around facilities for Contractor related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING INFRASTRUCTURE

.1 Execute work with least possible interference or disturbance to travelling public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.1 The Contractor shall ensure that they make provisions for safe working conditions while operating near live power and communication lines. The Contractor has sole responsibility to have the utility companies place required safety coverings over power lines, hold poles or suspend lines at the Contractor’s expense. Contractors are advised to review these costs with the Utility prior to the submission of their tender. All costs are deemed to be included in the contract unit prices quoted in the tender submission.

.2 Provide for pedestrian, cyclist and vehicular traffic.

1.5 SPECIAL REQUIREMENTS

.1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.2 Keep within limits of work and avenues of ingress and egress.

.3 Work shall be conducted in accordance with Parks Canada EAI and BIA (if provided) and BMP’s.

.4 Special Move Permits (over-weight and over-dimension) from the Province shall be submitted to Departmental Representative for review and approval prior to activity.

.5 Blasting is prohibited.

.6 Provide survey layout with stakes on both sides of the road/alignment at 20 metre station intervals (top of back slope, toe of slope, subgrade, granulars, shoulders, etc.) with centreline offset.

.7 Maintenance work on Contractor/Sub-Contractor equipment is prohibited within the National Park.

.8 If native topsoil is encountered during excavation, the Contractor shall salvage and stockpile such that embankments and designated areas can be dressed with the salvaged topsoil at the end of project prior to hydroseeding and sod.

.9 Maintain roadways, detours and site signage at all times during the Contract (i.e. dust control and free from potholes, bumps, PVMS, etc.)

.10 Repaving (asphalt paving to start and continue until completion within 5 days of completion of cold milling).

.11 Guiderail shall be installed at the same locations from which existing guide rail was removed, unless noted otherwise on the drawings or by the Departmental Representative.

.1 Where existing guiderail is to be removed and new or salvaged guiderail is to be installed at the same location, the Contractor shall complete the installation within the same working day or provide full physical protection of the region with traffic barrier protection, meeting the approval of the Departmental Representative.

.12 Work outside of normal working hours will require 48 hours written notice to the Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Mobilization and Demobilization consists of the preparatory work and operations including, but not limited to, those necessary for the loading, transportation, unloading, and complete set-up of all plant, equipment, labour, materials, facilities and incidentals necessary to complete the work associated with the Contract, as well as, the decommissioning, loading, transportation, unloading and storage of all plant, equipment, excess materials, facilities and incidentals after the work associated with the Contract is complete.

.2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 RELATED REQUIREMENTS

.1 See Section 01 11 00 – Summary of Work.

1.3 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures

1.4 DESCRIPTION

.1 There shall be no change in the Lump Sum Price of this Item due to a change in Contract scope or an extension to the Contract Completion Date.

.2 The payments from the Lump Sum Price shall be full compensation for the Work under this Item regardless of the number of times the Contractor mobilizes.

.3 At no time shall the total of the amounts paid to the Contractor under this Item be greater than the Contractor's Lump Sum Price.

.4 For those purposes of mobilization and demobilization, "project site" means the location.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CONSTRUCTION

.1 The Contractor shall carry out the Work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS OF THE BID AND ACCEPTANCE FORM

.1 Unit prices and Lump Sum prices bid are full compensation for the work necessary to complete each item in the Contract and in combination for all work necessary to complete the Work as a whole.

.2 All measurement shall be along a horizontal plane unless otherwise indicated.

.3 Overhaul will not be paid for on this project.

.4 The quantities listed in the Bid and Acceptance Form are approximate only and are for the purpose of tendering. Payment to the Contractor will be based on actual quantities of work completed in accordance with the Drawings and Specifications.

.5 The numbers of the items described below correspond to the numbers of the items in the Bid and Acceptance Form.

.6 Should the Contractor need to remove any existing regulatory/warning/information signs or posts in order to complete their Work, the removal and reinstatement of the signs and posts shall be considered incidental.

.7 There will be no measurement or payment for Work carried out beyond the limits defined on the Drawings.

1.2 MEASUREMENT AND PAYMENT

.1 All items in this Contract will be paid for as indicated in the bid items below.

.2 Lump Sum Item 1 – **Section 01 25 20** – Mobilization / Demobilization

Terms of Payment: Lump Sum (LS).

This item includes: For 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete. The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.

.3 Lump Sum Item 2 **- Section 02 41 13.14 -** Asphalt Pavement Removal

Unit of Measurement: Lump Sum (LS).

This item includes: the supply of all necessary materials, labour and equipment required for the removal of asphaltic concrete pavement, regardless of depth removed or number of operations required. All existing asphalt is to be trucked from site and shall become the property of the Contractor. Payment will include all sawcutting, milling of full depth removal, loading, hauling, stockpiling, disposal of asphalt, key joints, temporary asphalt tapers and cleaning of remaining pavement surface. The Contractor shall replace at no extra cost to the Departmental Representative, asphalt driving surface in any areas where milling operations break through to underlying granulars.

.4 Lump Sum Item 3 – **Section 01 35 00.06 -** Special Procedures for Traffic Control

Terms of Payment: Lump Sum (LS).

This item includes:

.1 Traffic control persons and traffic accommodation person(s).

.2 Provision, installation and maintenance of temporary traffic control devices, including detour signs, construction signage, portable variable message signs and pad sites for portable variable message signs.

.3 Traffic control devices and measures required to comply with Prince Edward Island Temporary Workplace Traffic Control Manual (TWTCM) including but not limited to all labour, materials and equipment related to traffic control, Accredited Sign Supervisor, traffic control signage, flashing light units, F-shape barriers, traffic barrels and all incidentals.

.4 Set up at single lane closure at Covehead Bridge, including temporary jersey barriers, signage and supply, installation and maintenance of lights.

Method of Measurement: Shall be paid on a percentage of work completed based on the latest updated construction schedule.

.5 Lump Sum Item 4 – **Section 01 35 43** – Environmental Procedures

Terms of Payment: Lump Sum (LS).

This item includes:

.1 Periodic and general maintenance of all erosion control measures or as directed by Departmental Representative.

.2 All environmental protection, sedimentation and erosion control measures required to complete the project, such as (but not limited to) diversion ditching, temporary ground covers, and rock flow checks in accordance with Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (Latest Edition), the BIA and EIA for the project and the Environmental Protection Plan.

Method of Measurement: Shall be paid on a percentage of work completed based on the latest updated construction schedule.

.6 Lump Sum Item 5 – **Section 01 50 00** – Temporary Facilities and Controls

Terms of Payment: Lump Sum (LS).

This item includes:

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary roads during period of the Work.

.3 Upon completion of the Work, rehabilitate any temporary roads to the satisfaction of the Departmental Representative.

.4 Clean roads and parking areas where used by the Contractor or employees.

.5 Provide, erect and maintain project identification site signs, Safety and Instruction signs, trail closure signs and notices.

.6 Provide sanitary facilities.

.7 Construction Site Trailer.

.8 Removal of temporary facilities from site as directed by the Departmental Representative.

Method of Measurement: Shall be paid on a percentage of work completed based on the latest updated construction schedule.

.7 Lump Sum Item 6 – **Section 31 23 33.01** – Excavating, Trenching and Backfilling – Common Excavation

Unit of Measurement: Lump Sum (LS).

This item includes:

.1 Excavation, loading, hauling, and disposal of materials, shaping, compaction and preparation of the subgrade and trimming of slopes as indicated on the Drawings.

.2 Excavated existing sandstone armourstone material at Covehead Bridge shall be used in the new work.

.3 Excavated sand for toe in of armourstone, sandstone and native material shall be salvaged and suitable material shall be reused for placement under filterstone or for redepositing sand placed over the Armourstone as indicated on the Plans. Remaining excavated sand material shall be placed on the sandstone protection at Dalvay Beach.

.4 All other excavated material shall become the property of the Contractor and disposed of outside the Park.

.5 Re-ditching of the existing roadway embankments in distress areas and at locations as indicated on the Drawings shall not be measured separately for payment and shall be considered as incidental to the Work.

.6 Backfill and compaction of subgrade with gravel sub-base materials will be measured under Section 32 11 16.01 - Granular Sub-Base.

.8 Lump Sum Item 7 – **Section 32 17 23** – Pavement Markings

Terms of Payment: Lump Sum (LS).

This item includes: The supply and application of paint in the colours, sizes, and configurations shown on the Drawings (matching existing line markings) and as specified by the Departmental Representative. Also includes submission of scaled and surveyed drawing for existing highway line markings, layout and pre-marking. All intersection markings, arrows, delineation, and other special markings in the sections will be considered incidental to this item. No additional payment for traffic control associated with the application of pavement markings shall be made.

.9 Lump Sum Item 8 - **Other Items** Not Included in the Unit Price Table

Terms of Payment: Lump Sum (LS).

Method of Measurement: Shall be paid on a percentage of work completed based on the latest updated construction schedule.

This item includes all other work required to complete the work as shown which are not specifically mentioned or accounted for in the Unit Price Table or other items in the Lump Sum Table, but are necessary to complete the work in accordance with the Contract, the Drawings, and Specifications. This item shall include but are not limited to the following; project layout and surveying, weigh scales, permits, temporary structures, water for dust control, utility locates and approvals required to complete the job.

.10 Unit Price Item 1 – **Section 31 23 33.01** – Beach Sand

Unit of Measurement: Tonne (t)

Method of Measurement: From scale and tickets.

This item includes: Handling, loading, hauling and placing of the beach sand, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Departmental Representative. The Contractor will be responsible to set up a temporary scale for measurement of this item.

This item shall also include the supply and installation of up to 500 m of sand fencing. Fencing to be installed as shown on the plans and as directed by the Departmental Representative.

Parks Canada Agency is supplying beach sand from a containment cell located on the east side of North Lake Harbour in North Lake, PEI. The contractor is responsible for loading and hauling beach sand from this location and placement at Dalvay Beach.

.11 Unit Price Item 2 – **Section 31 37 00** – R-25 Rip Rap

Unit of Measurement: Tonne (t)

Method of Measurement: From scale and tickets.

This item includes: Supply, handling, loading, hauling, and placing, of the R-25 Rip Rap, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Departmental Representative. This item also includes the supply and installation of geotextile material beneath the Rip Rap as required.

.12 Unit Price Item 3 – **Section 31 37 00** – R-500 Rip Rap

Unit of Measurement: Tonne (t)

Method of Measurement: From scale and tickets.

This item includes: Supply, handling, loading, hauling, and placing, of the R-500 Rip Rap, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Departmental Representative.

.13 Unit Price Item 4 – **Section 31 37 00** – Sandstone Rock

Unit of Measurement: Tonne (t)

Method of Measurement: From scale and tickets.

This item includes: Supply, handling, loading, hauling and placing of the Sandstone Rock, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Departmental Representative.

.14 Unit Price Item 5 **- Section 32 11 16.01** – Granular Sub-base – Select Borrow

Unit of Measurement: Tonne (t).

Method of Measurement: From scale and tickets

This item includes: Supply, handling, loading, hauling, placing and compacting of the gravel sub-base materials, as well as any incidentals, to the limits and at the locations indicated on the Drawings.

There shall be no payment for extra thickness of sub-base materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.15 Unit Price Item 6 - **Section 32 11 23** – Aggregate Base Courses – Class "A" Gravel

Unit of Measurement: Tonne (t).

Method of Measurement: From scale and tickets.

This item includes: Supply, handling, loading, hauling, placing, fine grading and compacting of the Class "A" Gravel, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Departmental Representative.

There shall be no payment for extra thickness of base materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.16 Unit Price Items 7 - **Section 32 12 16** – Asphalt Paving – Type "A" Base Coat

Unit of Measurement: Tonne (t).

Method of Measurement: From scale and tickets.

This item includes: Supply, transportation, placement and compaction as indicated and all equipment, labour, materials required, including the material transfer vehicle, surface preparation, rolling, asphalt keyed joints and temporary pavement markings.

There shall be no payment for extra thickness or extra width of asphalt placed outside of the theoretical lines and grades as indicated on the Drawings. Wherever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.17 Unit Price Items 8 - **Section 32 12 16** – Asphalt Paving – Type "B" Seal Coat

Unit of Measurement: Tonne (t).

Method of Measurement: From scale and tickets.

This item includes: Supply, transportation, placement and compaction as indicated and all equipment, labour, materials required, including the material transfer vehicle, surface preparation, rolling, asphalt keyed joints and temporary pavement markings.

There shall be no payment for extra thickness or extra width of asphalt placed outside of the theoretical lines and grades as indicated on the Drawings. Wherever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.18 Unit Price Item 9 - **Section 32 91 19** – Topsoil and Finish Grading

Unit of Measurement: Square Metres (m^2)

Method of Measurement: Plan measurement from width and length of topsoil and finish grading area of areas to receive material.

This item includes: Supply, delivery and placement as indicated and all equipment, labour and materials required.

.19 Unit Price Item 10 - **Section 32 92 16.19** – Hydraulic Seeding and Dry Mulch

Unit of Measurement: Square Metres (m^2)

Method of Measurement: Slope measure, from slope height and horizontal length of sections.

This item includes: supply and placing of all hydraulic seeding and dry mulch, including maintenance, to ensure successful growth.

.20 Unit Price Item 11 – **Section 33 42 12** – Pipe Culverts

Unit of Measurement: Metre (m)

Method of Measurement: Along centreline of new culvert pipe, from end to end of culvert, as laid and as accepted by the Departmental Representative.

This item includes: Supply and placement of new 750 mm diameter reinforced concrete pipe at Stanhope, supply and installation of connection requirements to existing HDPE pipe. This item **does not** include Rip Rap requirements as this item is deemed to be included in the respective item.

.21 Unit Price Item 12 - **Section 34 71 13.25** – Vehicle W-Beam Guiderail

Unit of Measurement: Metres (m)

Method of Measurement: This item shall be measured by linear metres of guiderail installed as indicated on the drawings. The measurement shall be taken along the centre of the guiderail from end to end of each section of guiderail, including buried ends, not including overlaps.

This item includes:

.1 Disassembly of existing guiderail to the limits indicated on the drawings, removal and storage of W-beam steel and disposal of wood posts and other components from site.

.2 Supply items include supply and delivery to site of all materials, posts, hardware accessories for installation of salvaged W-beam sections.

.3 Installation items include excavation, placing posts, salvaged rail, end treatments, joining to existing rail systems, accessories and surface reinstatement.

.4 Incidental to this pay item is the removal, storage and reinstallation of the wooden fence posts on the north side of the Gulf Shore Parkway at Dalvay Beach. Contractor to also include the supply and installation of 50 new posts.

.22 All and any items not specifically included in the Measurement for Payment and Pay Item List are considered incidental to the work and are to be included in the tendered price for related work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting two days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.1 Schedule of Work: in bar (GANTT) Chart format.

.2 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.3 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.4 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.5 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.6 Monthly progress claims, administrative procedures, photographs, hold backs.

.7 Appointment of inspection and testing agencies or firms.

.8 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and one week prior to project completion, schedule progress meetings bi-weekly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum two days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Corrective measures and procedures to regain projected schedule.

.6 Revision to construction schedule.

.7 Progress schedule, during succeeding work period.

.8 Review submittal schedules: expedite as required.

.9 Maintenance of quality standards.

.10 Review proposed changes for effect on construction schedule and on completion date.

.11 Other business.

1.4 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

.11 Make any changes in submissions which Departmental Representative may require consistent with Contract Documents and resubmit as directed by Departmental Representative.

.12 Notify Departmental Representative, in writing, when resubmitting of any revisions other than those requested by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Province of Prince Edward Island, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which

adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within one year of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution, monthly with progress statement as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints:

.1 Viewpoints and their location as determined by Departmental Representative.

1.5 WORK SCHEDULE

.1 Provide within 5 working days after contract award, schedule showing anticipated progress stages and final completion of work within time period required by Contract Documents.

.2 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

1.6 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 24 13 – Roadway Embankments

.2 Section 32 11 16.01 – Granular Sub-base

.3 Section 32 11 23 – Aggregate Base Courses

.4 Section 32 12 16 – Asphalt Paving

1.2 REFERENCES

.1 Manual of Uniform Traffic Control Devices for Canada.

.2 Prince Edward Island – Temporary Workplace Traffic Control Manual 2005.

1.3 REFERENCE STANDARDS

.1 Regulate traffic in accordance with the PEI Temporary Workplace Traffic Control Manual

.2 The Departmental Representative reserves the right to direct the Contractor to reduce the length or number of traffic control areas.

1.4 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to minimize interference and hazard to travelling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.3 Close lanes of road only after receipt of written approval from Departmental Representative.

.1 Before re-routing traffic erect suitable signs and devices to Prince Edward Island Temporary Workplace Traffic Control Manual.

.4 Keep travelled way graded, free from potholes and of sufficient width for required number of lanes of traffic.

.1 Provide 6 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.

.2 Provide 3.5 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.

.3 Traffic is not permitted to travel on subgrade or granular sub-base. A minimum 50 mm thickness of aggregate base course must be constructed prior to opening to traffic.

.4 Ensure 2 lanes of traffic at all times except for limited single lane closures as approved by the Departmental Representative.

.5 Provide gravelled detours or temporary roads as indicated, to facilitate passage of traffic around restricted construction area:

.1 Grade for detour in accordance with Section 31 24 13 - Roadway Embankments.

.2 Place and compact granular sub-base in accordance with Section 32 11 16.01 - Granular Sub-base.

.3 Place and compact granular base in accordance with Section 32 11 23 - Aggregate Base Courses.

.6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

.7 All flag persons and traffic control personnel shall have successfully completed a traffic control training course. Proof of training for all persons shall be available on site at all times.

1.5 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights, variable message signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.1 Construction of temporary pads, if required for the placement of temporary traffic control devices or portable variable message signs, shall be supplied by the Contractor. Temporary pad sites shall be approved by the Departmental Representative.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual and Prince Edward Island Temporary Workplace Traffic Control Manual 2005.

.3 Place signs, delineators, barricades and miscellaneous warning devices in locations recommended in UTCD Manual and Prince Edward Island Temporary Workplace Traffic Control Manual 2005.

.1 If situation on site changes, revise to approval of Departmental Representative.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 A traffic control plan and emergency response plan must be submitted for review by the Departmental Representative prior to the pre-construction meeting.

.6 Continually maintain traffic control devices in use:

.1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Remove or cover signs which do not apply to conditions existing from day to day.

.7 All signs to be legible in both of Canada’s Official Languages.

1.6 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual and Prince Edward Island Temporary Workplace Traffic Control Manual 2005 in following situations:

- .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
- .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and a traffic control signal system is not in use.
- .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
- .4 When entering or exiting construction site with equipment, trucks or personnel.
- .5 Where temporary protection is required while other traffic control devices are being erected or taken down.
- .6 For emergency protection when other traffic control devices are not readily available.
- .7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .8 Delays to public traffic due to contractor's operators: maximum 5 minutes.

.2 All Traffic Control Personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic control zone.

.3 All construction vehicles shall operate in accordance with and are subject to traffic control restrictions and operations in place on the project.

1.7 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic may be restricted as follows:

- .1 In accordance with Prince Edward Island Temporary Workplace Traffic Control Manual 2005.
- .2 Maintain existing conditions for traffic crossing right-of-way containing work except that, when required for construction under this Contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic.

.2 At the end of each day of work, traffic must be returned to two-lane two-way traffic. Restrictions of one lane traffic overnight or outside of work hours will not be permitted.

.3 Temporary structures shall be constructed as indicated on approved shop drawing submitted to Departmental Representative. All existing dimensions to be verified prior to construction with any discrepancies reported to the Departmental Representative.

.4 The Contractor shall provide for services 24 hrs per day, 7 days per week.

.5 Major responsibilities of the traffic accommodation person:

.1 Maintain traffic control devices and signs during regular shutdown on weekends and at night throughout the week.

.2 Clean signs, flares, barricades, etc. used to control and accommodate traffic.

.6 Contact proper authorities in the event of an emergency, i.e., Contractor's Supervisor, Park Warden, and Departmental Representative.

1.8 CLOSURES AND RESTRICTIONS

.1 Gulf Shore Parkway will remain open for the duration of the project. The Parkway can be closed to a single lane at both ends of Covehead Bridge as indicated on the plans. Extend width of closure to include road, bike path and ditches.

.2 At other times, Gulf Shore Parkway must remain open to two lanes of traffic. Short term single lane closures are permitted for delivery of equipment and materials, subject to approval from the Departmental Representative.

.3 A longer term single lane closure is permitted for paving operations.

1.9 SUBMITTALS

.1 Submit to the Departmental Representative copies of the following documents, including updates:

.1 Site specific traffic control plan.

.2 Names, 24 hr contact numbers for the Temporary Workplace Signer and afterhours Traffic Control Contact, if different from the Temporary Workplace Signer.

.2 Traffic control plan shall be submitted 5 working days from the contract award for review and approval by the Departmental Representative.

.3 Biking “Share the Road” signs are required as part of the traffic control plan.

1.10 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

1.2 SUBMITTALS

.1 Submit the Departmental Representative copies of the following documents, including updates:

- .1 Site Specific Health and Safety Plan.
- .2 Building Permit, compliance certificates and other permits obtained.
- .3 Letter of good standing from Provincial Workers Compensation organization.
- .4 Reports and directives issued by Federal and Provincial Safety Officer or other authority having jurisdiction.
- .5 Accident and Incident Reports.
- .6 MSDS data sheets.

.2 Upon request by Departmental Representative, submit other documents and reports as stipulated to be produced and maintained by Federal and Provincial Occupational Health and Safety Regulations and as specified herein.

.3 Submit above documents in accordance with Section 01 33 00.

1.3 COMPLIANCE REQUIREMENTS

.1 Comply with the Occupational Health and Safety Act for the Province of Prince Edward Island, and the Occupational Health and Safety Act Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code Part II.

.3 Observe and enforce construction safety measures required by:

- .1 National Building Code of Canada;
- .2 Provincial Worker's Compensation Board;
- .3 Municipal statutes and ordinances;
- .4 Canada National Parks Act.

.4 In the event of conflict between any provisions of above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

.5 A copy of the Canada Labour Code, Part II may be obtained by contacting:

Canadian Government Publishing
Public Works & Government Services Canada
Ottawa, Ontario, K1A 0S9
Tel: (819) 956-4800 (1-800-635-7943)
Publication No. L31-85/2000 E or F

.6 Maintain Workers Compensation Coverage for duration of Contract.

1.4 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, of property and for protection of persons and public circulating adjacent to work operations to extent that they may be affected by conduct of the Work.

.2 Enforce compliance by all workers, sub-contractors and other persons granted access to work site with safety requirements of Contract Documents, applicable Federal, Provincial and local statutes, regulations and ordinances, and with site-specific Health and Safety Plan.

1.5 SITE CONTROL AND ACCESS

.1 Control work site and entry points to construction areas.

.1 Delineate and isolate construction areas from other areas of site by use of appropriate means.

.2 Post notices and signage at entry points and at other strategic locations identifying entrance onto site to be restricted to authorized persons only.

.3 Signage must be professionally made, bilingual in both official languages or display internationally understood graphic symbols.

.2 Approve and grant access to site only to workers and authorized persons.

.1 Immediately stop non-authorized persons from circulating in construction areas and remove from site.

.2 Provide site safety orientation to all persons before granting access. Advise of site conditions, hazards and mandatory safety rules to be observed on site.

.3 Secure site at nighttime to extent required to protect against unauthorized entry. Provide security guard where protection cannot be achieved by other means.

.4 Ensure persons granted access to site wear appropriate personal protective equipment (PPE) suitable to work and site conditions.

.1 Provide such PPE to authorized persons who require access to perform inspections or other approved purposes.

1.6 PROTECTION

.1 Carry out work placing emphasis on health and safety of the public, facility personnel, construction workers and protection of the environment.

.2 Erect safety barricades, lights and signage on site to effectively delineate work areas, project pedestrian and vehicular traffic around adjacent to work and to create a safe working environment.

.3 Should unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advised Departmental Representative verbally and in writing.

1.7 FILING OF NOTICE

.1 File Notice of Project and any other required Notices with the Provincial Authorities prior to commencement of the work.

.1 Departmental Representative will assist in locating address for Filing Notice of Project if needed.

1.8 PERMITS

.1 Post on site permits, licenses, and compliance certificates.

.2 Where particular permit or compliance cannot be obtained at the required stage of work, notify Departmental Representative in writing and obtain his/her approval to proceed before carrying out that portion of work.

1.9 HAZARD ASSESSMENTS

.1 Conduct site specific health and safety hazard assessment before commencing project and during course of work. Identify risks and hazards resulting from site conditions, weather conditions and work operations.

.1 Perform ongoing assessments addressing new risks and hazards as work progresses.

.2 Also, conduct assessments when the scope of work has been changed by Change Order and when potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety representative.

.2 Record results in writing and address in Health and Safety Plan.

.3 Tidal conditions are present, address issues relative to tides on site specific health and safety hazard assessment.

.4 Keep copy of all assessments on site.

1.10 HEALTH AND SAFETY MEETINGS

.1 Attend pre-construction health and safety meeting conducted by Departmental Representative. Having the following persons in attendance:

.1 Site Superintendent;

.2 Person designated to perform on-site health and safety site supervision;

.3 Departmental Representative will advise of date, time and location.

.2 Conduct health and safety meetings and toolbox briefings on site. Hold on a regular and pre-scheduled basis during entire work in accordance with requirements and frequency as stipulated in Provincial Occupational Health and Safety Regulations.

.1 Keep workers informed of potential hazards and provide safe work practices and procedures to be followed.

.2 Take written minutes and post on site.

1.11 HEALTH AND SAFETY PLAN

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.1 Submit copy to Departmental Representative within 14 calendar days of acceptance of bid.

.2 Health and Safety Plan shall contain the following three (3) parts:

.1 Part 1 – Hazards: List of individual health risks and safety hazards identified by hazard assessment process.

.2 Part 2 – Safety Measures: Engineering controls, personal protective equipment and safe work practices used to mitigate hazards and risks listed in Part 1 of Plan.

.3 Part 3a – Emergency Response: Standard operating procedures, evacuation measures and emergency response in the occurrence of an accident, incident or emergency.

.1 Include response to all hazards listed in Part 1 of Plan.

.2 Evacuation measures to complement the Facility's existing Emergency Response and Evacuation Plan. Obtain pertinent information from Departmental Representative.

.3 List names and telephone numbers of officials to contact, including:

.1 General Contractor and all Sub-contractors;

.2 Federal and Provincial Departments as stipulated by laws and regulations and local emergency resource organizations, as needed based on nature of emergency or accident;

.3 Officials from Parks Canada Agency. Departmental Representative will provide list.

.4 Part 3b – Site Communications:

.1 Procedures used on site to share work related safety issues between workers, subcontractors and general contractor.

.2 List of critical tasks and work activities, to be communicated with the Facility Manager, which has risk of affecting tenant operations, or endangering health and safety of facility personnel and the general public. Develop list in consultation with the Departmental Representative.

.3 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above as follows:

Column 1	Column 2	Column 3
Part 1	Part 2	Part 3a / 3b
Identified Hazards	Safety Measures	Emergency Response & Site Communications

.4 Develop Health and Safety Plan in Collaboration with all subcontractors. Address all work and activities of subcontractors as they arrive on site. Immediately update Plan and submit to Departmental Representative.

.5 Implement, maintain and enforce compliance with requirements of the Health and Safety Plan until final completion of work and demobilization from site.

.6 As work progresses, review and update Plan addressing additional health risks and safety hazards identified by on-going hazard assessments.

.7 Submit revised versions of Plan to Departmental Representative.

.8 Post a typed written copy, including all updates of the Health and Safety Plan in a common visible location at work site.

.9 Submission of the Health and Safety Plan, and updates to the Departmental Representative is for review and information purposes only. Its submission shall not be construed to imply approval by Departmental Representative, be interpreted as a warranty of being complete, accurate and legislate compliant and shall not relieve the Contractor of his legal obligations for the provision Health and Safety of the Construction Project.

.10 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.12 SAFETY SUPERVISION AND INSPECTIONS

.1 Designate one person to be present on site at all times, responsible for supervising health and safety of the work.

.1 Person to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.

.2 Assign responsibility, obligation and authority to such designated person to stop work as deemed necessary for reasons of health and safety.

.3 Conduct regularly scheduled informal safety inspections of work site on a minimum by-weekly basis.

.1 Note deficiencies and remedial action taken in a log book or diary.

.4 Keep inspection reports on site.

1.13 TRAINING

.1 Ensure that all workers and other persons granted access to site are competently trained and knowledgeable on:

.1 Safe use of tools and equipment;

.2 How to wear and use personal protective equipment (PPE)

.3 Safe work practices and procedures to be followed in carrying out the work;

.4 Site conditions and minimum safety rules to be observed on site, as given at site orientation session.

1.14 MINIMUM SITE SAFETY RULES

.1 Notwithstanding the requirement to abide by Federal and Provincial Health and Safety Regulations, the followings safety rules shall be considered minimum requirements to be obeyed by all persons granted site access:

.1 Wear personal protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear and eye protection;

.2 Immediately report unsafe activity or condition at site, near-miss accident, injury and damage;

.3 Maintain site in tidy condition;

.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules and on disciplinary measures to be taken by Departmental Representative for violation or non-compliance of such rules. Post rules on site.

1.15 ACCIDENT REPORTING

.1 Investigate and report the following incidents and accidents:

.1 Those as required by Provincial Occupational Health and Safety Act and Regulations;

.2 Injury requiring medical aid as defined in the Canadian Directory of Safety Terms-1987, published by the Canadian Society of Safety Engineers (C.S.S.E.) as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Worker's Compensation Board of the province in which the injury was incurred.

.3 Property damage in excess of $5,000.00;

.4 Interruption to facility operations with potential loss to a federal department in excess of $5,000.00;

.5 Those which require notification to Worker's Compensation Board or other regulatory agencies as stipulated by applicable law or regulations.

.2 Send written report to Departmental Representative for all above cases.

1.16 TOOLS AND EQUIPMENT SAFETY

.1 Routinely check and maintain tools, equipment and machinery for safe operation.

.2 Conduct checks as part of site safety inspections. When requested, submit proof that checks and maintenance have been carried out.

.3 Tag and immediately remove from site item found faulty or defective.

1.17 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site. Post on site. Submit copy to Departmental Representative upon receipt.

1.18 POWDER ACTUATED DEVICES

.1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

1.19 POSTING OF DOCUMENTS

.1 Post on site safety documentation as stipulated by Authorities having jurisdiction and as specified herein. Place in a common visible location.

1.20 SITE RECORDS

.1 Maintain on site a copy of all health and safety documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.

.2 Upon request, make available to Departmental Representative and to other authorized safety representative for review. Provide copy when directed by Departmental Representative.

1.21 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Erosion: A combination of processes in which materials of the earth's surface are loosened, dissolved, or worn away, and transported from one place to another by natural agents.

.3 Sedimentation: The addition of soils to water bodies by natural and human related activities.

.4 Stormwater Runoff: Precipitation that does not soak into the ground or evaporate but flows along the ground surface as runoff.

.5 Erosion and Sediment Control Plan: Plan identifying the applicable stabilization and structural strategies that shall be employed to limit sediment and erosion during construction.

.6 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water and air; biological and cultural resources; and includes management of visual aesthetics, noise, solid, chemical, gaseous and liquid waste; radiant energy and radioactive material as well as other pollutants.

.7 Deleterious Substance: defined by the Fisheries Act as any substance that, if added to water, makes the water deleterious to fish or fish habitat or any water containing a substance in such quantity or concentration or has been changed by heat or other means, that if added to water makes that water deleterious to fish or fish habitat.

.8 Wetlands: Land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands", and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.

.9 Watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or saltwater body that contains waters for at least part of each year.

.10 Alien Species: refers to a species or sub-species introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.

.11 Buffer Zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.

.12 Contaminant: means any solid, liquid, gas, micro-organism, odour, heat, sound, vibration, radiation or combination of any of them, present in the environment.

.13 Contaminants and Deleterious substances includes, but are not limited to: sediment or sediment-laden water, petroleum products, paints, thinners, heated water, concrete wash water, salt, heavy metals, wood preservatives, cleaning supplies, pesticides, wood and food waste, and fecal matter.

.14 Environmental incidents or emergencies include:

.1 Chemical or Petroleum spills;

.2 Poisonous or Caustic Gas Emission;

.3 Biological or Chemical Explosion;

.4 Hazardous Material Spill;

.5 Sewage Spill;

.6 Contaminated Water into Waterways;

.7 Explosion and Ammunition.

.2 Reference Standards:

.1 Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure.

.1 Document is included in Technical Specifications as Appendix A.

.2 Basic Impact Analysis – Gulf Shore Parkway Shoreline Protection Project

.1 Document is included in Technical Specifications as Appendix B.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prior to the pre-construction meeting, submit Environmental Protection Plan for review and approval by Departmental Representative.

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.

.3 Name and qualifications of person responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Wastewater Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water and dewatering of ground water.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.3 SENSITIVE AREAS

.1 Site clearing, ground disturbance, and heavy equipment traffic shall not occur within Sensitive Areas unless absolutely required and authorized by Departmental Representative.

.2 Contractors must make all efforts to prevent contaminants and deleterious substances arising from their work from directly or indirectly entering those areas indicated as sensitive areas on drawings (e.g. watercourses and wetlands). This may include mitigative measures such as altering; work schedules, methods of undertaking the work, materials used, and installation of mitigative structures (e.g. sediment control fence, check dams, mulching, etc.).

.3 Failure to comply can lead to charges under various legislation, including the federal Fisheries Act.

1.4 FIRES

.1 Fires and burning of rubbish on site is not permitted.

.2 Immediately report all fires to the Departmental Representative. The Contractor is held responsible to make all reasonable efforts to extinguish any fires on the site.

.3 The Contractor is required to comply with the Fire Protection Regulations of the National Parks Act.

.4 In accordance with these Regulations, the Park Superintendent may restrict activities, or access to work areas, in the interest of fire prevention.

.5 The Contractor's equipment must be in proper working condition and be used in such a manner as to minimize the potential for ignition of vegetation.

.6 Vehicles and stationary equipment must be equipped with fire suppression equipment such as an operable fire extinguisher.

.7 If storage and/or operation of in-Park equipment during a high fire hazard season is of concern to the Park, the Contractor may be required to prepare and implement a Fire Suppression Contingency Plan.

1.5 DISPOSAL OF WASTES

.1 Littering is prohibited.

.2 Dispose of rubbish and waste materials at authorized site.

.3 Do not dispose of waste, volatile or deleterious materials into waterways, wetlands, storm or sanitary sewers.

.4 All refuse from demolition is the property of the Contractor and shall be removed and disposed of in a legal manner.

.5 All Hazardous materials shall be sealed as dictated by authorities having jurisdiction, and disposed of off-site, unless otherwise instructed by the Departmental Representative.

.6 Garbage must be collected and removed daily from the worksite to keep the site sanitary and to prevent unwanted interactions with Park fauna (e.g. bears).

1.6 DRAINAGE

.1 Provide temporary drainage and pumping required to keep excavations and site free from water.

.2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas designated by Departmental Representative.

1.8 WORK ADJACENT TO WETLANDS AND WATERCOURSES

.1 Construction equipment to be operated on land only.

.2 Use of borrow material from watercourses or wetlands is prohibited.

.3 Do not alter or draw any water from a watercourse or wetland without first obtaining necessary permits or approvals.

.4 Do not dump excavated fill, waste material or debris in watercourses or wetlands.

.5 Design and construct temporary crossings to minimize erosion to watercourse or wetland. All temporary crossings must be pre-approved by Departmental Representative prior to construction.

.6 Do not skid logs or construction materials across watercourses or wetland.

.7 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.8 Do not blast under watercourses or wetland within 100 m of spawning beds without obtaining necessary permits or approvals.

.9 Provide a buffer zone in combination with appropriate erosion and sedimentation control when working adjacent to watercourses and wetlands. Consult with regulatory agencies.

1.9 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Prior to the pre-construction meeting, prepare an Environmental Protection Plan, which addresses procedures to follow in the event of a pollution incident and ensure all staff are aware of these procedures. Provide copy of contingency plan to the Departmental Representative.

.4 Maintain temporary erosion and pollution control devices installed under this contract until the Work is completed as specified in the Project Documents.

.5 Remove temporary erosion and pollution control measures just prior to project completion unless directed otherwise. Chemicals used in dust control must have prior approval of the Departmental Representative.

.6 Control emissions from equipment to requirement of authority having jurisdiction.

.7 Provide temporary enclosures to protect environment from effects of abrasive blasting.

.8 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.9 Keep paved surfaces clean. Control dust by application of calcium chloride or water.

1.10 PETROLEUM, OIL AND LUBRICANT STORAGE

.1 Comply with Federal and Provincial laws, regulations, codes and guidelines for the storage of fuel and petroleum products on site.

.2 No fuel or petroleum products shall be stored on site. Do not fuel or lubricate equipment within buffer zones. Obtain approval from Departmental Representative of acceptable location on site for fuel storage and equipment service.

.3 Do not dump petroleum products or any other deleterious substances on ground or in the water.

.4 Be diligent and take all necessary precautions to avoid spills and contaminate the soil and water (both surface and subsurface) when handling petroleum products on site and during fueling and servicing of vehicles and equipment.

.5 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-liter (55 gallon) overpack spill kit for containment and clean-up of spills.

.6 Maintain vehicles and equipment in good working order to prevent leaks on site.

.7 In the event of a petroleum spill, immediately notify the Departmental Representative and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24-hour report line). Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

1.11 REFUELING AND SPILL CONTAINMENT

.1 Take precautions to avoid contamination of the site from fuel. Keep and maintain hydrocarbon containment and cleanup materials on site for the duration of construction activities. Ensure that Contractor's personnel are trained in the proper use of such materials.

.2 Establish suitable fueling and maintenance areas and obtain approval from the Departmental Representative.

.3 Do not refuel or maintain equipment adjacent to or within 200 meters of any sensitive areas.

.4 Monitor on site vehicles for fluid leaks. Implement a preventative maintenance program to keep vehicles free from leaks.

.5 Refueling of on-line equipment from storage facilities located outside Park boundaries is strongly preferred. Storage of any fuel has to occur only in previously approved locations, and with Departmental Representative consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven days prior to the start of the Work. The Contractor is expected to be prepared to effect the containment and cleanup of all spills related to the Work.

.6 Emulsion storage tanker and transfer of emulsion from tanker to spray vehicle are not permitted within National Park.

1.12 EQUIPMENT MOVEMENT AND MAINTENANCE

.1 Maintenance work on Contractor/Sub-Contractor equipment is prohibited within National Park.

.2 Waste oil and solvents are to be properly contained until they are removed from the site by qualified companies for recycling or disposal.

.3 Any leaking equipment must be taken out of service until repaired.

.4 Limit the number and length of temporary access and construction roads.

1.13 AIRBORNE POLLUTION AND PARTICULATE CONTROL

.1 Keep dust and inconvenience to site occupants to a minimum.

.2 Control emissions from equipment to local emission requirements.

.3 Do grading activities to minimize dusting. Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.14 NOISE CONTROL

.1 Operate construction equipment to prevent excessive noise.

.2 To reduce potential negative impacts on Park fauna (especially moose), noise control measures, such as properly functioning mufflers on equipment, must be in place.

1.15 BLASTING

.1 Blasting is prohibited.

1.16 SEWAGE DISPOSAL

.1 Provide and maintain temporary sanitary facilities for site personnel.

.2 Obtain all approvals required for the disposal of sanitary waste from any facilities, including offices, washrooms, and temporary site trailers.

.3 Remove sanitary facilities from site when no longer required.

1.17 WATER QUALITY

.1 Conduct work in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times.

.2 Visually monitor the water turbidity of the surrounding areas adjacent to the work and up to 200 meters.

.1 Should excessive change occur in the turbidity beyond the 200 meters which differs from existing conditions of the surrounding waterbodies, such as a distinct colour difference, notify the Departmental Representative to obtain appropriate mitigation measures to be followed.

.3 Do not wash down equipment within a 30 meter buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

.4 Any construction debris entering the marine environment will be retrieved.

.5 The construction material used must be clean and non-toxic (free of fuel, oil, grease and/or any contaminants).

.6 A silt curtain must be installed before commencing any work or propose a construction method to mitigate against a sediment plume in the surrounding waterbody.

1.18 BIRD AND BIRD HABITAT

.1 Become knowledgeable and abide by the Migratory Birds Convention Act (MBCA) in regard to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.

.2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the work.

.3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves or ferrying supplies.

.4 During nighttime work, position flood lights in opposite direction of nearby bird nesting habitat.

.5 Do not use beaches, dunes and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the Departmental Representative.

.6 Should nests of migratory birds in wetlands be encountered during work, immediately notify Departmental Representative for directives to be followed.

.1 Do not disturb nest site and neighbouring vegetation until nesting is completed.

.2 Minimize work immediately adjacent to such areas until nesting is completed.

.3 Protect these areas by following recommendations of Canadian Wildlife Service.

.7 Ensure that food scraps and garbage are not left at the worksite.

1.19 FISH AND FISH HABITAT

.1 Be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced in the water.

.2 To minimize the possibility of fish habitat contamination, all construction equipment which will be immersed into the water of a watercourse or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species.

.1 Equipment shall include boats, barges, cranes, excavators, haul trucks, pumps, pipelines and other all miscellaneous tools and equipment previously used in a marine environment.

.3 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.

.4 Conduct cleaning and washing operations as follows:

.1 Scrap and remove heavy accumulation of mud and dispose appropriately.

.2 Wash all surfaces of equipment by use of a pressurized fresh water supply.

.3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.

.4 Check and remove all plant, animal and sediment matter from all the bilges and filters.

.5 Drain standing water from equipment and let fully dry before use.

.6 Upon removal from water, drain standing water from equipment and let fully dry before removal off the site.

.5 Do not perform cleaning and washdown within a 30 meter buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

.6 Record of Assurance Logbook:

.1 Maintain an ongoing log of past and present usage and washdowns of all equipment to illustrate mitigation measures undertaken against fish habitat contamination by alien species.

.2 Write data in a hard cover bound logbook.

.3 Include the following:

.1 Date and location where equipment was previously used in a watercourse or wetland;

.2 Type of work performed;

.3 Dates of washdown for each piece of equipment;

.4 Cleaning method and cleaning agent(s) used.

.7 Keep Record of Assurance Logbook updated from project to project. Upon request, submit logbook to Departmental Representative for review.

.8 Abide by requirements and recommendations of the Federal Department of Environment and the Department of Fisheries and Oceans – Habitat Protection and Sustainable Development Branch in cleaning and washdown of equipment.

1.20 UNFORESEEN SITE STOPPAGES

.1 If contaminated sites, heritage sites, archeological resources, or other unforeseen site conditions are encountered in the work site area, work will immediately cease until investigations are completed and permission to continue is granted from the Departmental Representative.

1.21 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

.2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.22 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection Plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Take action only after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.23 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 SEDIMENT CONTROL FENCE

.1 Provide and maintain sediment control fence where required or as directed, prior to construction. Coordinate locations with Departmental Representative. Do not remove control features until authorized by the Departmental Representative.

.2 Sediment Control fence: preassembled sediment control fence with industrial woven geotextile fabric pre-stapled to wood posts spaced as indicated.

Part 3 Execution

3.1 SEDIMENT CONTROL

.1 The Contractor shall carry out the Work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 The Contractor shall install additional sediment control fence as directed by the Contractor’s on-site environmental representative, as well as per applicable permits and regulations.

.3 The sediment control fence shall be installed as required and prefabricated sediment control fence shall be installed as per the manufacturer’s instructions.

.1 In areas of potential sheet flow runoff where construction activity may cause the drainage run-off to transport sediment(s), and the Contract Documents do not provide for sediment control fences in these areas, the Contractor shall ensure that sediment control fences are properly located in effective runoff control.

.4 The Contractor shall maintain the sediment control fence in a functional condition continuously from the time of installation until the completion of the Contract or removal.

.5 The Contractor shall inspect all sediment control fences after each rainfall and at least daily during periods of prolonged rainfall.

.6 The Contractor shall immediately repair any damage to sediment control fences or parts thereof.

.7 The Contractor shall remove retained sediment prior to it having accumulated to a level approximately but not exceeding one-half the height of the fence, and this sediment shall be disposed of at a location at least 30m from any watercourse, and in such manner that the sediment will not be returned to the Work Area or the watercourse; or

.1 Subject to the approval of the Departmental Representative, the Contractor may install a second, back-up sediment control fence, at his/her expense.

.8 The Contractor shall remove all sediment control fence and the time of such removal shall be subject to the Departmental Representative approval but in all cases shall occur prior to the completion of the Contract.

.1 Sediment control fence removed shall become property of the Contractor and shall be disposed of outside of the Work Site.

.2 If the Departmental Representative notified the Contractor in writing, prior to the completion of the Contract, that all or any part of the sediment control fence is to remain in place, the Contractor shall be deemed to have completed her/his obligations for that portion of the sediment control fence under his Item and the sediment control fence shall become the property of the Owner.

.9 At the time of removal, the Contractor shall excavate any remaining sediment and dispose of it at a location at least 30m from any watercourse, and in such manner that the sediment will not be returned to the Work Area or the watercourse and shall dress and seed the area of the removed fence and sedimentation, to the satisfaction of the Departmental Representative.

3.2 EROSION CONTROL

.1 The Contractor shall carry out the Work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 The Contractor shall install additional erosion control structures as directed by the Contractor’s on-site environmental representative, as well as per applicable permits and regulations.

.3 Erosion control structures shall be constructed as indicated on Contract Documents.

.4 Erosion control structures may be installed in natural swales prior to ditch construction, in temporary or partially constructed ditches, and/or in completed ditches.

.1 In areas of potential sheet flow runoff where construction activity may cause the drainage run-off to transport sediment, and the Contract Documents do not provide for erosion control structures in these areas, the Contractor shall ensure that erosion control structures are properly located for effective runoff control.

.5 The Contractor shall carry out the Work in accordance with Contract Documents.

.6 The application, construction details and clean-out requirements for different types of erosion control structures shall be carried out as indicated in Table 1.4.1 and Clause 1.4.7.

Table 1.4.1
Erosion Control Structures

Type	Application	Clean-Out Requirements
"A"	Type A structures shall be installed as spillways of dykes that are built to pond runoff from ditches or from grubbed areas, or at the end of a cut where runoff leaves the ditch to flow down a natural slope.	The Contractor shall remove the sediment deposits prior to the level of sedimentation reaching a point within 300mm of the crest of the spillway.
"B"	Type B structures are typically installed in rock ditches where stakes required for Type C and D structures cannot be driven.	The Contractor shall remove the sediment deposits prior to the level of sedimentation reaching a point within 100mm of the crest of the notch.
"C"	Type C structures are typically installed in earth ditches or swales.	The Contractor shall remove the sediment deposits prior to the level of sedimentation reaching a point of 100mm of the crest of the notch.
"D"	Type D structures are typically installed in earth ditches or swales.	The Contractor shall remove the sediment deposits prior to the level of sedimentation reaching a point of 100mm of the crest of the notch.

.7 Clean-out consists of removal of sediment deposits retained by the structure and disposal of the removed materials in accordance with Clause 1.4.11.

.1 Sediment removal shall be performed so as to cause minimal disturbance to the ground or any part of the erosion control structure, and in the case of Type A structures, to the sediment pond dyke.

.8 The Contractor shall maintain erosion control structure(s) in a functional condition from the time of installation until their removal.

.1 All erosion control structures shall be kept in place until the grass on hydroseeded slopes and ditches is stabilized as an effective erosion deterrent, or as directed by the departmental representative.

.1 In Work Areas that are hydroseeded up to but no later than September 15th, erosion control structures Types B, C, and D shall be kept in place until the day on which the ground is prepared for hydroseeding, as approved by the Departmental Representative.

.2 All erosion control structure(s) shall be removed as follows:

.1 The Contractor shall carry out the Work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 Scheduling of the removal of the erosion control structures shall be subject to the approval of the Departmental Representative.

.1 Erosion control structures removed shall become property of the Contractor and shall be disposed of outside of the Work Site.

.2 If the Departmental Representative notified the Contractor in writing, prior to the completion of the Contract, that all or any of the erosion control structure(s) are to remain in place, the Contractor shall be deemed to have completed his/her obligations for the portion of the Work under this Item and the erosion control structure(s) indicated shall become the property of the Owner.

.3 At the time of the removal the Contractor shall excavate any remaining sediment and dispose of it at a location at least 30m from any watercourse, and in such manner that the sediment will not be returned to the Work Area or the watercourse.

.4 The Contractor is the ensure that all possible care is taken to ensure that ground disturbance is maintained at a minimum during the erosion control structure removal operation and that all necessary precaution is taken to ensure that no sediment release occurs as a result of this removal activity.

.5 The Contractor shall be responsible to match the affected ditches and Slopes with the Slopes and ditch grades of the adjacent Work Area(s).

.6 The Contractor shall restore the area of the removed erosion control structure, deposited sedimentation and other disturbed ground within the Work Area, to the satisfaction of the Departmental Representative within 48 hours following the removal of the erosion control structure.

.9 The Contractor shall inspect all erosion control structure(s) after each rainfall and at least daily during periods of prolonged rainfall.

.10 The Contractor shall immediately repair any damage to erosion control structure(s) or parts thereof.

.11 The Contractor shall dispose of the excavated sediment at a location, at least 30m away from any watercourse, and in such manner that the sediment will not be returned to the Work Area or watercourse.

.12 The Contractor shall not remove any erosion control structure without the authorization of the Departmental Representative.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave work area clean at end of day.

.2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.3 Final Cleaning: upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling

.2 Section 31 24 13 – Roadway Embankments

.3 Section 32 11 16.01 – Granular Sub-base

.4 Section 32 11 23 – Aggregate Base Courses

.5 Section 32 12 16 – Asphalt Paving

1.2 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 TESTING

.1 Tests on materials, as specified in various sections on the Specifications is the responsibility of the Contractor except where stipulated otherwise.

.1 Provide all necessary instruments, equipment and qualified personnel to perform tests.

.2 At completion of tests, turn over 2 sets of fully documented tests reports to Departmental Representative. Submit in accordance with Section 01 33 00.

.1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00.

.3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.

.4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor to repair at its own costs.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative; otherwise all costs for materials testing shall be borne by the Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection

1.5 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.8 REPORTS

.1 Submit 3 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to sub-contractor of work being inspected or tested.

1.9 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

1.10 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SITE ACCESS AND PARKING

.1 Parking will be permitted in the area of the site provided that it does not disrupt the performance of the work, interfere with traffic flow and subject to approval of the Departmental Representative.

.2 Build and maintain temporary access roads and any required access to the site and provide snow removal and dust control during period of work.

.3 Maintain new and existing roads and parking areas at site, where used by Contractor, for duration of contract.

.1 Keep clean and free of mud and dirt by washing on a regular basis.

.2 Provide snow removal in areas located within construction site or enclosed by work.

.3 Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.

1.2 CONTRACTOR'S SITE OFFICE

.1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.

1.3 DEPARTMENTAL REPRESENTATIVE'S SITE OFFICE

.1 Contractor to provide Departmental Representative's office trailer/space. Minimum office trailer/space size is 3.0 m x 6 m.

.2 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.

.3 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.4 Install electrical lighting system to provide minimum 750 lx using surface-mounted, shielded commercial fixtures with 10% upward light component.

.5 Contractor to arrange and pay for telephone, internet connection and photocopier in Departmental Representative's office for its exclusive use. Capacity of internet to be suitable for business applications.

.6 Contractor to equip office with two 1 m x 2 m tables, one 1 m x 2 m drafting table, 4 chairs, and one coat rack and shelf.

.7 Upon completion of the Contractor, all equipment and furniture provided by the Contractor shall be returned to it.

.8 Supply of the Departmental Representative's office, supplies and services will be incidental to the work.

.9 Contractor to provide laboratory space for the Departmental Representative at the aggregate crushing operation, laboratory to include the following:

.1 Ability to secure laboratory.

.2 Minimum laboratory trailer/space size is 3.0 m x 7.5 m.

.3 Contractor to supply continual access to clean water.

.4 One work desk and one chair.

.5 Contractor to supply continual access to electricity and lighting. Sufficient electricity and outlets to power two 120v/240v warming ovens, one 120v hot plate, one electronic scale, one 120v sieve shaker and three table fans simultaneously.

.6 Sink for washing samples.

.7 Secure storage for a nuclear density gauge.

.8 Minimum 1.0 m x 3.0 m work bench.

.10 Contractor to provide laboratory space for the Departmental Representative at the asphalt plant, laboratory to include the following:

.1 Ability to secure laboratory.

.2 Minimum laboratory trailer/space size is 3.0 m x 10.0 m.

.3 Contractor to supply continual access to clean water.

.4 One work desk and one chair.

.5 Contractor to supply continual access to electricity and lighting. Sufficient electricity and outlets to power one NCAT 240v ignition oven, two 120v/240v warming ovens, one 120v hot plate, one electronic scale, one 120v sieve shaker, one 120v vacuum pump and three table fans simultaneously.

.6 Sink for washing samples.

.7 Secure storage for a nuclear density gauge.

.8 Minimum 1.0 m x 5.0 m work bench.

1.4 MATERIAL STORAGE

.1 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

1.5 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

1.6 CONSTRUCTION SIGN AND NOTICES

.1 Upon request by Departmental Representative, erect a self-supporting project sign in location indicated.

.2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in size complete with required wood framing at 400 mm o.c and support posts.

.3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.

.4 Contractor or subcontractor advertisement signboards are not permitted on site.

.5 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321-96 (R2006).

.6 Maintenance and Disposal of Site Signs:

.1 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.7 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

.3 Clean dirt or mud tracked onto paved or surfaced roadways.

.4 Store materials resulting from demolition activities that are salvageable.

1.8 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Government of Canada Weights and Measures Act 1985.

.2 Government of Canada Weights and Measures Regulations 1990.

1.2 CERTIFICATION

.1 Prior to use, Contractor shall have weigh scales certified as meeting requirements of Statutes of Canada, Weights and Measures Act. Display certificate in a visible location.

1.3 OPERATION

.1 Contractor shall provide a weigher at scale location to issue tickets and prepare a daily summary sheet to submit to Departmental Representative. Tickets shall include information to identify the truck and registered weight along with tare, gross and net weights.

.1 Tickets shall not be issued to vehicles which exceed the vehicle's registered weight.

Part 2 Products

2.1 EQUIPMENT

.1 Weigh scales: of sufficient capacity to weigh loaded vehicles in a single operation. The weigh scale shall be calibrated in SI units.

.2 Scale house:

.1 To enclose mass indicator and where weigher can perform work and maintain records.

.2 Waterproof, one sliding window facing scale platform, one other window for cross ventilation, entrance door not to fact on to scale platform.

.3 Approved weigh tickets, in triplicate, with consecutive serial numbers shall be provided by Contractor.

Part 3 Execution

3.1 INSTALLATION

.1 Provide, install and maintain scales and scale house at location approved by Departmental Representative.

.2 Remove scales and scale house when no longer required and as directed by Departmental Representative. Level approach ramps.

.3 The work shall include installation of the anchorage assemblies.

3.2 MAINTENANCE

.1 Maintain scale platform and scale mechanism clean and free from gravel, asphalt, snow, ice and debris.

.2 Maintain approach ramps in good condition free from sags and ruts.

.3 Have scales re-tested and re-certified if requested by Departmental Representative.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations and open edges of structures, or as indicated in Contract Documents.

.2 Provide as required by governing authorities and as directed.

1.4 ACCESS TO SITE

.1 Provide and maintain access roads, ramps and construction runways as may be required for access to Work.

1.5 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent Traffic Control Persons, traffic control signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

.2 Contractor to provide automated temporary traffic control signals at all times during lane closures (24 hours a day, 7 days a week).

.3 One lane to remain open at all times during construction with concrete jersey barriers along edge of excavation and embankment.

1.6 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.8 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.5 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.9 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.10 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.11 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.2 QUALIFICATION OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Province of Prince Edward Island, acceptable to Departmental Representative.

.2 A qualified instrument person may be considered for approval if proof of a minimum of 10 years of experience is provided.

1.3 SURVEY REFERENCE POINTS

.1 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.2 The Contractor shall be satisfied, before commencing any Work, as to the meaning, intent and accuracy of any control points, control lines and benchmarks established by the Departmental Representative.

.1 Records of control point check surveys will contain all electronic survey files, reports and other relevant survey data showing closures.

.3 Should the Contractor discover or suspect any errors in any control points, control lines, benchmarks, and data provided by the Departmental Representative, the Contractor shall at once discontinue the affected work until such errors are investigated by the Departmental Representative and, if necessary, rectified.

.4 No separate payment will be made for layout work and the cost thereof will be considered incidental to the various items of work to be performed in the Contract.

.5 Make no changes or relocations without prior written notice to Departmental Representative.

.6 Report to Departmental Representative when reference point is lost, destroyed or requires relocation because of necessary changes in grades or locations.

.7 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

.1 The Contractor shall be responsible for establishing all secondary control points and/or lines, all slope stakes, the establishment of line and grades for subgrade and the various granular aggregate layers, layout by line and grade of all structures, culverts, and underground utilities, and shall perform all other layout and measurement necessary for the proper execution of the Contract.

.2 Secondary control point accuracy shall be:

.1 Minimum horizontal requirement is 3.0 cm ± 1:20,000 at a 95% confidence level.

.2 Minimum vertical requirement for a closed level loop is 0.008 times the square root of the distance leveled in kilometres.

.3 The staking of all works shall be of a sufficient accuracy and frequency for the Departmental Representative to carry out its quantity measurements and quality assurance program.

.4 On request of the Departmental Representative, the Contractor shall submit documentation to verify the accuracy of the layout work.

.5 Provide survey layout with stakes on both sides of the road/alignment at 20 metre station intervals (top of back slope, toe of slope, subgrade, granulars, shoulders, etc.) with centreline offset.

.6 Record elevation and location of all existing and installed end caps of abandoned underground services.

1.5 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

1.6 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of site works, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

1.7 SUBMITTALS

.1 Submit name and address of Surveyor to Departmental Representative.

.2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

1.8 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.3 Provide on-site containers for collection of waste materials and debris.

.4 Dispose of waste materials and debris off site.

.5 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.6 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Sweep and wash clean paved areas.

1.3 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING DURING CONSTRUCTION

.1 The Contractor shall ensure that adequate dust control is provided at all times during the Contract to avoid any hazardous situations and shall immediately implement any measures as directed by the Departmental Representative to control dust problems. Any damages or costs incurred as a result of excessive dust shall be paid for by the Contractor.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 43 – Environmental Procedures

.2 Section 02 41 13 – Selective Site Demolition

1.2 WASTE MANAGEMENT PLAN

.1 Prior to commencement of work, prepare Waste Management Work Plan.

.2 Work Plan to include:

.1 Waste audit;

.2 Waste reduction practices;

.3 Material source separation process;

.4 Procedures for sending recyclables to recycling facilities;

.5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site;

.6 Training and supervising workforce on waste management at site;

.7 Contaminated soil removal and disposal.

.3 Work Plan to incorporate waste management requirements specified herein and in other sections of the specifications.

.4 Develop Work Plan in collaboration with all sub-contractors to ensure all waste management issues and opportunities are addressed.

.5 Submit copy of Work Plan to Departmental Representative for review and approval.

.1 Make revisions to Plan as directed by Departmental Representative.

.6 Implement and manage all aspects of Waste Management Work Plan for duration of work.

.7 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.

1.3 WASTE AUDIT

.1 At project start-up, conduct waste audit of:

.1 Site conditions identifying salvageable and non-salvageable items and waste resulting from demolition and removal work.

.2 Projected waste resulting from product packaging and from material left over after installation work.

1.4 WASTE REDUCTION

.1 Based on waste audit, develop waste reduction program.

.2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.

.3 Identify materials and equipment to be:

.1 Protected and turned over to Departmental Representative when indicated;

.2 Salvaged for resale for Contractor;

.3 Sent to recycling facility;

.4 Sent to waste processing/landfill site for their recycling effort;

.5 Disposal of an approved landfill site.

.4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:

.1 Use of a central cutting area to allow for easy access to off-cuts;

.2 Use of off-cuts for blocking and bridging elsewhere;

.3 Use of effective and strategically placed facilities on each site for storage and staging of leftover or potentially cut materials (such as gypsum board, plywood, ceiling tiles, insulation, etc.) to allow for easy incorporation into work whenever possible, avoiding unnecessary waste.

1.5 MATERIAL SOURCE SEPARATION PROCESS

.1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at each site.

.2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.

.1 Use suitable containers for individual collection of items based on intended purpose;

.2 Locate to facilitate deposit, but without hindering traffic or other site operations;

.3 Clearly mark containers and stockpiles as to purpose and use.

.3 Perform demolition and removal of existing structure components and equipment following a systematic deconstruction process.

.1 Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:

.1 Reinstallation into the work where indicated;

.2 Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site;

.3 Sending as many items as possible to locally available recycling facility;

.4 Segregating remaining waste and debris into various individual waste categories for disposal in a “non-mixed state” as recommended by waste processing/landfill sites.

.4 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.

.5 Send leftover material resulting from installation work for recycling whenever possible.

.6 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course work are properly isolated, stored on site and disposed in accordance with applicable laws and regulations from authorities having jurisdiction.

.7 Isolate and store existing materials and equipment identified for re-incorporation into the work. Protect against damage.

1.6 WORKER TRAINING AND SUPERVISION

.1 Provide adequate training to workforce, through meetings and demonstrations, to emphasize purpose and worker responsibilities in carrying out the Waste Management Plan.

.2 Waste Management Coordinator: designate full-time person on site, experienced in waste management and having knowledge of the purpose and content of Waste Management Plan to:

.1 Oversee and supervise waste management during work;

.2 Provide instructions and directions to all workers and sub-contractors on waste reduction, source separation and disposal practices.

.3 Post a copy of the Plan in a prominent location on each site for review by workers.

1.7 CERTIFICATE OF MATERIAL DIVERSION

.1 Submit to Departmental Representative, copies of certified weigh bills from authorized waste processing sites and sale receipts from recycling/reuse facilities confirming receipt of construction materials and quantity of waste diverted from landfill.

.2 Submit data at pre-determined project milestones as determined by Departmental Representative.

.3 Compare actual quantities diverted from landfill with projections made during waste audit.

1.8 DISPOSAL REQUIREMENTS

.1 Burying or burning of rubbish and waste materials is prohibited.

.2 Disposal of waste, volatile materials, mineral spirits, oil, paint, paint thinner or unused preservative material into waterways, storm, or sanitary sewers is prohibited.

.3 Do not dispose of preservative treated wood through incineration.

.4 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.5 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.

.6 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

.7 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with Provincial and Municipal regulations.

.8 Transport waste intended for landfill in separated condition, following rules and recommendations of landfill operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.

.9 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.

.10 Sale of salvaged items by Contractor to other parties not permitted on site.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative's inspection.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Certificates required by jurisdictional authorities have been submitted.

.4 Work is complete and ready for Final Inspection.

.3 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

1.2 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment, but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative, one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.3 RECORD DRAWINGS

.1 Departmental Representative will provide two sets of white prints for record drawing purposes.

.2 Maintain project record drawings and record accurately deviations from Contract documents.

.3 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to the Departmental Representative.

.4 Record following information:

- .1 Field changes of dimension, detail and elevation.
- .2 Changes made by Change Order or Field Order.
- .3 Other significant deviations which are concealed in construction and cannot be identified by visual inspection

.5 At completion of project and prior to final inspection, neatly transfer "as-recorded" records to second set of white prints using fine, red marker. Neatly print lettering and numbers in size to match original. Lines may be drawn freehand but shall be neat and accurate. Add at each drawing title block note: "AS-RECORDED". Also, circle on List of Drawings each title and number of drawing marked with "as-recorded" records.

.6 Submit this set of "as-recorded" drawings to Departmental Representative.

.7 At the completion of construction the Contractor shall complete a topographic as-recorded survey of the project areas and submit the survey data in an acceptable form to the Departmental Representative.

.8 If project is completed without significant deviations from contract drawings, declare this in writing and submit to Departmental Representative in lieu of record drawings.

.9 The Departmental Representative will review the progress of the record drawings as part of each payment certificate authorization. Should the drawings not be properly updated, payment will be withheld for each payment certificate until the work is completed to the satisfaction of the Departmental Representative.

.10 Provide digital photos, if requested, for site records.

.11 Contract Drawings and shop drawings: mark each item to record actual construction, including:

- .1 Measured depths of elements of foundation in relation to finish road elevation.
- .2 Measured horizontal and vertical locations of underground utilities, guiderail and appurtenances, referenced to permanent surface improvements.
- .3 Field changes of dimension and detail.
- .4 Changes made by change orders.
- .5 Details not on original Contract Drawings.
- .6 References to related shop drawings and modifications.

1.4 FINAL SURVEY

.1 Submit final site survey plan and site survey certificate, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.5 MEASUREMENT FOR PAYMENT

.1 The work for this Section will not be measured for payment but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 REFERENCES

.1 Definitions:

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or environment if handled improperly.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.

.2 Scheduling: meet project timelines without compromising specified minimum rates of material diversion.

.1 Notify Departmental Representative when unforeseen delays occur.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures.

.2 Storage and Protection.

.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

1.7 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Do not dispose of waste or volatile materials including but not limited to, mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by Departmental Representative.

.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

.2 Existing Conditions.

.1 Remove contaminated or hazardous materials as defined by authorities having jurisdiction from site, prior to start of demolition Work, and dispose of in safe manner in accordance with applicable regulatory requirements.

Part 2 Products

2.1 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.4 Culverts, pipe sewers, drains and catch basins removed shall become property of the Contractor and shall be disposed of outside the work site.

.5 Backfill:

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 REMOVAL OF EXISTING ARMOURSTONE

.1 Existing sandstone at Covehead Bridge area to be removed and used at Dalvay Beach area.

.2 Shape existing armourstone base to accommodate existing.

.3 Excavate for toe-in of rock material.

.4 Prevent debris from going adrift.

.5 All damage to existing armourstone, roadway and other structures not specified for removal to be repaired at the Contractor's expense.

.6 Disposal of materials not designated for salvage or re-use in work will be the Contractor's responsibility and must be disposed of off site.

3.5 REMOVAL OF GUIDE RAIL

.1 Guide rail, offset blocks, hardware and delineators shall be dismantled to individual components.

.2 The dismantling and removal shall be carried out in a manner so as to avoid damage to the adjacent and surrounding roadway.

.1 The Contractor shall be responsible, at their own expense, to repair any such damage resulting from the work.

.3 Dismantled posts, hardware and delineators shall become property of the Contractor and shall be disposed of outside the work site. Guiderail sections to be salvaged for reuse.

.4 The Contractor shall organize the work such that the removal and reinstatement of any length of guide rail section is completed in the same day.

3.6 REMOVAL OF GUIDEPOSTS

.1 The removal shall be carried out in a manner so as to avoid damage to the adjacent and surrounding roadway.

.1 The Contractor shall be responsible, at their own expense, to repair any such damage resulting from the work.

.2 All materials shall become property of the Contractor and shall be disposed of outside the work site.

.3 The Contractor shall be responsible to completely backfill the hole resulting from the guidepost removal with compacted Class A gravel, compact during placement and shall finish the backfilled area to match the surrounding grade.

.1 The Contractor shall fill and compact all holes left from post removal with before nightfall.

.4 The Contractor shall shape and grade the shoulder by removing excess materials that have accumulated over time and shall leave the work site in a uniform and consistent grade matching the adjacent surface.

3.7 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.8 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

3.9 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.10 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.11 PROTECTION

.1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 EQUIPMENT

.1 The cold milling and asphalt removal equipment shall be automatically controlled for grade and slope during the asphalt concrete removal operation. The surface remaining after cold milling shall have a constant and continuous cross fall matching the intended surface course cross fall and shall have an even texture free of grooves and/or ridges in all directions.

.2 Saw-cutting equipment capable of creating smooth face.

Part 3 Execution

3.1 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative, areas, depths and lines of asphalt pavement to be removed.

.2 Protection: protect existing pavement not designated for removal, signs, guiderail and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.2 REMOVAL OF ASPHALT CONCRETE

.1 The Contractor shall advise the Departmental Representative at least 48 hours in advance of carrying out the cold milling operation.

.2 The cold milling operation shall be carried out in such a manner as to maintain an uninterrupted flow of traffic at all times.

.3 Remove existing asphalt pavement to lines and grades as indicated.

.4 The cold milling equipment shall be automatically controlled for grade and slope during the asphalt concrete removal operation.

.1 When existing pavement has been removed in advance of paving the joint area, the Contractor shall construct a smooth taper at the joint area to a slope of at least 50 horizontal to 1 vertical (50H:1V). The taper may be placed on tar paper and shall be removed just prior to paving the keyed area or as directed by the

Departmental Representative. The transverse joint shall be straight and have a vertical face when the taper is removed.

.2 The lanes shall be completed to the same location at the end of the day's cold milling.

.5 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.6 The Contractor shall take care in full depth removal not to contaminate the reclaimed asphalt pavement with the underlying aggregate materials or other materials.

.7 Suppress dust generated by removal process.

.8 The Contractor shall provide for the drainage of water from the cold milled surfaces as determined by the Departmental Representative.

.9 The surface remaining after cold milling shall have a constant and continuous cross fall matching the intended surface course cross fall and shall have an even texture free of grooves and/or ridges in all directions.

.10 The Contractor shall continuously maintain the Work Site free of potholes and standing water and in a condition providing for the safe and efficient flow of traffic, from the time of removal, until such time as the new asphalt pavement is placed.

.1 Hot mixed asphalt pavement shall be placed in the potholes; cold mix or reclaimed asphalt pavement are acceptable only as a temporary repair.

.11 Proper stockpiling procedures shall be used and care taken not to contaminate or consolidate the reclaimed asphalt pavement stockpile.

.12 If the contract documents specify that the reclaimed asphalt pavement is to be used in a hot recycled asphalt mix, the reclaimed asphalt pavement shall be weighed prior to placement in the stockpile.

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 Immediately following the cold milling operation and prior to the traffic being allowed on the cold planed surface, the Contractor shall sweep the surface and remove any bonded asphalt concrete material left by the cold planning machine.

.1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

.2 All loose material remaining after cold milling shall be swept to a granular shoulder or picked up from paved shoulders, gutters or from under guide rail before reopening the work area to traffic.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

1.2 SOURCE APPROVAL

.1 Source of materials to be incorporated into work or stockpiled requires acceptance.

.2 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.

.3 If, in opinion of Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements.

.4 Should a change of material source be proposed during work, advise Departmental Representative at least 4 weeks in advance of proposed change to allow sampling and testing.

.5 Acceptance of material at source does not preclude future rejection if it subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.

1.3 PRODUCTION SAMPLING

.1 Aggregate will be subject to continual sampling during production.

.2 Provide Departmental Representative with ready access to source and processed material for purpose of sampling and testing.

1.4 MEASUREMENT FOR PAYMENT

.1 This item will not be measured separately.

Part 2 Products

2.1 MATERIALS

.1 Aggregate Quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or mineral or other substances.

.2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.

.3 Fine aggregates satisfying requirements of applicable section shall be on or 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 shall be one of the following:

.1 Crushed rock and slag.

.2 Gravel composed of naturally formed particles of stone.

Part 3 Execution

3.1 DEVELOPMENT OF AGGREGATE SOURCE

.1 Prior to excavating materials for aggregate production, clear and grub are to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by the Departmental Representative.

.2 Clear, grub and strip an area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.3 When operating in stratified deposits, use excavation equipment and methods that will produce a uniform, homogeneous aggregate.

.4 When execution is completed, 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 a neat condition.

3.2 PROCESSING

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregate if required to obtain gradation requirements specified. Use approved methods.

.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 specification. Use only equipment accepted by Departmental Representative.

3.3 HANDLING

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

3.4 STOCKPILING

.1 Stockpiling aggregates on stabilized, clean and well drained surfaces.

.2 To ensure that no material other than stockpile aggregate is used, do not incorporate bottom 250 mm of stockpile into work if aggregates are stockpiled on ground.

.3 Stockpile far enough apart to prevent intermixing.

.4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed within 48 hours of rejection.

.5 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1 m for coarse aggregate and base course materials.

.2 Max 2 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.6 Complete each layer over entire stockpile area before beginning next layer.

.7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build-up stockpile as specified.

.8 Coning of piles or spilling of materials over edges of pile will not be permitted.

.9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 41 13 – Selective Site Demolition

.2 Section 32 11 16.01 – Granular Sub-Base

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.5 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000, Cementitious Materials Compendium.

.2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete**.**

1.3 REQUIRED WORK

.1 Work under this Section generally includes the following:

.1 Armourstone/Rip Rap:

.1 Required excavation to required grade for installation of new filterstone and armourstone, including toe-in at end of armourstone.

.2 Shaping of existing material to proper grade for placement of new filterstone and armourstone.

.3 Placement of sand over armourstone as indicated on the Plans. Sand to be placed over all armourstone at Dalvay Beach.

.4 Redepositing unused sand along beach as indicated on the Plans.

1.4 DEFINITIONS

.1 Excavation classes: three (3) classes of excavation will be recognized; common, rock and channel excavation.

.1 Common Excavation: excavation of materials of whatever nature, other than rock excavation, including those unsuitable for use in work or surplus to requirements.

.2 Rock excavation: excavation of solid rock materials, including naturally occurring boulders that are one (1) cubic meter or larger in volume, from the project area to provide required road grades which cannot be removed by conventional excavation equipment.

.3 Channel Excavation: excavation and placing of material excavated for improvement of existing watercourses and watercourse channel realignments.

.2 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.

.5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.6 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 C136: Sieve sizes to CAN/CGSB-8.2.

.2 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.7 Unshrinkable backfill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 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 clearance record from utility authority, as required.

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform Departmental Representative at least 2 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.4 Prior to beginning excavation Work, notify utility companies to establish location and state of use of buried utilities and structures. Utility companies to clearly mark such locations to prevent disturbance during Work.

.5 Confirm locations of buried utilities by careful test excavations.

.6 Maintain and protect from damage, water, electric, telephone and other utilities and structures encountered.

.7 Where utility lines or structures exist in area of excavation, the Contractor must obtain a clearance report from the utility before starting work. Any costs for such Work are considered incidental and will not be paid for.

.8 Record location of maintained, re-routed and abandoned underground lines.

.9 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, fencing, service poles, wires, pavement, mailboxes, light standards, survey benchmarks and monuments and other similar items 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.

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

1.7 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Backfill:

.1 Premium Borrow as per Section 32 11 16.01 – Granular Sub-base.

.2 Class “A” Gravel:

.1 As per Section 401 of PEI Standard Specifications

.3 Reuse of Materials:

.1 Sand:

.1 Excavated sand material can be salvaged and reused as redeposited sand material to be placed over the armourstone as indicated on the Plans. Any unused material shall be spread onto the beach, within the dry, in the tidal zone area.

.2 Sand from a dredge containment cell in North Lake, PEI will be hauled to site by the contractor for use at Dalvay Beach. The contractor is to ensure the sand will not be contaminated with other native material during loading and hauling to site. Sand shall be clean and free of deleterious material.

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 and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control plan, specific to site, whichever is more stringent.

.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 neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 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.

.5 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from moisture and contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and applicable local regulations.

.2 Obtain permit from authority having jurisdiction for temporary diversion of watercourse.

.3 Construct temporary Works to depths, heights and locations as indicated or directed by Departmental Representative.

.4 During backfill operation:

.1 Unless otherwise indicated or directed by 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 and restore watercourses as directed by Departmental Representative.

3.6 DEWATERING AND HEAVE PROTECTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative's approval 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 accordance with Section 01 35 43 - Environmental Procedures and 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, or other treatment 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 for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as specified or shown on the Drawings.

.3 Remove paving and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.4 Excavation must not interfere with bearing capacity of adjacent foundations.

.5 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.

.6 Trenches for piping, conduit, and related excavations shall be of sufficient width and depth at all points to allow pipes to be laid, joints to be formed, and appurtenant structures to be built in a workmanlike manner, and when needed, to allow for sheeting and shoring, pumping, draining, and for removing and replacing all materials unsuitable for foundations.

.7 Excavate trenches so pipe can be laid to the alignment and depth required. Unless otherwise authorized by Departmental Representative in writing, excavation length to be not more than pipe length that can be laid and backfilled in one day. Brace and drain trench so workers may work safely and efficiently.

.8 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.9 Restrict vehicle operations directly adjacent to open trenches.

.10 Dispose of surplus and unsuitable excavated material off site.

.11 Do not obstruct flow of surface drainage or natural watercourses.

.12 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.13 Notify Departmental Representative when bottom of excavation is reached.

.14 Obtain Departmental Representative approval of completed excavation.

.15 Found excavated surfaces on solid undisturbed ground. If the excavated surface is unsuitable, the Departmental Representative will determine what work is required to secure a proper foundation. If such work is due solely to the nature of the ground, then the Departmental Representative will measure the work, but if such work is due to any act or default of the Contractor in carrying out of the Works, resulting in disturbance of natural ground conditions, then the Contractor shall execute such work at no additional cost to the Contract.

.16 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.17 Correct unauthorized over-excavation with approved select backfill compacted to minimum of 95% of the maximum dry density in accordance with ASTM D698.

.18 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.

3.8 FILL TYPE AND COMPACTION

.1 Use types of fill as indicated, and compacted in accordance with the requirements stated elsewhere in this specification.

3.9 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 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.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.

.2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

.5 Backfill trench from top of bedding to top of subgrade with layers of approved material.

.6 Place backfill in 150 mm layers and compacted to a minimum of 95% of the maximum dry density in accordance with ASTM D698. Thoroughly compact each layer before placing next layer.

.7 During backfilling, keep trenches free of water at all times and controlled so as to prevent surface water running into excavated areas. Remove silty materials, which become wetted and subsequently liquid or extremely plastic.

.8 Place unshrinkable backfill in areas as indicated. Consolidate and level unshrinkable backfill with internal vibrators.

.9 Install filter system in backfill as indicated as directed by Departmental Representative.

3.10 SAND PLACEMENT

.1 Contractor to load, haul and place beach sand from a containment cell at North Lake, PEI to Dalvay Beach.

.2 Sand to be placed at locations shown on the plan and as directed on site by the Departmental Representative.

.3 Sand to be placed within voids of R-500 rock berm.

.4 Install sand fencing parallel to the back of the rock berm. Install sand fencing on the berm as directed by the Departmental Representative.

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil as directed by Departmental Representative.

.3 Reinstate pavements 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 backfill for initial 24 hours.

.6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

.7 Dispose of surplus material off-site, unless otherwise directed by the Project Documents.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 32 11 16.01 – Granular Sub-base

.2 Section 32 11 23 – Aggregate Base Courses

1.2 REFERENCES

.1 Definitions:

.1 Rock: insitu bedrock, and naturally occurring boulders that are 1 m^3 or larger in volume. Frozen material will not be classified as rock.

.2 Common material: excavated soil which is not rock, unsuitable or topsoil.

.3 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.

.4 Borrow Material: material obtained from areas off of Parks Canada property and required for construction of embankments or for other portions of work.

.5 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.6 Unsuitable material: all material which is not suitable for use in work and must be disposed of as directed by the Departmental Representative.

.7 Surplus material: excavated material not required for re-use.

.8 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

.2 Reference Standards:

.1 ASTM International

.1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3 (600kN-m/m^3).

.2 Prince Edward Island Department of Transportation and Energy – General Provisions and Contract Specifications for Highway Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 MATERIALS

.1 Embankment materials require approval by Departmental Representative.

.2 Borrow Material – in accordance with Section 32 11 16.01 – Granular Sub-base.

.3 Aggregate Base – in accordance with Section 32 11 23 – Aggregate Base Courses.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that condition of substrate is acceptable for roadway embankment Work:

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 COMPACTION EQUIPMENT

.1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.

.1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.

.2 Replace or supplement equipment that does not achieve specified densities.

.2 Operate compaction equipment continuously in each embankment when placing material.

3.3 WATER DISTRIBUTORS

.1 Apply water with equipment capable of uniform distribution.

3.4 PREPARATION

.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 and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction, whichever is more stringent.

.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.

.2 Protection of in-place conditions:

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.

.4 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.

.5 Protect buried services that are required to remain undisturbed.

3.5 EXCAVATING

.1 Notify Departmental Representative when waste materials are encountered and remove to depth and extent directed.

.2 Excavate all types of materials to lines and elevations indicated and as necessary for construction.

.3 Notify Departmental Representative if in doubt as to definition of material.

.4 Select method of excavation, support, and dewatering unless otherwise indicated or directed. Protect property and structures from damage.

.5 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial regulations whichever is more stringent.

.6 Where Subgrade requires undercutting, sub-excavation shall be carried out to the specified depth below subgrade on a plane parallel to the Subgrade cross-slope.

.7 Excavate as required to carry out work.

.1 Do not disturb soil or rock below bearing surfaces.

.2 Notify Departmental Representative when excavations are complete.

.3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.

.8 Drainage:

.1 Maintain profiles, crowns and cross slopes to provide good surface drainage.

.2 Provide ditches as work progresses to provide drainage.

.3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.

.9 Handle materials in a manner that will not endanger the public, personnel, property or the work. Do not reduce sight distances or obstruct roadways or utilities. Do not obstruct flow of surface drainage or natural watercourses

.10 Hauling of common excavation over Aggregate Base Courses shall not be permitted, unless authorized.

.11 The Contractor shall shape ditches to the lines and grades specified, and any grade conditions that would cause water to pond shall be removed.

.12 Take care to protect granular material from the elements.

.13 Prior to the placement of any fill, the exposed subgrade surface must be allowed to dry and shall be proof rolled and compacted. The subgrade preparation should occur during dry weather. The Contractor is expected to work the fill materials including scarifying and drying as required to achieve a moisture content sufficient to achieve the specified minimum compaction.

.14 All excavated materials shall become property of the Contractor and shall be disposed of outside the work site.

.15 Obtain appropriate permits and written approval of Departmental Representative before proceeding with blasting.

.16 Borrow Excavation:

.1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.

3.6 DEWATERING

.1 Keep bottom of excavation free of water by draining or pumping.

.2 Dewater excavation in a manner which will not endanger stability of the work.

.3 Dispose of water from excavation in a manner that is not injurious to property, public health or any operation of the work. Prevent water pumped out of an excavation from entering a watercourse or wetland. Discharge from pumped water shall be in a well vegetated area in excess of 30 metres from a watercourse or wetland.

.4 Take precautions to prevent uplift of pipe or structures.

3.7 EMBANKMENTS

.1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.

.1 Method used to be to be pre-approved in writing by Departmental Representative.

.2 Break up or scarify existing road surface prior to placing embankment material.

.3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized by Departmental Representative.

.4 Maintain crowned surface during construction to ensure ready run-off of surface water.

.5 Drain low areas before placing materials.

.1 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

.6 Where material consists of rock:

.1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.

.2 Distribute rock material to fill voids with smaller fragments to form compact mass.

.3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.

.4 Do not place boulders and rock fragments with dimensions exceeding 200 mm within 300 mm of subgrade elevation.

.7 Deductions from excavation will be made for overbuild of embankments.

3.8 COMPACTION

.1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

.2 Deposit, spread, and level, embankment material in layers 200 mm maximum thickness before compaction.

.1 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.

.2 Ensure required compaction for each layer before placing any material for next layer.

.3 Use specialized compaction equipment supplemented by routing, hauling, and leveling equipment over each layer of fill.

.4 Maximum lift of material for compaction is 300 mm.

.5 Obtain written approval from Departmental Representative before using specialized compaction equipment such as tamping rollers, vibratory rollers, or other alternate compaction equipment that produces the required results.

.6 Compact each layer to 100% Standard Proctor Maximum Dry Density.

.7 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.9 FINISHING

.1 Finished subgrade surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

.2 Finish slopes and ditch bottoms true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.

.3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

.4 Hand finish slopes that cannot be finished satisfactorily by machine.

.5 Round top of backslope 1.5 m both sides of top of slope.

.6 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.

.7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.10 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.

3.11 PROTECTION

.1 Maintain finished surfaces in condition conforming to this section until acceptance by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 ASTM International

- .1 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .2 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .3 ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- .4 ASTM D4716, 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, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .6 ASTM D5261, Standard Test Method for Measuring Mass per Unit Area of Geotextiles

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-4.2 No. 11.2-M89, Textile Test Methods - Bursting Strength - Ball Burst Test.
- .2 CAN/CGSB-148.1, Method of Testing Geosynthetics
  - .1 No.2, Methods of Testing Geosynthetics - Mass per Unit Area.
  - .2 No.3, Methods of Testing Geosynthetics - Thickness of Geotextiles.
  - .3 No.6.1, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
  - .4 No.7.3, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
  - .5 No. 10, 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 Samples:

.1 Submit following samples 2 weeks prior to beginning Work.

.1 Minimum length of 1 m of roll width of geotextile.

.2 Methods of joining.

.4 Test and Evaluation Reports:

.1 Submit copies of mill test data and certificate at least 2 weeks prior to start of Work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect geotextiles from direct sunlight and UV rays.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIAL

.1 Geotextile: synthetic fibre fabric, supplied in rolls.

.1 Width: 4.5 m minimum.

.2 Composed of minimum 85% by mass of polypropylene and resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

.2 The plastic yarn of the geotextile and the threads used in sewing operations shall consist of a long chain synthetic polymer composed of at least 85% by mass of propylene, ethylene, ester, amide or vinylidene-chloride, and shall contain stabilizers or inhibitors added to the base plastic to make the filaments resistant to deterioration by ultraviolet and heat exposure.

.3 Thread for the seams shall be equal to or better than the geotextile in resistance to chemical and biological degradation and both factory and field sewn or sealed seams shall have a grab tensile strength equal to 90% of that of the geotextile.

2.2 WOVEN GEOTEXTILES

.1 Physical properties:

.1 Grab tensile strength and elongation: to CAN/CGSB-148.1, No. 7.3.

.1 Breaking force: minimum 1100 N, wet condition.

.2 Elongation at break: maximum 50-100%.

.2 Mullen burst strength: to CAN/CGSB-4.2, No. 11.2, minimum 3.0 MPa, wet condition.

.3 Bursting strength: use values specified in CAN/CGSB-148.1, No. 6.1, wet condition.

.4 UV Stability: 70% @ 500h

.2 Hydraulic properties:

.1 Apparent opening size (AOS): to ASTM D4751, 50 μm (minimum) 150 μm (maximum).

.2 Filtration opening size (FOS) to CAN/CGSB-148.1 No.10.

.3 Hydraulic Conductivity, 0.01 cm/sec.

.4 Permeability: to CAN/CGSB-4.2 No. 11.1-9.

.3 The geotextile is to be Terrafix 600R or approved equal.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Owner’s Representative.

.2 Inform Owner’s Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Owner’s Representative.

3.2 INSTALLATION

.1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with sandbags.

.2 The areas to be covered with geotextile shall be prepared by shaping the ground to present a uniform and regular surface free from bumps and depressions.

.1 Geotextile shall not be placed on stumps, brush, limbs, ice or other material that may tear or puncture the fabric.

.2 The geotextile shall be placed so as to create a surface that is 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 The manufacturer's installation procedures shall be the standard of installation that shall be applied except as follows:

.1 Where more than one width of fabric is used, the fabric shall be joined by sewing or by an overlap of at least 600 mm and all overlap joints shall be securely held in place.

.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 hours of placement.

.7 The Contractor shall immediately repair damaged geotextile to approval of Owner's Representative.

.1 The damaged area shall be covered with a patch of the same fabric type extending a minimum of one metre beyond the perimeter of the damaged area.

.8 Place and compact soil layers in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfill.

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 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 01 74 21 – Construction/Demolition, Waste Management and Disposal

.2 Section 31 05 17 – Aggregates - General

1.2 MEASUREMENT AND PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM):

.1 ASTM C127-07, Test Method for Material Finer than 75 μm Sieve in Mineral Aggregate by Washing.

.2 ASTM C131-06, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition, Waste Management and Disposal.

1.5 SOURCE APPROVAL

.1 Source(s) of all stone materials to be incorporated into the work requires the approval of the Departmental Representative.

.2 Inform the Departmental Representative of proposed source(s) of materials and submit stone quality test results at least one (1) week prior to shipping material to site.

.3 Individually select armour stone at the source and mark for delivery to the site.

.4 Acceptance of material at the source does not preclude future rejection at the site if it fails to conform to the requirements specified.

1.6 STONE MATERIALS QC/QA PROGRAM

.1 Quality Control (QC) Program:

.1 Establish and maintain, Quality Control for all stone production, hauling and placement under this contract to assure compliance with the specifications.

.2 Exercise care in loading, hauling, unloading and placing of stone during all phases of construction to prevent cracking and splitting that would otherwise lead to rejection at the job site.

.3 Maintaining a daily log, compiled in tabular format, presented in a clear and legible fashion indicating the following as a minimum:

.1 Quantity of stone produced to date for each stone type.

.2 Quantity of stone shipped to date for each stone type.

.3 Loading trucks with stone from one classification only.

.4 Maintaining separate stockpiles of stone materials by stone classification. Stone may only be shipped to the site from stockpiled materials.

.5 Visually inspecting all armour stone for blast fractures, size and quality factors to verify that stone meets the quality requirements of this section.

.6 Conducting stone gradations and quality/durability tests and making appropriate production modifications on each stone classification as required to verify that they meet the gradation and geometric requirements of this section.

.2 Quality Assurance (QA) activities:

.1 Quality Assurance activities will be performed jointly by the Contractor and the Departmental Representative. These activities are intended to provide independent observations of conformance to the requirements of this section prior to shipment of the stone to the site and in no way relieves the Contractor of their responsibilities for Quality Control (QC) and in-place requirements.

.3 The Departmental Representative may also perform Quality Assurance (QA) activities at the project site.

1.7 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 STONE QUALITY

.1 General:

.1 Stone to be dense, hard, sound, close-grained, durable rock, free of overburden material and resistant to weathering and disintegration under freezing/thawing and wetting/drying conditions and be of a quality to ensure permanence of the structure in the climate in which it is to be used.

.2 All stone must be free from detrimental cracks, must have minimal visible fine bedding seams and other defects that tend to increase deterioration from natural causes or cause breakage in handling and/or placing. Stone with high argillaceous or shale content is more susceptible to weathering, abrasion, thin bedding, close fracturing and other undesirable rock properties and will not be accepted.

.3 Stone to be free from damage as a result of blasting during production. Blast damage is a significant cause of rejection of stone. Blast cracks that have the potential of causing more than 20% loss of weight of an individual stone, if the crack opens in service, are not acceptable. Stones with minor cracking may be reworked at the Contractor’s option, with cracked portions being removed by jacking or other suitable method. The remaining stone, if within the gradation limits, may be re-evaluated for acceptance.

2.2 MATERIALS

.1 Filterstone:

.1 Clear, hard, durable, angular, crushed, quarried rock aggregate free from silt, clay, lumps, organic matter, foreign substance and free from splits, seams, or defects.

.2 Specific gravity not less than 2.60 when tested to ASTM C127.

.3 Absorption not more than 2% when tested to ASTM C127.

.4 The rock material, if subjected to the Micro-Deval Test (CSA A23.2), shall have a loss not greater than 20%.

.6 When tested for soundness, five cycles of magnesium sulphate (ASTM C88), the rock material shall have a loss of not greater than 15%.

.7 Rock, when tested by the Free/Thaw Test method in accordance with MTOLS-614, shall have a loss not greater than 15%.

.8 Filterstone to be R-5 or R-25rip rap as per Section 213 of PEI Transportation and Infrastructure Standard Specifications.

.2 Armourstone:

.1 Clear, hard, durable, angular, crushed quarried rock aggregate free from silt, clay, lumps, organic matter, foreign substance and free from splits, seams or defects.

.2 Specific gravity not less than 2.65 when tested to ASTM C127.

.3 Absorption not more than 2% when tested to ASTM C127.

.4 The rock material, if subjected to the Los Angeles Abrasion Test (ASTM C131), shall have a loss not greater than 35%.

.5 The rock material, if subjected to the Micro-Deval Test (CSA A23.2), shall have a loss not greater than 20%.

.6 When tested for soundness, five cycles of magnesium sulphate (ASTM C88), the rock material shall have a loss of not greater than 15%.

.7 Rock, when tested by the Freeze/Thaw Test Method in accordance with MTOLS-614, shall have a loss not greater than 15%.

.8 Armourstone to be R-500 rip rap as per Section 213 of PEI Transportation and Infrastructure Specifications.

.3 Sandstone to be 1-2T in size, have a minimum specific gravity of 2.0 and a compressive strength of 40 MPa.

Part 3 Execution

3.1 PLACING

.1 Where Rip Rap is placed on slopes, excavate trench at toe of slope to dimensions as indicated.

.2 Fine grade area to be armored to 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 The Rip Rap shall be placed to the lines and grades shown on the drawings or as directed by the Departmental Representative. Placement shall be by machine in order to avoid waste and to ensure that the stone is in a stable position.

3.2 FILTERSTONE

.1 Place filter material to lines, grades and dimensions indicated on the plan.

.2 Place material on clean bottom to specified grades, and after the removal of kelp, debris, snow, ice, etc.

.3 Execute work in such a manner to protect filter material from storm wave action or tidal erosion damage. Replacement of material lost due to storm or erosion damage will be the responsibility of the Contractor.

.4 Do not extend corestone material for breakwater more than 10 meters beyond filterstone protection.

.5 Grades, lines, dimensions, slope and quantity of core to be reviewed and approved by the Departmental Representative before proceeding with overlaying armourstone.

3.3 ARMOURSTONE

.1 Place armourstone layer material to lines, grades and dimensions indicated on the plans.

.2 Place armourstone layer material in two layers as shown on plans.

.3 Place each armourstone individually using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump filter units into place. Commence placement at toe of slope and proceed up the slope towards the crest. Place each armourstone so that it is stable, secure on slope and supported by units below. Control placement of armourstone so as to produce a uniform and continuous cover over the underlying layer.

.4 Replace armourstone units broken or damaged during placement. Damaged units to be removed from the work and will not be paid for.

.5 Grades, lines, dimensions, slopes and quantity of armourstone to be reviewed and approved by Departmental Representative before proceeding with the overlying armour layer.

3.4 TOLERANCES

.1 Completed component layers to be within the following tolerances of lines and grades as indicated:

.1 Core: +/- 50 mm

.2 Armourstone: +/- 150 mm

3.5 CROSS SECTIONS

.1 During construction, the Contractor shall submit cross section sheets to the Departmental Representative showing the following:

.1 Cross sections at stations every 10 meters along the slope.

.2 The design cross section showing proposed filter and armourstone in solid lines.

.3 Superimposed in dashed lines elevations taken at 2 meter intervals perpendicular to the centerline and at top and toe of slopes showing filterstone and armourstone as constructed surfaces.

.4 Cross sections to be referenced to B/3 with stations shown for reference.

.5 Cross sections to be submitted as work at each station is completed for each class of stone. Next layer not to be placed until Departmental Representative or his representative has reviewed and approved the as-built elevations for underlying layer.

3.6 PROTECTION

.1 Take into account anticipated weather conditions and degree of exposure of site and tidal conditions in setting requirements for protection.

.2 Schedule and carry out construction so that each phase of work is not left exposed longer than necessary.

.3 Progress of placement of core and stone to be recorded daily by Departmental Representative's inspector with Contractor's concurrence. Replacement of material lost due to storm wave action or tidal erosion damage to be based on daily journal of work progress and to be considered incidental to the work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling

.2 Section 31 24 13 – Roadway Embankments

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3).

.5 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m^3).

.6 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.7 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire Inch Series.

.2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.4 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Granular sub-base: material in accordance with the following requirements:

.1 Premium Borrow:

.1 Composed of clean, uncoated particles free from lumps of clay and other deleterious materials.

.2 No more than 15% shall pass the number 75µm sieve and no materials shall be retained on a 100mm sieve.

.3 That portion of premium borrow material passing a 4.75mm sieve shall have a maximum of 20 percent finer than 75µm as tested when delivered to site.

.4 The percent by mass passing the 12.5mm sieve shall not exceed 75%.

.5 All premium borrow is to contain a sufficient amount of gravel sizes following placement/compaction to ensure stable conditions.

Part 3 Execution

3.1 SEQUENCE OF OPERATION

.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, free from snow and ice.

.5 Begin spreading base material on crown line or on high side of one-way slope.

.6 Place material using methods which do not lead to segregation or degradation of aggregate.

.7 For spreading and shaping material, use spreader boxed having adjustable templates or screeds which will place material in uniform layers of required thickness.

.8 Place material to full width in uniform layers not exceeding 200mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.10 Remove and replace that portion of layer in which material becomes segregated during spreading.

.2 Compaction Equipment:

.1 Compaction equipment to be capable of obtaining required material densities.

.3 Compacting:

.1 Compact to density not less than 100% Standard Proctor Maximum Density in accordance with ASTM D698.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.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.

.4 Prior to placing select borrow, carry out a "Proof Roll" test on subgrade material. The proof roll test shall consist of the following and shall be taken in the presence of the Departmental Representative and the Contractor's materials testing firm experienced with this type of test.

.1 Prepare a fully loaded tandem truck.

.2 Drive truck along the entire driveway, parking lot and all areas to be paved with asphalt materials, in a longitudinal manner. Cover the entire area with no more than 2.0 meters between each line of wheel tracks.

.3 Observe deflection on subgrade in a continuous manner. If deflection at any location is greater than 5mm or if excessive cracking occurs, obtain direction from Engineer. At a minimum, excavate a further 300 mm and place Premium Borrow.

.4 Excavate to a lower elevation at locations as identified by the Engineer. All excavations shall be tapered from original grade at a 5 horizontal to 1 vertical ratio.

.5 Placement of premium borrow in 150mm thick lifts unless directed otherwise by the Engineer. Compact to a 100 percent Standard Proctor Maximum Dry Density.

.6 Shape and roll alternately to obtain a smooth, even and uniform compacted layer.

.7 The shaping and compaction operation shall continue until the surface conforms to the specified requirements and shall be repeated as required to maintain the surface until it is covered by gravel material.

.8 Confirm all premium borrow material has been placed to required lines and grades prior to placing Class "A" gravel.

.9 If truck traffic is utilizing areas where premium borrow and select borrow has been placed, excavate the top 10mm of material to remove potentially contaminated material. Replace and regrade as required.

3.2 SITE TOLERANCES

.1 Finished base surface to be within plus or minus 5mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

3.4 QUALITY CONTROL

.1 Contractor to retain services of independent materials testing firm to carry out necessary testing.

.2 Contractor to retain services of PEI Land Surveyor for layout and grade certification.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 41 13.14 – Asphalt Paving Removal

.2 Section 31 24 13 – Roadway Embankments

.3 Section 32 11 16.01 – Granular Sub-base

1.2 REFERENCES

.1 ASTM International

.1 ASTM C117, Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.3 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.4 ASTM C136, 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/ft^3 (600 kN-m/m^3)).

.6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

.3 Prince Edward Island Department of Transportation, Infrastructure and Energy – General Provisions and Contract Specifications for Highway Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.4 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Aggregate base and shoulder material:

.1 Approved hard, durable crushed quarried rock.

.2 The aggregate shall be free from flat, elongated or other objectionable pieces and shall be approved by the Departmental Representative prior to utilization.

.3 To meet PEI DOTIE Class A and Class B and the following requirements:

Sieve Size, µm	Percent Passing	
	Class A	Class B
50.0mm	-	-
45.0mm	-	-
38.0mm	-	-
31.5mm	100	100
25.0mm	95-100	95-100
19.0mm	-	-
12.5mm	50-83	50-83
4.75mm	30-60	30-60
1.18mm	15-40	15-43
600 µm	10-32	10-35
300 µm	5-22	5-26
75 µm	3-9	3-9

.2 Reclaimed Asphalt Product (RAP): (N/A)

.1 The Contractor may incorporate RAP into the virgin granular material.

.2 Base gravels may contain up to 20% by weight, RAP.

.3 Final blended product to meet gradation specified in 2.1.1.3.1.

.4 To avoid agglomeration of crushed RAP, it should be blended as soon as possible with conventional aggregate into a homogeneous mixture. However, blended material that is stockpiled for a considerable period of time, particularly in warm weather, may harden and require re-crushing and rescreening before it can be incorporated into granular base applications.

.5 Blended RAP-aggregate stockpiles should not be allowed to remain in place for extended time periods because the stockpiled material is likely to become overly wet, possibly requiring some drying prior to use.

.3 Shoulder Material:

.1 Shoulder material shall be Class A Granular.

Part 3 Execution

3.1 AGGREGATE BASE (CLASS A) PLACING

.1 Place aggregate base after sub-base surface is inspected and approved in writing by Departmental Representative.

.2 Construct aggregate base to depth and grade in areas indicated.

.3 The Contractor shall satisfy himself that the existing grade has been constructed to the lines and grades as indicated in the Contract Documents prior to the commencement of the Work.

.4 Ensure no frozen material is placed.

.5 Place material only on clean unfrozen surface, free from snow and ice.

.6 Aggregate materials shall not be placed on inundated, soft, muddy, potholed rutted or frozen surfaces. Any ruts or potholes which appear in advance of travel surface placement shall be eliminated by scarifying, shaping or compacting, or if necessary by excavating unsuitable material and placing and compacting new material of the same quality.

.7 Aggregate base materials shall conform to the properties and specified gradation requirements for the class of material specified.

.1 If the material incorporated into the Work does not conform with the specified properties and/or gradation, the Contractor shall cease hauling from the source of supply and shall immediately rectify the problem to the satisfaction of the Departmental Representative.

.2 Any material found to be non-conforming to the specified material shall be removed from the Work.

.8 Begin spreading base material on crown line or on high side of one-way slope.

.9 Place material using methods which do not lead to segregation or degradation of aggregate.

.10 Aggregate base materials shall be shaped with a blade grader while being compacted.

.11 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.

.1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.12 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.13 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 COMPACTION

.1 Compaction Equipment:

.1 Ensure compaction equipment is capable of obtaining required material densities.

.2 Compact to a minimum of 100% of the Standard Proctor Maximum Dry Density in accordance with ASTM D698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.4 Apply water as necessary during compacting to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 PROOF ROLLING

.1 The top of aggregate base course shall be proof rolled as per Section 32 11 16.01, Part 3.4.

.2 Obtain written approval from Departmental Representative to use non-standard proof rolling equipment.

.1 If use of non-standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.

.3 Where proof rolling reveals areas of defective aggregate base course:

.1 Remove base, sub-base and subgrade materials to depth and extent as directed by the Contractor's Materials Testing Firm.

.2 Backfill excavated subgrade and sub-base with premium borrow and compact in accordance with Section 32 11 16.01 – Granular Sub-base.

.3 Backfill excavated base with aggregate base course materials and compact in accordance with this Section.

.4 Excavate and replace with new materials in accordance with Section 32 11 16.01 – Granular Sub-base and this Section.

3.4 SHOULDER MATERIAL PLACEMENT

.1 The placement of shoulder material shall be carried out in a manner so as to avoid damage to the adjacent and surrounding roadbed.

.1 The Contractor shall be responsible, at their expense, to repair any damage to the adjacent and/or abutting finished surfaces resulting from this work.

.2 Shoulder material shall be placed by equipment specifically designed for that purpose.

.1 Any shoulder spreader considered for the work shall be constructed so that it shall not place any shoulder material on the pavement.

.2 Shoulder material shall not be bladed onto the roadway foreslope.

.3 Shoulder material shall be compacted to a minimum of 100% of the Standard Proctor Maximum Dry Density in accordance with ASTM D698 and shall be shaped with a blade grader while being compacted.

.4 On secondary roads with narrow shoulders, it may not be safe or practical to utilize standard compaction equipment.

.1 At the discretion of the Departmental Representative, alternate methods of compaction and/or target densities may be approved for shoulder material in these situations.

.5 Shoulder material placed by the Contractor in the vicinity of guide rail posts and sign posts shall be hand raked to the satisfaction of the Departmental Representative.

.6 The shaping of the material shall be continued until it is well compacted, free from ruts, waves and undulations.

3.5 SITE TOLERANCES

.1 Finished base surface to be within plus or minus 5 mm of established grade and cross section but not uniformly high or low.

3.6 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.

3.7 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section covers asphalt concrete paving on reconstructed and asphalt cold milled roadbeds.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13.14 – Asphalt Paving Removal

.2 Section 32 12 13.16 – Asphalt Tack Coat

1.3 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

.1 AASHTO M156, Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.2 AASHTO MP1, Standard Specification for Performance Graded Asphalt Binder.

.3 AASHTO PP6, Standard Practice for Grading or Verifying the Performance Grade of an Asphalt Binder.

.4 AASHTO T245, Standard Method of Test for Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus.

.5 AASHTO T283, Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.

.2 Asphalt Institute (AI)

.1 AI MS-2, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.3 ASTM International

.1 ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C117, Standard Test Method for Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C123, Standard Test Method for Lightweight Particles in Aggregate.

.4 ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.5 ASTM C128, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate.

.6 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.7 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.8 ASTM C207, Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM D75, Standard Practice for Sampling Aggregates.

.10 ASTM D140, Standard Practice for Sampling Bituminous Materials.

.11 ASTM D2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

.12 ASTM D2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.13 ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.14 ASTM D2950, Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.

.15 ASTM D3549, Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.

.16 ASTM D3665, Standard Practice for Random Sampling of Construction Materials.

.17 ASTM D4469, Standard Practice for Calculating Percent Asphalt Absorption by the Aggregate in an Asphalt Pavement Mixture.

.18 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.19 ASTM D6926, Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.

.20 ASTM D6927, Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures.

.21 ASTM D7113, Standard Test Method for Density of Bituminous Paving Mixtures in Place by the Electromagnetic Surface Contact Methods.

.22 ASTM E178, Standard Practice for Dealing with Outlying Observations.

.4 Prince Edward Island Department of Transportation and Infrastructure – General Provisions and Contract Specifications for Highway Construction, Section 600.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit viscosity-temperature chart for asphalt cement to be supplied showing Kinematic Viscosity in centistokes, temperature range 105 to 175ºC 4 weeks prior to beginning Work.

.2 At least 4 weeks before commencing work, submit refinery's test data and certification that asphalt cement meets requirements of this section which also includes the specific gravity of the asphalt cement.

.3 Samples:

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 4 weeks prior to beginning Work.

.2 Submit samples of following materials proposed for use 4 weeks prior to beginning Work.

.1 One 5 L container of asphalt cement.

.2 50 kg of each aggregate to be used in the asphalt mix.

.4 Test and Evaluation Reports:

.1 Submit manufacturer's test data and certification that asphalt cement meets specification requirements.

.2 Submit asphalt concrete mix design and trial mix test results to Departmental Representative for approval at least 4 weeks prior to beginning Work.

1.5 SUBMISSION OF MIX DESIGN

.1 Samples of aggregate for mix design shall be derived from stockpiles not less than 1000 tonnes of each of fine and coarse aggregate.

.2 The Contractor will submit, in writing, asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to commencing work. The mix design shall contain the Job Mix Formula which shall include the following:

.1 Type and specific gravity of asphalt cement.

.2 Asphalt cement content.

.3 Specific gravity and absorption of each aggregate.

.4 Percentage of each aggregate.

.5 Gradation of Job Mix Formula.

.6 Marshall Stability and flow, kN.

.7 Bulk Specific Gravity, kg/m^3.

.8 Maximum theoretical density, kg/m^3.

.9 Percentage voids in mineral aggregate.

.10 Percentage air voids.

.11 Percentage voids filled with asphalt.

.12 Percentage of absorbed asphalt cement.

.13 TSR (AASHTO T283).

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Stockpile minimum 50% of total amount of aggregate required before beginning asphalt mixing operation.

.3 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.4 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two mix components are permitted.

.5 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

.6 Submit to Departmental Representative copies of freight and waybills for asphalt cement as shipments are received.

.7 There will be no separate payment for mobilization and demobilization to site.

1.7 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Performance graded asphalt cement: to AASHTO M320 Table 1, PG 58-28 Grade.

.2 Aggregates:

.1 Coarse aggregate to be supplied for the manufacture of asphaltic concrete shall consist of crushed stone, composed of clean, sound, hard and durable particles free from coating of silt, and/or clay and shall not contain other deleterious materials. Coarse aggregate shall conform to the physical requirements for coarse aggregate shown in Table 2.1-1 and 2.1-2.

.2 Irrespective of compliance with the physical requirements of Table 2.1-1 and 2.1-2, a coarse aggregate may be rejected on the basis of past field performance.

.3 Fine aggregate to be supplied for the manufacture of asphaltic concrete shall consist of manufacture material processed by crushing quarried rock or natural sand and gravel, the particles of which shall be clean, hard, durable and free from coatings of silt, clay or other deleterious material. Fine aggregate shall conform to the physical and gradation requirements shown in Table 2.1-3 and the fraction between any two of the following consecutive sieves (4.75mm, 2.36mm, 1.18mm, 600µm, 150µm) shall be a minimum of 7%. A minimum of 25% fine aggregate, processed by crushing quarried rock, shall be incorporated into all asphaltic mixes.

Table 2.1-1 Gradation Requirement for Coarse Aggregate – ASTM C-136

Material Size	**9.5 mm**	**12.5 mm**	**19.0 mm**
Sieve Size	**Passing (%)**	**Passing (%)**	**Passing (%)**
25.0 mm	-	-	100
19.0 mm	-	100	90-100
12.5 mm	100	90-100	50-75
9.5 mm	80-100	45-75	20-55
6.3 mm	15-50	-	-
4.75 mm	0-15	0-15	0-15

Table 2.1-2 Physical Requirements for Coarse Aggregate

Test	**A Base**	**B Seal**	**ASTM**
Los Angeles Abrasion, Max % Loss	35	35	C-131
Magnesium Sulfate Soundness, Max. % Loss	15	15	C-88
Absorption, Max. %	1.7	1.7	C127
Crushed, Min. %	75	75	(1)
Flat and Elongated, Max. %	20	20	(2)

Petrographic Number, Max.	200	140	(3)
4.75 mm Sieve, Max % Passing	15	15	C-136
75 µm Sieve with PI ≤ 3, Max % Passing	3	3	C-117

(1) Crushed percentage is the fraction of particles by mass retained on the 4.75 mm Sieve having two or more freshly fractured faces for Classes A, B.
(2) Flat and elongated particles to be determined using current PEI DOTIE test procedures.
(3) Petrographic number to be determined using current PEI DOTIE test procedures.

Table 2.1-3 Physical and Gradation Requirements for Fine Aggregate

Test	A Base	B Seal	ASTM
Magnesium Sulfate Soundness, Max. % Loss	15	15	C-88
4.75 mm Sieve, Min. % Passing	85	85	C-136
75 µm Sieve, Max. % Passing	8	8	C-117

.3 Blending Sand:

.1 Blending sand supplied for the manufacture of asphaltic concrete shall consist of clean, tough, durable particles, free from silt clay and other deleterious material.

.2 The gradation of the blending sand shall be such that when incorporated into the asphaltic concrete mix, the resultant mix shall meet the requirements of Tables 2.2-4, 2.2-5 and 2.2-6.

.3 The blending sand shall have 100% passing the 9.5 mm Sieve and a maximum of 50% passing the 300 µm Sieve.

.4 The physical requirements of the blending sand shall be as specified in Table 2.1-3 with the exception of the limitation on the maximum percent passing the 75 µm Sieve.

.5 The maximum mass of blending sand to be used in the total mix shall not exceed 12% for all mixes.

2.2 MIX DESIGN AND JOB MIX FORMULA

.1 Contractor Mix Design: The contractor shall use professional engineering services and a qualified testing laboratory to assess the performance grade asphalt cement and aggregate materials proposed for use and to carry out the design of the asphalt mix.

.2 Requirement for Asphalt Mix Design: the asphalt mix design shall follow the Marshall method of mix design based on 75 blows and be in accordance with the latest edition of the Asphalt Institute Publication, Mix Design Methods for Asphalt Concrete Manual Series No. 2 (MS-2).

.1 The asphalt cement grades shall be PG58-28, unless otherwise specified. The optimum percent of asphalt cement shall be that percent which yields design air voids of 4% ± ½%.

.2 The approved asphalt mix design specifying the aggregate cement content shall be considered as the job mix formula.

.3 Contracts with SADT (Summer Average Daily Traffic) less than 10,000 shall have a job mix formula asphalt content yielding air voids of 3.5% ± ½%.

.4 The percent passing the 4.75 mm Sieve size ± 2% for the blended aggregate gradations for given mix types shall be as follows:

Mix Type	% Passing 4.75 mm Sieve Size
A	50%
B	67%

.5 The asphalt mix design data and the proposed job mix formula is to be submitted by the Contractor for review and shall include for each blend the following:

.1 The name of the testing firm responsible for the mix design.

.2 The specific location (s) of the source (s) of mineral aggregate.

.3 The source and type of mineral admixture and the percentage to be used.

.4 The percentage of aggregate passing each of the specified sieves for each aggregate to be incorporated into the mixture.

.5 The proportion of each material (in percent of aggregate), including hydrated lime, if required, as an anti-stripping additive.

.6 The composite gradation based on (4) and (5) above.

.7 The composite gradation plotted on a 0.45 power graph paper.

.8 The results of all aggregate testing, determinations, etc., as defined in Tables 2.1-1, 2.1-2 and 2.1-3, including bulk specific gravity and apparent specific gravity. In addition, aggregates shall be tested to determine if they are prone to stripping (tensile strength ratio < 0.8) as well as no visual evidence of stripping. If an anti-stripping additive is required, hydrated lime or an effective liquid anti-stripping agent shall be used.

.9 The mix design with a minimum of four (4) different asphalt contents (minimum 0.5 % between each point) with at least on point above and one point below the optimum asphalt percentage that reports the following:

.1 The percentage (in units of one tenth of 1%) of asphalt cement to beaded, based on the total weight of the mixture.

.2 The Marshall test results for the individual and average bulk specific gravity, stability and flow of at least three specimens at each asphalt content.

.3 The maximum theoretical specific gravity at each asphalt content.

.4 The percent of air voids in the mixture for each asphalt content.

.5 The percent voids in mineral aggregate (VMA) at each asphalt content.

.6 The percent voids filled with asphalt (VFA) at each asphalt content.

.7 The design asphalt content as a percent of total mix.

.10 All Marshal mix design characteristics, including graphs used in arriving at the final mix design, the bulk relative density of the combined aggregates and the asphalt absorption of the combined aggregates. The Contractor shall submit the following with the asphalt mix design for verification purposes:

.1 One – 20 kg sample of each representative virgin aggregate.

.2 Thirty-two 1.2 kg samples of representative virgin aggregate blended to the design mix gradation of the asphalt mix aggregate.

.3 Four Litres of the type of performance grade asphalt cement to be used.

Table 2.2-4 Blended Aggregate Gradation and Asphalt Content for Asphaltic Concrete Mixes

Sieve Size	Passing (%)	
	A Base	**B Seal**
25.0 mm	100	-
19.0 mm	90-100	-
12.5 mm	71-86	100
9.5 mm	60-78	90-100
4.75 mm	39-61	55-75
2.36 mm	23-49	32-60
1.18 mm	16-34	19-45
600 µm	11-24	13-35
300 µm	7-16	8-22
150 µm	5-10	5-12
75 µm	3.3-6	4.5-6.5
Asphalt Cement % by Mass of Total Mixture	4.7-6.0	5.5-7.0

Table 2.2-5 Physical Requirements for Dense Graded Asphaltic Concrete

Test	A Base	B Seal
Stability at 60°C (N)	5800	5800
Flow (0.25 mm)	8-16	8-16
Air Voids (%)	2.5-4.5	2.5-4.5
Min. VMA (%)	13	15
VFA (%)	68-78	70-80

Table 2.2-6 Mix Control Tolerance Variation from Job Mix Formula

Sieve Size	Allowable Variation of % Passing (± %)
25.0 mm	5
19.0 mm	5
16.0 mm	5
12.5 mm	5
9.5 mm	5
4.75 mm	5

Sieve Size	Allowable Variation of % Passing (± %)
2.36 mm	4
1.18 mm	4
600 µm	3
300 µm	3
150 µm	2
75 µm	1
Asphalt Cement	0.3

.3 Physical Requirements of the Mixture:

.1 The mixture shall be uniform and shall consist of a mixture of coarse and/or fine aggregate together with any required blend sand, mineral filler or lime, and mixed with asphalt cement.

.2 The mineral constituents shall be combined in such proportions as to produce a mixture conforming to the gradation requirements of Table 2.2-4. The grading shall not show marked fluctuations from opposite extremes of the limiting sizes.

.3 Mixtures shall meet the physical requirements of the properties specified in Table 2.2-5. Current Department test procedures will be used to determine these properties.

.4 Mix Control Tolerances:

.1 Once the job mix formula has been designated by the Departmental Representative, the Contractor shall be required to produce and asphaltic concrete mixture conforming to the mix control tolerance as specified in Table 2.2-6.

.5 Stockpile Requirements:

.1 Stockpiling sites shall be level, well drained, free of all foreign materials and of adequate bearing capacity to support the mass of the stockpiled materials. Stockpiles shall be either far enough apart or separated by substantial dividers to prevent intermingling.

.2 For all aggregates except where stockpiled on Portland cement concrete, asphaltic concrete or on otherwise acceptably stabilized areas, the bottom 150 mm of the stockpile is not to be incorporated into the Department's work.

.3 Stockpiles shall be built up in layers not exceeding 1 m in depth. Each layer shall be completed over the entire area of the stockpile before beginning the next layer. Coning of the piles or spilling of material over the edges of the pile will not be permitted. Traffic over the stockpile surface shall be limited to that required for adequate levelling or removal.

.4 The minimum size of each coarse and fine aggregate stockpile shall be 1000 tonnes. The minimum size of the stockpiles (s) of blending sand shall be 150 tonnes.

.5 Before any production of asphaltic concrete mixture has commenced, aggregate stockpiles of the required size and gradation shall be provided at the asphalt plant site. Minimum stockpile requirements shall be maintained throughout the

project. Aggregates brought to the site after production has commenced shall be stored in separate stockpiles.

.6 A minimum of 2 working days between the arrival of asphalt aggregate and its incorporation into the asphaltic concrete mixture will be required to facilitate complete analysis of the aggregate prior to its use.

.6 Handling, Feeding and Drying of Aggregate:

.1 Aggregate shall be loaded into the cold feed bins so as to prevent the mixing of separated sizes of aggregate. Mixing of materials on site or loading of more than one material into a single bin shall not be permitted.

.2 Where the Contractor chooses to use a batch or continuous mix operation, the aggregate shall be dried and heated in the drier and separated by screening into hot storage bins. When the aggregate is delivered to the mixer, it shall be at a temperature consistent with proper mixing and laying and shall in no case exceed 165°C. Surfaces of dried aggregate shall be free of carbon or unburnt fuel oil.

.3 The aggregate shall be sufficiently dried as evidenced by the lack of noticeable steaming, bubbling, or foaming of the asphalt mixture and the absence of visible free water on the tailgate of the truck box.

.4 If insufficient drying is evident, the Contractor shall take steps as deemed necessary to provide properly dried aggregates.

Part 3 Execution

3.1 PLANT AND MIXING REQUIREMENTS

.1 Feeder lines for loading asphalt cement to the asphalt tanks shall be elevated and drained and the use of diesel fuel to clean asphalt cement pump feeder lines is not permitted. When necessary to use diesel to flush lines and pump, all flushed material shall be collected and not permitted to enter asphalt cement tanks or dumped on the ground.

.2 Batch and continuous mixing plants:

.1 To ASTM D995.

.2 Heat asphalt cement and aggregate to mixing temperature directed by Departmental Representative. Do not heat asphalt cement above 165°C.

.3 Before mixing, dry aggregates to a moisture content not greater than 0.5% by mass or to a lesser moisture content if required to meet mix design requirements.

.4 Make available current asphalt cement viscosity and specific gravity data at plant. With information relative to viscosity of asphalt cement being used, Departmental Representative will direct temperature of completed asphalt concrete at plant and at paver after considering hauling and placing conditions.

.5 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders. Aggregate will not be fed directly to the plan from the crusher.

.6 Feed cold aggregates to plant in proportions that will ensure continuous operations.

.7 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.8 Store hot screened aggregates in a manner to minimize segregation and temperature loss.

.9 Maintain temperature of materials within plus or minus 5°C of specified mix temperature during mixing.

.10 Mixing time:

.1 In batch plants, both dry and wet mixing times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain a thoroughly blended asphalt concrete but not less than 30 s or more than 75 s.

.2 In continuous mixing plants, mixing time as directed by Departmental Representative but not less than 45 s.

.3 Do not alter mixing time unless directed by Departmental Representative.

.3 Dryer drum mixing plant:

.1 Feed aggregates to burner end of dryer drum by means of a multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.2 Meter total flow of aggregate by an electronic weigh belt system with an indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate and asphalt cement entering mixer remain constant.

.3 Provide for easy calibration of weighing systems for aggregates without having material enter drum.

.4 Make provision for conveniently sampling the full flow of aggregate from the cold feed.

.5 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate from cold feed prior to entering drum.

.6 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.

.7 Accomplish heating and mixing of asphalt concrete in an approved parallel flow dryer-mixer in which aggregate and asphalt cement enter drum at burner end and travel parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt cement. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt concrete at discharge, with a printing recorder that can be monitored by plan operator. Submit printed record of mix temperatures at end of each week.

.8 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves plant to be less than 0.5%.

.4 Temporary storage of hot asphalt concrete:

.1 Provide storage of sufficient capacity to permit continuous operation and designed to prevent segregation.

.2 Do not store in storage bins in excess of 3 h.

.5 While producing asphalt concrete for this project, do not produce it for other users unless separate storage and pumping facilities are provided for materials supplied to this project.

.6 Mixing tolerances:

.1 Permissible variation in aggregate gradation from job mix (percent of total mass):

Sieve, µm	Allowable Variation, %
> 5000	5.0
5000	5.0
2500	4.0
315	3.0
160	2.0
80	2.0

.2 Permissible variation of asphalt cement from job mix, 0.25%.

.3 Permissible variation of asphalt concrete temperature at discharge from plant, 5°C.

3.2 EQUIPMENT

.1 General: All equipment used on this project shall be in top operating condition.

.2 Pavers: Mechanical grade controlled self-powered pavers capable of spreading asphalt concrete within specified tolerances, true to line, grade and crown indicated.

.1 Pavers to be equipped with automatic screed controls, as recommended by manufacturer for control of longitudinal grade and transverse slope.

.2 Pavers to be equipped with joint matching shoe to operate with longitudinal grade control.

.3 Transverse slope control shall be capable of operating from either side of paver.

.4 Pavers to be equipped with an approved 12 m ski. Where ski is a flexible unit, it shall be equipped with a spring tensioned wire extending between brackets fitted on and slightly above each end of ski. Sensing grid shall ride on wire and not on ski.

.3 Rollers: sufficient number of rollers of type and mass to obtain specified density of compacted mix.

.4 Vibratory rollers:

.1 Minimum drum diameter: 1200 mm.

.2 Maximum amplitude of vibration (machine setting): 500 µm for lifts less than 40 mm thick.

.5 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers (tarps) of sufficient size and weight to completely cover and protect asphalt concrete when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.4 Truck which cannot be weighed in a single operation on scales supplied will not be accepted.

.5 Truck tailgate assemblies must be such that they do not strike paver hopper when emptying into the hopper.

.6 Hand tools:

.1 Lutes or rakes with covered teeth for spreading and finishing operations.

.2 Tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm^2 for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.

.3 Straight edges, 3 m in length, to test finished surface.

3.3 PREPARATION

.1 When paving over existing asphalt surface, clean pavement surface to approval of Departmental Representative.

.1 When levelling course is not required, patch and correct depressions and other irregularities to approval of Departmental Representative before beginning paving operations.

.2 Prior to laying mix, clean surfaces of loose and foreign material.

3.4 PLACING

.1 Obtain Departmental Representative's approval of existing surface prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines as directed by Departmental Representative.

.3 Following levelling course, complete topographic survey to ensure no ponding will occur. If low areas occur, add asphalt seal to ensure positive drainage.

.4 Placing conditions:

.1 Place asphalt concrete only when air temperature is above 5°C and rising.

.2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.

.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.5 Place asphalt concrete in compacted lifts of thickness as indicated on Drawings.

.6 Where possible do tapering and levelling where required in lower lifts. Overlap joints by not less than 300 mm.

.7 Place individual strips no longer than 500 m unless approved by Departmental Representative.

.8 Spread and strike off mixture with self-propelled mechanical finisher.

.9 Place individual mats so that the days paving leaves minimal exposed longitudinal cold joint (<10m).

.10 Construct longitudinal joints and edges true to line markings. Lines for paver to follow will be established by Departmental Representative parallel to centreline of proposed pavement. Position and operate paver to follow established line closely.

.11 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.

.12 Correct irregularities in alignment left by paver by trimming directly behind machine.

.13 Correct irregularities in surface of pavement course directly behind paver.

.1 Remove excess material forming high spots using shovel or lute.

.1 Fill and smooth indented areas with hot mix.

.2 Do not broadcast material over such areas.

.2 Do not throw surplus material on freshly screeded surfaces.

.3 The forward speed of the paver shall be regulated by capacity of the plant and the rollers but shall not exceed a forward speed of 10m/min.

.14 When hand spreading is used:

.1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section.

.1 Use measuring blocks and intermediate strips to aid in obtaining required cross-section.

.2 Distribute material uniformly without broad casting material.

.3 During spreading operation, thoroughly loosen and uniformly distribute asphalt concrete by lutes or covered rakes.

.1 Reject asphalt concrete that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt.

.1 Control temperature to avoid burning material.

.2 Do not use tools at higher temperature than temperature of mix being placed.

.15 Irregularities in the horizontal alignment and grade along the outside edge of the asphalt concrete shall be corrected by the addition or removal of mix before the edge is rolled.

.16 Paving of intersections, extra widths and other variations from standard lane alignment and as defined in the Contract, whether by hand spreading or machine laying, shall be carried out concurrently with the machine laying operation of the regular mat, unless otherwise approved by the Departmental Representative.

3.5 COMPACTING

.1 Do not change rolling pattern unless mix changes or lift thickness changes.

.1 Inform Departmental Representative prior to making changes to rolling pattern.

.2 General:

.1 Provide at least 3 rollers and as many additional rollers as necessary to achieve specified pavement density.

.2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.

.3 Operate roller slowly initially to avoid displacement of material. Do not exceed 5 km/h for breakdown and intermediate rolling for static steel-wheeled and pneumatic tired rollers. Do not exceed 8 km/h for finish rolling.

.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 25 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing not to exceed compacted lift thickness.

.5 Overlap successive passes of roller by by at least one-half width of roller and vary pass lengths.

.6 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water and do not use diesel fuel.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.

.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.

.1 Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.

.10 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.11 Do not refuel rollers on fresh asphalt concrete.

.3 Breakdown rolling:

.1 Begin breakdown rolling with vibratory roller immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

.3 Operate breakdown roller with drive roll or wheel nearest finishing machine. Exceptions may be made when working on steep slopes or super-elevated sections.

.4 Use only experienced roller operators.

.4 Intermediate rolling:

.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.

.2 Rolling to be continuous after initial rolling until mix placed has been thoroughly compacted.

.3 Conduct rolling operations in close sequence.

.5 Finish rolling:

.1 Use static finish roller to remove roller marks and achieve smooth driving surface.

.6 All asphalt concrete shall be compacted to 92.5% of Theoretical Maximum Relative Density (TMRD) in accordance with ASTM D3203.

.7 The Contractor will supply additional compaction equipment if required density is not achieved.

.8 Gutters will be compacted with vibratory compactors which operate perpendicular to the direction of the gutter.

.9 Upon completion of placing and shaping, the asphalt concrete for gutter shall be compacted to 94% of the theoretical maximum relative density or to the satisfaction of the Departmental Representative.

3.6 JOINTS

.1 General:

.1 Trim vertical face to provide true surface and cross section against which new pavement may be laid. Remove loose particles.

.2 Paint joint face with tack coat emulsified asphalt cement prior to placing of fresh asphalt concrete.

.3 Overlap previously laid strip with spreader by 100 mm.

.4 Rake fresh asphalt concrete against joint and thoroughly tamp and roll.

.5 Remove surplus material from surface of previously laid strip. Dispose of surplus material as directed by Departmental Representative.

.6 Do not throw surplus material on freshly screened mat surface.

.7 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:

.1 Carefully construct and thoroughly compact transverse joints to provide a smooth riding surface.

.2 Hold transverse joints to a minimum. When paving single width and maintaining traffic, construct one lane no farther than one-half total paving day.

.3 Stagger joint locations 1.5 to 3.0 m. Schedule each day's paving operation to terminate adjacent lanes in any one area to within above specified joint locations.

.4 Offset transverse joint in succeeding course by at least 600 mm.

.3 Longitudinal joints:

.1 Before rolling, carefully remove with a lute or rake and discard coarse aggregate in asphalt concrete overlapping joint.

.2 Roll longitudinal joints directly behind paving operation.

.3 When rolling with static roller, shift roller cover onto previously placed lane in order that no more than 150 mm of roll rides on edge of newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until a thoroughly compacted neat joint is obtained.

.4 When rolling with vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.

.5 When abutting lane is not placed in same day, or when joint is distorted during day's work by traffic or other means, carefully trim edge of lane to line and paint with a thin coating of asphalt tack before abutting lane is placed.

.6 Ensure joints are offset at least 150 to 200 mm from those in lower layers.

3.7 FINISH TOLERANCES

.1 Finished asphalt surface to be within 6 mm of design elevation but not uniformly high or low.

.2 Finished asphalt concrete not to have irregularities exceeding 6 mm when checked with a 3 m straight edge placed in any direction.

3.8 TEMPORARY MARKINGS

.1 The Contractor shall place temporary pavement markings before sunset following each day's work. Marking material, spacing and type shall be approved by the Departmental Representative.

3.9 SURFACE DEFECTS

.1 The finished surface of any pavement course shall have a uniform texture and be free of visible signs of poor workmanship and bumps and/or dips exceeding 3 mm as measured with a 3 m straight edge.

.2 Any obvious defects, as determined by the Departmental Representative, shall be cause for rejection of the pavement course.

.1 Multiple defects within a 10 metre section shall be considered as one defect.

.2 If a defect is continuous beyond 10 metres it shall be considered as one defect.

.3 Defects shall include but not necessarily be limited to the following:

.1 Segregated areas;

.2 Ravelling;

.3 Roller marks;

.4 Cracking or tearing;

.5 Improper matching of longitudinal and transverse joints;

.6 Tire marks;

.7 Sampling locations not properly reinstated;

.8 Improperly constructed patches;

.9 Contaminant on the mat;

.10 Flushed areas; and

.11 Pneumatic-tired roller pickup.

.4 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required.

3.10 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing checking or rippling. Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.11 QUALITY ASSURANCE/PAYMENT ADJUSTMENT

.1 Quality Assurance testing for payment adjustment to be performed by Departmental Representative.

.2 Mix Tolerance:

.1 Loose mix samples will be collected every 800 tonnes by Departmental Representative, with a minimum of one (1) per day.

.2 Mix tolerances as per Prince Edward Island Department of Transportation, Infrastructure and Energy General Provisions and Contract Specifications for Highway Construction.

.3 Departmental representative will determine sampling locations.

.3 Asphalt Compaction:

.1 Compaction will be based on the average compaction of three (3) cores from stratified random locations each day of paving as determined by the Departmental Representative.

.2 Rejected hot mix asphalt will not be paid by Department and Contractor will bear the cost of repairs.

.3 Rejected asphalt to be removed and replaced.

3.12 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.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 32 12 16 – Asphalt Paving.

1.2 WORK INCLUDED

.1 This section includes the supply and placing of paint to be applied for traffic lines, parking lines and walkways, including cross-hatch areas and gore areas.

.2 This section also includes the supply and placing of paint for symbols.

.3 It is the intent of this section that all paint lines, cross hatch areas, gore areas and symbols presently on site be replaced to their original location following placement of new asphalt materials.

1.3 DEFINITIONS

.1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.

.2 CGSB 1-GP-12C-68, Standard Paint Colors.

.3 CGSB 1-GP-71-83, Method of Testing Paints and Pigments.

.4 CGSB 1-GP-74M-79, Paint, Traffic, Alkyd.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative the following material sample quantities at least 4 weeks prior to commencing work

.1 Two (2) one-litre samples of each type of paint.

.2 One (1) kg sample of glass beads.

.3 Sampling to CGSB 1-GP-71.

.3 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, MPI specification number and formulation number and batch number.

.4 Submit scaled and surveyed drawing for existing highway line markings as outlined under Clause 3.1.

1.5 APPLICATION

.1 Apply all paint and glass beads on two (2) occasions.

Part 2 Products

2.1 MATERIALS

.1 Paint:

.1 To CGSB 1-GP-74M, alkyd traffic paint.

.2 To CGSB 1-GP-149M, alkyd reflectorized traffic paint.

.3 Colour: to CGSB 1-GP-12C, yellow 505-308, white 513-301.

.2 Thinner: to CAN/CGSB 1.5.

.3 Glass Beads:

.1 Overlay Type: to CGSB 1-P-74M.

Part 3 Execution

3.1 PAVEMENT MARKING DRAWINGS

.1 Where a pavement marking drawing is provided, the Contractor is required to paint markings as indicated on the Drawing. Where a pavement marking drawing is not provided, the Contractor is to accurately inventory existing markings by topographic survey methodologies. Departmental Representatives' approval of the Contractor's inventory drawing is required prior to the cold milling of the existing asphalt pavement. In locations where a pavement marking drawing is not provided, the following shall apply to assist the Contractor in establishing uniformity in the development of pavement marking drawings/descriptions. This checklist should be used as a guide to ensure that all of the basic elements are covered.

.1 For locations which require a scaled and surveyed drawing:

.1 The Contractor shall submit a pavement marking drawing that is to a 1:500 scale. Drawings shall be submitted in PDF form and printed to either an 11 x 17 or A-1 size. The pavement marking drawing shall be produced from a survey and shall inventory the existing pavement markings. The Contractor shall be responsible for including any revisions as directed by the Departmental Representative. The inventory shall include pavement markings at the project limits, except for continuous center or lane lines.

.2 The pavement marking drawing shall be submitted no later than 10 business days before scheduled cold milling.

.3 The pavement marking drawing shall include:

.1 Project name, highway, limits, tender number and date.

.2 Indicate north arrow and scale.

.3 Use a legend to define all symbols.

.4 Show colours, sizes and configurations of existing pavement markings (arrows, solid/dashed lines, hatching, bicycle symbols, etc.).

.5 Dimension individual lane widths, bike lane widths, length/width of hatching, stop bar setbacks, etc.

.6 Layout pavement markings in accordance with the Manual of Uniform Traffic Control Devices for Canada, unless otherwise indicated.

3.2 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.

.2 Proceed with Work only after unacceptable conditions have been rectified.

3.3 EQUIPMENT REQUIREMENTS

.1 The Contractor shall supply a mobile highway striping truck which is capable of striping centre, lane and edge lines and of applying overlay-type glass beads to the wet painted line by means of pressurized bead dispensers. The truck shall be fitted with a paint heater capable of heating paint to any temperature up to 80^{o}C and maintaining a constant temperature during spraying operations.

3.4 APPLICATION

.1 Pavement markings: layout by Contractor.

.2 Traffic line painting shall include centerline painting, lane line painting and edge line painting. The term centerline shall be used to describe any of the standard line combinations separating opposing traffic lanes on two-lane, two-way traffic highways and shall include the following:

.1 Single skip lines;

.2 Single skip and single solid lines;

.3 Double solid lines;

.4 Single solid line (Occasionally a narrow local low volume road may have a single solid centerline).

.3 All such centerlines shall be yellow in colour.

.4 The term lane line shall be used to describe any line separating lanes of traffic travelling in the same direction and may be either a single white skip line or a single white solid line.

.5 The term edge line shall be used to describe any line which defines the shoulder edge of the outside traffic lanes. On two-lane highways, edge lines shall be white in colour. On divided highways the edge line on the right in the direction of traffic flow shall be a single solid white line, the one on the left a single solid yellow line.

.6 Symbols, hatching and letters to dimensions and colours indicated.

.7 The width of painted lines shall be 11.5 cm. Paint shall be heated to a temperature sufficient to enable it to dry when applied to the road, in a time frame short enough to

avoid the use of traffic cones for protection of vehicles and the painted line itself. Paint shall be applied at a rate to achieve in one pass a minimum dry film thickness (dft) of 255 µm. Overlay-type reflectorizing glass beads shall be dispensed from the paint striping truck by means of a pressurized bead dispenser to the wet painted line at the rate of 700 g/L of paint applied.

.8 All lines are to be true with clearly defined edges and without noticeable overspray of adjacent road surfaces.

.9 No painting shall be carried out when visible moisture is present on the road surface.

.10 Lines not painted in accordance with these specifications shall be repainted by the Contractor at the expense of the Contractor.

.11 The Contractor shall inform the Department's Representative of the Contractor's daily schedule to enable the Representative to be present as they deem necessary during loading and painting operations.

3.5 TRAFFIC LINES

.1 All pavement lines and markings shall be in accordance with the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada (MUTCDC).

3.6 TOLERANCE

.1 Paint markings: within plus or minus 12 mm of dimensions indicated.

.2 Remove incorrect markings in accordance with Departmental Representative's instructions.

3.7 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.

3.8 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

.2 Repair damage to adjacent materials caused by pavement marking application.

3.9 REAPPLICATION

.1 All pavement markings are to be applied to the following requirements:

.1 48 hours and 30 days after placing asphalt seal material.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

.1 This section specifies topsoil, topsoil amendments, the stripping of topsoil, the preparation of existing grades, the placement of topsoil, and finish grading.

1.2 RELATED SECTIONS

.1 Section 32 92 23 – Sodding

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 TESTING

.1 All soil and sand used in this project shall be tested for compliance with texture specification by a laboratory designated by the Owner. Soil sampling, testing and analysis to be in accordance with Provincial regulations and standards. Contractor will arrange and pay for cost of tests.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Municipality.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

.1 Topsoil for this project to consist of topsoil stripped from site and imported topsoil to be supplied by the Contractor.

.2 Topsoil: mixture of mineral particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth, free of debris, weeds, foreign objects, toxic materials and stones and roots greater than 20mm length.

.3 Soil Texture: sandy loam, based on the Canadian System of Soil Classification, to the following particle distribution and gradation:

Particle Type	Distribution By Volume	Acceptable Range	Gradation
Very Coarse Sand	10%	10% or less	2.0 – 1.0 mm
Coarse Sand	45%	42-47%	1.0 – 0.5 mm
Medium Sand	45%	42-47%	0.5 – 0.25 mm
Fine Sand	15%	13-17%	0.25 – 0.15 mm
Very Fine Sand	10%	8-12%	0.15 – 0.106 mm
Clay	20%	18-23%	Less than 0.06 mm

.4 Organic Matter: 4 – 20% by dry weight volume, well decomposed and stable. Organic material measuring 20 mm will not exceed 2% by volume.

.5 pH Range: 6.0 – 7.0.

.6 Consistency: friable when moist.

.7 Fertility: major soil nutrients present in the following ratios:

.1 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.

.2 Phosphorus (P): 10 to 20 micrograms of phosphate per gram of topsoil.

.3 Potassium (K): 80 to 120 micrograms of potash per gram of topsoil.

.4 Calcium, magnesium, sulphur and/or establishment of intended vegetation.

2.2 SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to supply topsoil as specified.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping of areas after all wood brush and grasses have been removed from site.

.2 Strip and pulverize topsoil to depths as indicated. Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 meters.

.4 Unused topsoil is to remain on site.

.5 Protect stockpiles from contamination and compaction.

3.2 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 25mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75mm above surface. Dispose of removed material off site.

.4 Cultivate entire site which is to receive topsoil to minimum depth of 100mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL / PLANTING SOIL

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150mm.

.3 Spread topsoil/planting soil to following minimum depths after settlement:

.1 150 mm for seeded areas.

.2 500 mm for shrub beds.

.4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 SOIL AMENDMENTS

.1 For planting beds and turf areas: apply and thoroughly mix soil amendments into full specified depth of topsoil at following rates recommended by soil analysis.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative. Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

.1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

.1 Dispose of surplus materials off site.

3.8 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.2 Clean all exposed rock and boulder surfaces to approval of Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 General Provisions and Contract Specifications for Highway Construction, PEI Department of Transportation, Infrastructure and Energy, Item 803.

1.2 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 seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.

.2 Submit 2 copies of WHMIS MSDS in accordance with Sections 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Labelled bags of seed and fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number. Alternatives to the specified seed and fertilizer mixes will not be accepted without prior approval of the Departmental Representative. The Departmental Representative may sample the seed and fertilizer for analysis and verification.

.2 Inoculant containers to be tagged with expiry date.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Seed and fertilizer shall be kept dry and protected from direct sunlight and other detrimental conditions.

.1 Seed and fertilizer that have been subjected to moisture shall not be used.

1.4 WARRANTY

.1 For seeding, 12 months warranty period is extended to 1 full growing season.

.2 Contractor hereby warrants that hydroseeding will remain free of defects in accordance with General Conditions GC 12.3, but for 1 full growing season.

.3 End-of-warranty inspection will be conducted by Departmental Representative.

1.5 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

2.1.1 Seed

.1 All materials shall be supplied by the Contractor.

.2 Seed mix and fertilizer shall be as per Section 803.02 of the PEI TIE Standard Specifications, which includes the following species, by mass:

.1 60% Creeping Red Fescue;

.2 20% Hard Fescue;

.3 10% Alsike Clover;

.4 10% Perennial Rye Grass

.3 Water shall be free of any impurities which would inhibit germination of the seed.

.4 Hydraulic mulch for hydroseeding as specified as per Section 803 shall be a product made primarily for use in hydroseeding, and shall consist of shredded wood fibres, shredded newsprint coloured green with an environmentally acceptable dye, or shredded straw mixed with raw cotton fibres and/or shredded newsprint.

.1 Hydraulic mulch shall form a homogeneous slurry when agitated or mixed in water with the other specified materials and shall contain no growth-inhibiting chemicals or compounds.

.5 When applied, the hydroseeding mix shall be capable of forming an absorptive mat, which will allow moisture to percolate into the underlying soil.

.6 Binder (organic tackifier) acts as an adhesive to bind soil, fiber and seed particles together and to temporarily control the effects of wind and water erosion during seed germination and plant establishment. It may be supplied in liquid or powder form and shall be applied at the manufacturer's recommended application rate. It shall not contain any toxic or growth inhibiting chemicals or compounds.

.7 Binder may be supplied in liquid, flake or powder form.

.8 Applications rates shall be as per Section 803 of the PEI TIE Standard Specifications.

2.1.2 Mulch

.1 All materials shall be supplied by the Contractor.

.2 Mulch shall be hay or straw and supplied in either of the following forms:

.1 Unprocessed form such as bales or rolls, free of noxious weeds and other undesirable material, and not so wet, decayed or compacted so as to inhibit even and uniform spreading; or

.2 Approved equivalent

.3 When applied the mulch shall form an absorptive mat, which will allow moisture to percolate into the underlying soil.

.4 Binder for mulch must be capable of joining together the mulch particles to secure the mulch to the ground and shall remain effective for 60 days from the time of application.

.5 Binder for mulch shall not form an impervious seal which would prevent the penetration of moisture to the underlying soil.

.6 Binder may be supplied in liquid, flake or powder form

.7 Water shall be contaminant-free and obtained from a source approved by the appropriate regulatory agency.

.8 Approved unprocessed hay or straw mulch shall be spread evenly and uniformly at a rate of 4500kg/ha ±15%.

.1 Lumps and thick clumps of mulch shall be broken apart and dispersed.

.2 Binder shall be mixed in a solution of water with sufficient green dye or green-coloured wood-fibre or paper mulch and sprayed uniformly over the mulched ground.

.3 Binder application shall be completed within 48 hours after the unprocessed hay or straw has been placed

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections are acceptable for hydraulic seeding in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PROTECTION OF EXISTING CONDITIONS

.1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.

.2 Immediately remove any material sprayed where not intended as directed by Departmental Representative.

3.3 PREPARATION OF SURFACES

.1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water or temperatures which inhibit seed germination unless otherwise approved by the Departmental Representative.

.2 Areas to be hydroseeded shall be free of ruts, ridges, and deleterious materials such as weeds, sticks, roots and large rocks which would impede growth of the seed mix and mowing.

.1 Stones greater than 75mm in the least dimension shall be removed and disposed of outside the work area.

.3 Final shaping of slopes shall include loosening of the top 50 mm of soil and scarification to minimize runoff velocities.

.1 Scarifications shall be parallel to the contour of the slope with a minimum indentation (high to low) of 25 mm and at a maximum spacing of 150 mm no sooner than 2 days prior to hydroseeding. Scarifying can be made by means of dozer treads or any other mechanical means such that scarifications meet the above noted specifications.

.2 Hydroseeding will not permitted on hardened, crusted or rutted soil.

.4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.

3.4 HYDRAULIC SEEDING

.1 The Contractor shall carry out the work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 The hydraulic mulch, seed, fertilizer and binder shall be thoroughly mixed with water in a hydroseeding tank capable of continually agitating the mixture during the hydroseeding operation to ensure that a homogeneous slurry is produced. The hydroseed mix shall be prepared on site and applied immediately. It shall not be left in the tank for longer than 6 hours before being used.

.3 Binder shall be used for all hydroseeding work.

.4 The Contractor shall proportion the ingredients in the hydroseeding tank according to the size of the tank and the area anticipated to be covered with each tankful of mix, so that the materials are applied at the prescribed rates. The Contractor shall adjust the quantities of ingredients per tankful as required if the actual coverage (m^2/tank) is different from that anticipated.

.5 The mixture shall be applied uniformly onto prepared surfaces from a hydroseeder which shall be capable of spraying the extremities of slopes or other areas of exposed ground, whether through the towergun nozzle or extension hose.

.6 Hydroseeding shall be carried out in all cases within 2 days after completion of the surface preparation, as defined by Section 3.3.

.1 The Departmental Representative shall approve and pre-measure all areas to be hydroseeded, in advance of the commencement of the hydroseeding of any area.

.2 The Departmental Representative shall be notified at least 24 hours in advance of the application of the hydroseeding.

.7 Hydroseeding done between May 1st and Labour Day must produce a satisfactory growth over at least 95% of the area hydroseeded in the growing season of that year.

.1 Areas of poor or no growth shall be reseeded as determined by the Departmental Representative.

.8 After Labour Day, and up to the end of the week in which September 30th occurs:

.1 The hay/straw mulching operation, which forms part of the Hydraulic Seeding, shall be carried out within 48 hours of the hydroseeding operation.

.2 Growth will be based on the performance during the next growing season as per the conditions of 3.4.7.

.9 No hydroseeding shall be carried out after the week of September 30th without the prior approval of the Departmental Representative.

3.5 MULCH

.1 The Contractor shall carry out the work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 Mulch shall be applied with binder at the manufacturer's recommended application rate.

.3 The Contractor shall maintain the mulched areas until mulch is no longer required during the Contract period.

.1 The Contractor shall apply additional mulch as required, to restore the area(s) exposed after the initial application of mulch.

.4 Ditches and areas requiring the hand placement of mulch may, subject to the approval of the Departmental Representative, be placed without binder.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. At all times:

.1 Leave Work area clean at end of each day.

.2 Keep pavement and adjacent areas clean and free from mud, dirt and debris.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.1 Clean and reinstate areas affected by Work.

3.7 PROTECTION

.1 Protect seeded areas from trespass until plants are established.

.2 Remove protection devices as directed by Departmental Representative.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.

.2 Perform following operations from time of seed application until acceptance by Departmental Representative.

.3 Grass Mixture:

.1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.2 Fertilize seeded areas after 10 weeks after germination provided plants have mature true leafs in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.

3.9 ACCEPTANCE

.1 Seeded areas will be accepted by Departmental Representative provided that:

.1 Grass is uniformly established.

.2 Area is free of bare and dead spots.

.2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.10 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

1.2 SUBMITTALS

.1 Product Data:

.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit manufacturer's instructions, printed product literature and data sheets, processed products and tackifier.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performances characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 SCHEDULING

.1 Schedule dry mulching to coincide with preparation of soil surface.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Labelled bags of processed material identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.

.2 Inoculant containers to be tagged with expiry date.

.3 Storage and Handling Requirements:

.1 Material should not be so wet, decayed or compacted as to inhibit even and uniform spreading.

.2 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.3 Replace defective or damaged materials with new.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/ Demolition Waste Management and Disposal.

.2 Do not dispose of unused materials where it will pose health or environmental hazard.

Part 2 Products

2.1 MULCH

.1 Straw in an unprocessed form, such as in bales or rolls, free of noxious weeds, as defined by the Weed Control Act and other undesirable species such as those having ecological or maintenance concerns (e.g. Purple Loosestrife and Sweet Clover).

.2 Material in processed form shall be shredded straw or wood fibre packaged in plastic bags.

2.2 WATER

.1 Free of impurities that would inhibit plant growth.

2.3 MULCH TACKIFIER

.1 Water diluted liquid dispersion containing polyvinyl acetate polymer emulsion.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do not spray onto structures, signs, guiderails, fences, plant material, utilities and other than surfaces intended.

.2 Clean up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.

3.2 PREPARATION OF SURFACES

.1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.

.2 Grade areas to be mulched.

.3 Remove deleterious materials such as sticks, roots, or stones and loosen top 50 mm of soil to remove hardened or crusted soil.

.4 Water soil to moisten.

.5 Obtain Departmental Representative’s approval of grade before starting to mulch.

3.3 DRY MULCHING

.1 Mulch shall be spread by hand or mulch blower evenly and uniformly over the designated areas at a rate of 4500 kg/ha +/- 10%. Rough grade and steep slopes require more mulch and tackifier than finished or flatter ground. Adjust application rate to ensure the soil is covered with an appropriate thickness of mulch.

.2 Tackifier shall be applied immediately after the mulch application as an aqueous slurry. The spray shall be broadcast upwards over the previously placed mulch at low pressures to assure large droplet sizing. The tackifier shall not be applied during or immediately before a rain event.

.3 Where tackifier is not used, mulch shall be mechanically incorporated into the soil surface of all mulched areas, using a mulch crimper, “sheep’s foot” roller, punch roller or by scarification with a track walking vehicle. Scarifications shall be parallel to the contour of the slope.

3.4 MAINTENANCE DURING ESTABLISHED PERIOD

.1 Perform the following maintenance operations from time of application to acceptance:

.1 Bare spots to be re-mulched to maintain adequate cover.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures

.2 Section 31 05 16 – Aggregate Materials

.3 Section 31 23 33.01 – Excavating, Trenching and Backfilling

.4 Section 31 24 13 – Roadway Embankments

.5 Section 31 32 19.01 – Geotextiles

.6 Section 31 37 00 – Armour Rip Rap

1.2 REFERENCES

.1 AASHTO

.1 AASHTO M196, Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains.

.2 ASTM International

.1 ASTM C76M, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).

.2 ASTM C443M, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).

.3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.4 ASTM F667, Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings.

.5 ASTM F679, Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

.6 ASTM F794, Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

.7 ASTM F949, Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.

.8 ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

.3 CSA International

.1 CAN/CSA A3000, Cementitious Materials Compendium.

.2 CAN/CSA A257 Series, Standards for Concrete Pipe and Manhole Sections.

.3 CAN/CSA B182.2, PSM Type Polyvinylchloride (PVC) Sewer Pipe and Fittings.

.4 CAN/CSA B182.4, Profile Polyvinylchoride (PVC) Sewer Pipe and Fittings.

.5 CAN/CSA B182.8, Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings.

.4 Specifications Book, Prince Edward Island Department of Transportation and Infrastructure.

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 pipes and bedding and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Inform Departmental Representative at least 2 weeks before beginning Work, of proposed source of bedding materials and provide access for sampling.

.4 Certification: to be marked on pipe.

.5 Test and Evaluation Reports:

.1 Submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with this Section and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

1.5 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 All materials shall be supplied by the Contractor.

2.2 CORRUGATED ALUMINUM ALLOY PIPE

.1 Corrugated aluminum alloy pipe (Type 2) shall conform to AASHTO M196.

.2 The nominal wall thickness for corrugated aluminum alloy pipe shall be:

Diameter (mm)	Wall Thickness
100 to 500	1.6mm for any corrugation
600 to 1200	2mm for any corrugation
1400 to 1800	2mm for 125mm x 25mm corrugation or 3.5mm for 68mm x 13mm corrugation
2000 to 2400	2.8mm for 125mm x 25mm corrugation or 4.2mm for 68mm x 13mm corrugation

.3 The couplers shall be aluminized corrugated band couplers or universal dimple couplers complete with angle flanges and bolted connectors. Couplers shall be 600mm wide for all pipe sizes.

.4 Should strutting be required during backfill operations, then the Contractor shall provide the necessary timber.

2.3 CORRUGATED HIGH-DENSITY POLYETHYLENE PIPE

.1 High Density Polyethylene (HDPE) Pipe shall be double walled, with a smooth interior surface, conforming to CAN/CSA-B182.8.

.1 HDPE shall have a minimum stiffness of 320 kPa.

.2 HDPE Pipe supplied for use as Driveway Culvert Pipe shall have an open-end area equivalent to or greater than the open-end area for the corresponding diameter of corrugated steel pipe.

.2 Joints: Bell and spigot with integrated gasket.

2.4 GRANULAR BEDDING AND BACKFILL

.1 Granular bedding and backfill material to Section 31 05 16 - Aggregate Materials and following requirements:

.1 For aluminized steel pipe materials, fill material to be placed within 300mm of the top, bottom and the sides of corrugated pipe shall consist of clean well graded Other Material, or small sized shot rock. The maximum dimension of any stone in the Other Material, or in the shot rock, shall not exceed 150mm.

.2 Contractors are advised that should HDPE pipe be used, then the pipe shall be installed in a Select Backfill Material consisting of well graded Other Material having no more than 10% passing the 0.075mm sieve with a maximum particle size not exceeding 75mmm.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.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 and sediment and erosion control plan or requirements of authorities having jurisdiction, whichever is more stringent.

.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.

3.3 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.4 BEDDING

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.

.2 Place 200 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.5 LAYING CORRUGATED ALUMINUM ALLOY CULVERTS

.1 Begin pipe placing at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

.3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.

.4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.6 JOINTS: CORRUGATED ALUMINUM ALLOY CULVERTS

.1 Corrugated aluminum alloy pipe:

.1 Match corrugations or indentations of coupler with pipe sections before tightening.

.2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.

.3 Insert and tighten bolts.

3.7 LAYING CORRUGATED HIGH-DENSITY POLYETHYLENE PIPE CULVERTS

.1 Begin laying at downstream end of culvert.

.2 Install pipe in trench by lowering.

.3 Ensure bottom of pipe is in contact with shaped bedding throughout pipe length.

.4 Allow water to flow through pipes during construction only as permitted by Departmental Representative.

3.8 JOINTS FOR HIGH-DENSITY POLYETHYLENE CULVERTS

.1 Install couplings in accordance with manufacturer's instructions.

3.9 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

.1 AASHTO M180, Standard Specification for Corrugated Sheet Steel Beams for Highway Guardrail.

.2 ASTM International

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

.3 ASTM A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.3 CSA International

.1 CAN/CSA O80 Series, Wood Preservation.

.2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA S136, North American Specification for the Design of Cold-formed Steel Structural Members.

.4 CSA W59, Welded Steel Construction (Metal Arc Welding).

.4 National Lumber Grades Authority (NLGA).

.1 Standard Grading Rules for Canadian Lumber.

.5 American Wood Preservers' Association (AWPA).

1.2 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 guide rail, wood, and coatings and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit product name and manufacturer's specification for the preservative to be applied to the post field cuts and zinc-rich paint to repair minor damage to galvanized coating, and to coat cut ends and field drilled holes.

.3 Submit manufacturer's certification, for all galvanized metals, that the materials supplied meet the specified requirements.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect guide rails from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.4 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Steel W-beam guide rail as indicated and as follows:

.1 Steel rail and terminal sections: manufactured from open hearth, electric furnace or basic oxygen semi-spring steel sheet and hot dip galvanized after fabrication.

.1 To AASHTO M180, class A Type 2 zinc coated.

.2 The steel beam shall be in accordance with the cross-section and dimensions as shown on the contract drawings.

.2 Rails shall be punched for splice and post bolts in strict conformity with the AASHTO Standard to the designated number and centre-to-centre spacing of posts. No punching, cutting or welding will be permitted on site.

.3 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to CSA G164.

.4 If any guiderail installation requires curved W-beam rails, the Contractor shall form these to the radius specified by the Departmental Representative prior to galvanizing.

.5 Each beam element shall be identified by the following marking in accordance with AASHTO M 180:

.1 Name or brand of manufacturer,

.2 Identification symbols or code for heat,

.3 Number and coating lot,

.4 AASHTO specification number, and

.5 Class, type, and thickness

.6 The rails and terminal elements shall be manufactured according to the following standards:

.1 Mechanical properties of the base metal for the rails shall conform to the following requirements:

.1 Minimum Yield Point: 345 MPa

.2 Minimum Tensile Strength: 483 MPa

.3 Minimum Elongation: 12% in 50 mm length

.2 Sheet thickness shall be in accordance with Table 2 (Class A, Type 2) of AASHTO Standard M180 of the latest edition, with a nominal base metal thickness of 2.82 mm (2.59 mm minimum).

.7 Welding for the fabrication of terminal elements shall conform to the requirements of CSA-W59.

.2 Posts and Blocks as indicated and as follows:

.1 The acceptable species for guide rail posts and blocks shall be:

.1 Eastern hemlock

.2 Red Pine

.2 The posts shall be sound and rot-free and shall conform with the requirements for No. 1 Structural Posts and Timbers, graded in accordance with the National Lumber Grading Authority (NLGA) Standard Grading Rules for Canadian Lumber. Posts and blocks shall be subject to inspection by the Departmental Representative when the bundles are opened immediately prior to use.

.3 The dimensions of eastern hemlock or red pine (softwood) guiderail posts shall be 150 x 150 x 2130 mm, unless specified otherwise. Matching softwood blocks shall be 150 x 150 x 342 mm. The tops of wooden posts shall be cut as specified.

.4 Post delineators shall be supplied by the Contractor.

.5 Prior to pressure-treating, posts and blocks shall be incised on all four sides and dried to their fibre saturation point of 25 to 30% at 25 mm depth.

.6 For pressure treating, preservative treatment of posts and blocks shall be chromated copper arsenate (CCA). For field cut surfaces, preservative shall be 2% copper napthenate wood preservative, applied in two coats.

.7 Treatment shall be completed in accordance with requirements of CSA-080. The penetration and retention of preservatives shall conform to the requirements of CSA Standard O80.14, Table 1, Minimum Retention of Preservatives in Pressure Treated Wood for Highway Construction, under the headings “Post-Guardrail, Guide, Sign and Sight” for posts, and “Bridge Handrails, Guardrails and Posts” (not in contact with ground or water). The Departmental Representative may verify the penetration and retention of the preservative by the assay method.

.3 Bolts, Nuts and Washers:

.1 All bolts, nuts and washers shall conform to ASTM A307 and shall be hot dip galvanized conforming to CAN/CSA G164.

.4 Hot Dip Galvanizing:

.1 Hot dip galvanized coating shall be smooth, free of beading or sharp projections at edges. Coating adherence shall prevent the peeling of any portion of the zinc coating so as to expose the base metal by cutting or prying with a stout knife under considerable pressure (bond check). A magnetic gauge will be used for checking thickness, in accordance with ASTM E316.3.

.2 Warped or otherwise deformed rails and terminal elements will be rejected, as will those with injurious defects or excessive roughness of the zinc coating. When the rail is laid on a flat surface, the warpage shall not be greater than 50 mm.

.5 Cedar Posts:

.1 New posts along Gulf Shore Parkway to be 150 mm diameter cedar posts.

.2 Posts to be of sufficient length to be buried minimum 1200 mm into ground.

.3 Posts are to be well peeled with no peeler marks.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for guiderail installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

.2 Prior to commencing work, the Departmental Representative shall locate in the field all proposed areas for installing new guiderail including special or curved installations. These locations shall be reviewed by the Contractor, with the Departmental Representative, to confirm locations and extents. The Contractor shall contact the Departmental Representative 24 hours prior to any work being done.

3.2 ERECTION

.1 Set posts by instrument for alignment, and locations as indicated and as directed by Departmental Representative.

.2 To maintain consistency throughout a project, only one size post and block shall be used on any one section of a contract. 200 x 200 x 440 mm blocks shall only be used with 200 x 200 x 2100 mm posts.

.3 Unsuitable material at the bottom of the holes excavated for guiderail shall be replaced with granular material, as directed by the Departmental Representative. The Contractor shall thoroughly compact the bottom of the hole. The guiderail posts shall rest directly and solidly on the bottom of the hole at the time of installation.

.4 Excavated material which is unsuitable for use as a backfill shall be substituted with granular material, as directed by the Departmental Representative. Backfill shall be thoroughly compacted, in layers not exceeding 150 mm, for the full depth of the excavation. For augured post installation, hand compaction of backfill in layers not exceeding 150 mm is acceptable.

.5 Care shall be taken during the transport, treatment and handling of posts and blocks to prevent damage. Any damage occurring to the posts and blocks prior to delivery and during delivery and installation shall be repaired to the satisfaction of the Departmental

Representative and shall be considered as incidental to construction for the purpose of payment.

.6 No alterations to treated posts and blocks shall be permitted without the approval of the Departmental Representative. Blocks shall not be manufactured from posts. Any exposed cuts shall be treated with two coats of 2% copper napthenate wood preservative. Field applied wood preservative which comes in contact with any galvanized components shall be removed immediately.

.7 Guiderail and guideposts shall be installed plumb, and set according to alignment and grade, regardless of the material encountered, as shown on the drawings or as directed by the Departmental Representative. The rail elements shall be erected to produce a smooth continuous rail paralleling the line and grade of the highway surface as directed by the Departmental Representative. All rail elements shall be lapped in the direction of traffic.

.8 Standard W-beam rail sections shall not be modified to suit post locations; posts shall be located to match W-beam pre-punched bolt hole locations. If Contractor wishes to use two crews, on a given section, the crews shall work from the middle of the job outwards to avoid modifications of standard W-beam rail sections due to varying post spacings. Only at the approval of the Departmental Representative, can holes be drilled or cuts be made to W-beam rail sections. Holes and cut ends shall be treated with a zinc-rich paint that has been approved by the Departmental Representative. Bolts shall be tightened to a torque of 100 Nm.

.9 Two 50 mm x 75 mm delineators are required for each post. A white delineator shall be placed on the side of the post facing traffic; a yellow delineator shall be placed on the opposite side. The delineators shall be located at the edge of the post nearest the road, vertical, with the top 75 mm below the lowest point of the guide rail panel. The delineators shall be attached with galvanized nails.

.10 All damage to pavement, shoulders, ditches, slopes, lawns and any other surfaces and areas within or outside of the project limits, arising from the Contractor's work, shall be repaired to the satisfaction of the Departmental Representative, within five working days, at the expense of the Contractor.

.11 Surplus excavated material and debris shall be removed from the site by the Contractor, at his expense.

.12 All end termination of guide rail installations shall be buried as per PEI DT&I Standard Specifications.

3.3 TOUCH UP

.1 The Contractor shall take all necessary precautions to eliminate damage to galvanizing.

.2 Galvanized steel-touch up:

.1 Cut ends, field drilled holes (permitted on bridge approach/departure elements only) and other areas where the galvanizing has minor damage shall be repaired with a minimum of two coats of zinc-rich paint according to ASTM A780, at no additional cost to the Contract. The coating thickness for the repair shall at least comply with the requirements of AASHTO M180 respecting hot dip galvanizing. Major abrasions shall be repaired by re-galvanizing. The method to be used for repair of any damage shall be approved by the Departmental Representative

before such work is commenced. The Contractor, at his cost, shall carry out the repair or replace components to the satisfaction of the Departmental Representative.

3.4 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.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by guiderail installation.

3.6 CEDAR POST INSTALLATION

.1 Posts to be buried a minimum of 1200 mm into ground.

.2 Post projection to match adjacent post installation.

.3 Top of posts to be cut with a 25 mm slope.

END OF SECTION

APPENDIX

A

PARKS CANADA NATIONAL BEST MANAGEMENT PRACTICES – ROADWAY, HIGHWAY, PARKWAY AND RELATED INFRASTRUCTURE

Parks Canada Parcs Canada

Parks Canada National Best Management Practices

Roadway, Highway, Parkway and Related Infrastructure

Canada

May 2015

Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure

Approved by

Original signed by Mike Wong

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Mike Wong, Executive Director Natural Resource Conservation Branch

Original signed by Kalvin Mercer

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Kalvin Mercer, Associate Vice-President Asset Management and Project Delivery

July 23, 2015

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Date

Contents

Introduction

The Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure will allow an identified suite of project activities to be undertaken in such a manner that there will not be resulting significant adverse environmental effects.

The Best Management Practice (BMP) pathway is applied when there is a suite of routine, repetitive projects (e.g. paving) or activities (e.g.de-watering), with well understood and predictable effects. This fulfils Park's Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land, see the Guide to the Parks Canada EIA Process. The BMP maximizes efficiency through creation of a pre-approved impact assessment for the defined suite of projects, to which standard mitigation and environmental management measures can be applied.

The impact assessment officer (IAO) will review a proposed project and advise the functional manager of the project if and how this BMP should be applied. The IAO's advice will be based on whether the project falls within the scope of the BMP, and whether application of the mitigation measures in the BMP will adequately address potential adverse effects of the project.

Project Managers are responsible to ensure all mitigation measures applicable to the project are added to the terms and conditions of any permits or contracts issued for the project.

The Impact Assessment Officers must ensure the project, EIA pathway applied and determination are recorded in the Parks Canada National Impact Environmental Assessment Tracking System.

Scope of Application

This BMP outlines the impact assessment of repetitive and routine projects on roadways, highways and parkways. If a project involves some or all of below activities, and the initial assessment of site and project indicate "the project is unlikely to result in significant adverse environmental effects" the BMP can be applied. Projects that this BMP would likely be applied to include:

- The proposed maintenance or repair of an **existing** sidewalk, or parking lot.
- The proposed maintenance or repair of an **existing** road, including pull-off areas, that would be carried out on the existing right of way[1].

Activities included in the scope of this BMP are:

1. Project Design
2. General Activities
    - Worksite Conditions/Staging/Laydown
    - Equipment operations
    - Fuel storage and refueling

[1] Highway Footprint or Right of Way (ROW): The permanent physical intrusion of a highway or freeway, including the road surface, shoulders, side slopes, drainage ditches and/or storm drainage ponds (Transport Canada, 2008).

- Site Clean Up/Waste Disposal

3. Asphalt Production and Handling
    - Asphalt Plant Operation
    - Gravel Crushing and Washing
    - Oiling of Truck Boxes
    - Clean Up and Disposal of Waste Products
4. Concrete Handling
    - Operation, maintenance and inspection of Onsite Temporary Concrete Washout Facility
    - Removal of Temporary Concrete Washout Facilities
    - Onsite concrete management
5. Paving, Resurfacing and Grading
    - Grading
    - Paving and Resurfacing
    - Pavement Marking and Barrier and Guardrail Reinstatement
6. Barriers and Guardrails
    - Repair, replacement and upgrades of barriers and guardrails
7. Vegetation Removal
    - Vegetation Removal
    - Grubbing
    - Brushing
    - Disposal of Vegetation Debris
    - Integrated Pest Management
8. Excavation, Soil Stripping and Overburden Removal
    - Excavation
    - Soil Stripping
    - Topsoil Salvage
    - Excavated Material Storage
    - Excess Material and Waste (overburden removal)
9. Slope Stabilization, Drilling and Blasting
    - Slope stabilization-scaling, hydraulic hammers
    - Drilling and blasting for Slope Stabilization and Geotechnical Investigations
10. Soil and Vegetation Restoration
    - Topsoil Replacement
    - Soil Amendments
    - Seedbed Preparation
    - Species Selection
    - Seed Lot Selection
    - Seed Mixture Composition
    - Seeding
    - Alternatives to Seeding
    - Reclamation Standards
    - Reclamation Plot Evaluation
    - Time Limits

10. Drainage Structures
    - Drainage structures
    - Culverts
11. Bridge Maintenance
    - Bridge Cleaning
    - Bridge Repairs Using Treated Wood Products
    - Bridge and Structure Painting
12. Water Withdrawal and Dewatering
    - Water Withdrawal
    - Pump Screens
    - Dewatering

Exceptions

This BMP is not suitable for the following project activities as they would require supplemental assessment and/or mitigations:

- Work that may impact aquatic or terrestrial wildlife habitat connectivity, such as fences or culverts;
- Elongation of culverts; realigning water courses; dredging; or work below the high water mark of a fish bearing water body;
- Bridge projects needing work to occur below the High-Water Mark[1], with permanent; alteration to the water course, such as replacement of piers/abutments or permanent installation of structures on the bed of a water body;
- Greater than 10% increase in land use footprint (e.g. gravel pit expansion); and,
- Work which might adversely impact any potential or established Aboriginal and Treaty rights or traditional use[2].

If the project has the potential to have an adverse effect on the critical habitat of a species at risk (with endangered, threatened, or extirpated status) this BMP does NOT apply. The project will require a separate environmental impact analysis.

If the project has the potential for **residual** adverse effects on a listed species at risk (including effects to individuals and residence of the individuals) this BMP does NOT apply, the project will require a separate environmental impact analysis.

Note: If there is any uncertainty regarding potential adverse effects to species at risk, consult a member of the National Office Species Conservation team.

[1] High-water Mark is the usual or average level to which a body of water rises at its highest point and remains for a sufficient time so as to leave a mark on the land. (Fisheries and Oceans, 2015). Upper Controlled Water Elevation (UCWE) is used as definition of High-water Mark in managed waterways.

[2] Parks Canada must engage in additional and separate consultations with Aboriginal groups if there is a possibility of a project adversely affecting established or potential Aboriginal or Treaty rights. This is required to fulfill federal government responsibilities in upholding the honour of the crown. If there is uncertainty regarding the need for Aboriginal consultation with respect to a project, refer the matter to Parks Canada Legal Services for advice. Guidance on consultation may be sought from the Aboriginal Affairs Secretariat and from the guidance document "A Handbook for Parks Canada Employees on Consultation with Aboriginal Peoples".

Approved geographic area of application

This BMP is intended for use in all Parks Canada administered protected heritage places with roadways, highways and parkways.

Components of the environment that may be affected

Potential effects from projects of this type are well understood and predictable. They include:

Water Resources:

- Adverse modifications to surface drainage patterns
- Reduced water quality due to increased erosion, sedimentation, transportation of debris and contamination (i.e. from leaks and accidental spills, etc.)

Soil/Land Resources:

- Change in slopes, landforms, and landscape
- Soil compaction and rutting
- Slope instability, due to increased soil exposure and improper excavation and storage
- Soil contamination

Air quality:

- Decreased ambient air quality (i.e. from dust, equipment emissions, etc.)
- Increased ambient noise levels
- Temporary increased levels of CO_2 and other pollutants
- Temporary increased localized temperatures from paving and equipment operation.

Flora and Fauna:

- Damage to and/or removal of vegetation in immediate or adjacent areas
- Introduction of non-native species populations, or expansion of existing populations
- Wildlife sensory disturbance causing displacement/preferred habitat avoidance
- Wildlife habituation/attraction to artificial food sources
- Impeded/altered wildlife movement
- Damage to nests/disruption of nesting animals
- Mortality from project activities

Cultural Resources:

- Adverse effects on the heritage value or character-defining elements of a cultural resource
- Impacts to archaeological resources (known or potential)

Mitigation Measures

To use the document efficiently, keep the activity mitigation lists that apply to the project expanded and collapse the other activities by clicking on the section titles, print this as a pdf or paper document and include with the EIA determination record. This will reduce the overall size and scope of the mitigations to present to contractors and project managers.

Choose all that apply to project. Each title is hyperlinked to the related section.

Module	
1.	Project Design
2.	General Activities
3.	Asphalt Production and Handling
4.	Concrete Handling
5.	Paving, Resurfacing, Grading
6.	Barriers and Guardrails
7.	Vegetation Removal
8.	Excavations, Soil Stripping and Overburden Removal
9.	Slope Stabilization, Drilling and Blasting
10.	Soil and Vegetation Restoration
11.	Drainage Structures
12.	Bridge Maintenance
13.	Water Withdrawal and Dewatering

1. Project Design

When upgrades to infrastructure are planned opportunities to decrease the environmental impacts of long term operation should be considered in the engineering design. Some examples are: directing runoff into vegetated areas rather than directly into surface waters to decrease pollution in surface waters, increasing the span length of bridges during replacements to allow for terrestrial wildlife passage underneath and converting smaller culverts to larger culverts or clear span bridges to allow for better fish passage and less restricted flows.

2. General Activities Mitigations Module

Construction activities involve the use of laydown/staging areas, equipment operations, storage and handling of hazardous materials. Potential adverse effects include: destruction of vegetation, erosion and sedimentation, constriction for wildlife movements and introduction/spread of non-native vegetation.

Work Site Conditions/Staging/Laydown

2.1. All employees must attend a briefing with an Impact Assessment Officer (IAO) or Surveillance Officer (SO) before beginning work at the site review and explain the mitigations that are conditions of the project approvals.

2.2. Minimize vegetation-clearing activities and ground disturbance by staging on existing hardened areas wherever possible.

2.3. Avoid or terminate activities on site that attract or disturb wildlife. Vacate the area and stay away from the immediate location if wildlife display aggressive behaviour or persistent intrusion.

2.4. Control materials that might attract wildlife (e.g. petroleum products, human food and garbage).

2.5. Notify the SO immediately about dens, litters, nests, carcasses (road kills), wildlife activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported to SO within 24 hours.

2.6. Delineate the work zone; clearly mark the limits to active construction and the access and egress locations.

2.7. When work involves the disturbance of soils or the use of erodible materials (e.g. sands, topsoil), prevent the transport of sediment by the installing of appropriate erosion and sediment control.

2.8. An Erosion and Sedimentation Management Plan shall be prepared for the components of the work undertaken in proximity to watercourses, wetlands or riparian environments. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger. The ponds shall also be designed to handle 1:5 year storm events, with overflow spill capacity for 1:10 year storm events and emergency spillway capacity for 1:100 year storm events. All components require regular maintenance to ensure effectiveness.

Equipment Operations

2.9. Equipment movements and workers' private vehicles shall be restricted to the 'footprint' of the construction area.

2.10. Ensure machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, noxious weeds and soils from off-site.
2.11. Operate machinery on land above the high water mark, on ice, or in another manner that minimizes disturbance to the banks and bed of any water body.
2.12. Limit machinery crossing (fording) a stream or watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure in compliance with the *Fisheries Act*.
2.13. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
2.14. Use temporary crossing structures or other practices to cross streams or water bodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds.

Fuel Storage and Refueling/Emergency Plans

2.15. A Spill Response Plan will be prepared and detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products in accordance with all applicable federal and provincial legislation. The Plan shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
2.16. Spill kits shall be provided at re-fuelling, lubrication, and repair locations that are capable of dealing with 110% of the largest potential spill and shall be maintained in good working order. Site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
2.17. If potentially hazardous materials (e.g. cement-based products, sealants or paints) are used on site ensure raw material, mixed compounds and wash water are not released to any watercourse or soils. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
2.18. Hazardous or toxic products shall be stored no closer than 100 metres from streams, wetlands, water bodies or waterways.
2.19. Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The SO shall be notified immediately of any spill. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
2.20. The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the proponent. The site will be inspected to ensure completion to the expected standard and to the satisfaction of Parks Canada.

Site Clean Up/Waste Disposal

2.21. Clean tools and equipment off-site to prevent the release of wash water that may contain deleterious substances.

2.22. Where possible, sweep up loose material or debris. Any material thought to pose a risk of contamination to soils, surface water or groundwater should be disposed of appropriately off-site.
2.23. Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in Parks Canada protected heritage places. These wastes shall be contained and removed in a timely and approved manner and disposed at an appropriate waste landfill site located outside the Parks Canada protected heritage place. Construction waste storage containers, shall be emptied when 90% full. Waste containers will have lids, be wildlife proof if there attractants and waste loads shall be covered while being transported.
2.24. Sanitary facilities, such as a portable container toilet, shall be provided and maintained in a clean condition.

3. Asphalt Production and Handling Mitigations Module

Asphalt is a common building material for transportation infrastructure. Its production requires the use of gravel, water, and petroleum products, and associated project activities include transportation, storage and handling of these materials. Installation of asphalt plants is common within the larger parks where gravel extraction is undertaken.

Timing of Works

3.1. Asphalt works are preferably undertaken during periods of dry weather as this allows easier control of contaminated runoff and sediment.
3.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

Operation of Asphalt Plants

3.3. Asphalt plant operation must comply with all environmental pollution control regulations, including provincial regulations, and the plant operational plan.
3.4. Spoil piles and stock piles will be at least 30 meters from the edge of any water body.
3.5. There must be enough room between the stockpiles and the asphalt plant for a loader in the event of a spill at the asphalt plant.
3.6. A containment berm with an associated liner made of occlusive material (e.g. plastic of a thickness approved by the SO) and covered with absorbent sand or clay shall be installed under the asphalt storage tank to ensure containment of 110% of the tank's capacity.
3.7. The proponent shall be responsible for the purchase and safe delivery/storage/handling of asphalt cement and emulsions to the asphalt plant site.
3.8. Excess hot mix or reject new asphalt shall be temporarily in stored in the containment area sufficient to prevent runoff of petroleum into soils or surface waters as directed by

the SO, and removed from the Parks Canada protected heritage place, prior to project completion.

3.9. Every effort will be made to recycle waste asphalt, either as a base course, or by recycling waste asphalt through the asphalt plant according to engineering specifications.Old cured ground asphalt material shall be removed, recycled, or stored for future recycling at an approved operational gravel pit or asphalt plant site. Stockpiles must be further than 30 metres from any surface waters.

3.10. Remaining stockpiles will be removed or incorporated into reclamation plans for the gravel pits or asphalt plant sites.

3.11. Asphalt to be removed must be sampled and analyzed to determine possible lead contamination. Contaminated asphalt will be transported to an approved waste disposal facility. A receipt of delivery is to be provided to the SO.

3.12. Proponent should protect containment/catchment areas and drip trays at the asphalt plant from rainfall since, if contaminated, all of the collected water will require disposal of at an approved disposal facility at the expense of the Proponent.

3.13. Dyking and ponding will be required to control the rate and quality of runoff from the plant site.

3.14. Ensure that the water in the settling ponds remains clean of petroleum products. Any contaminated water will require disposal at an approved disposal facility at the expense of the Proponent.

Gravel Crushing and Washing

3.15. Where possible within engineering constraints, asphalt materials should be recycled to reduce the need for new gravel.

3.16. Gravel will be obtained from an approved operational borrow pit only. For gravel obtained from a borrow pit within a protected heritage place or borrow pit, gravel extraction within the footprint of the disturbed area of the approved operational borrow pit is permitted.

3.17. Gravel will not be crushed within 30 meters of any water body.

3.18. If water for cleaning is extracted from a watercourse, refer to water withdrawal section of this BMP.

3.19. If gravel requires washing, the water used will not be returned directly to any watercourse.

3.20. Water free from chemical contaminants will be discharged into ground where further erosion and runoff into surface water is prevented. Discharging into well vegetated ground surface, at a rate which prevents erosion can often provide increased absorption and reduction of sediment load.

3.21. Contaminated water must be treated to meet CCME guidelines or transported outside of the Parks Canada protected heritage place for disposal at an approved facility.

3.22. For waste removed from the park a detailed receipt of delivery to an approved facility will be provided to the SO.

Oiling of Truck Boxes

Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of thin fuel oil to prevent the mixture from adhering and causing waste asphalt.

3.23. Truck boxes may be oiled only when absolutely necessary.
3.24. Oiling will take place in a bermed area, consisting of a plastic underlay with 15 centimetres overlay of clean gravel. Oil contaminated gravel will be hand collected (so as to prevent tearing of the plastic) from the bermed area daily, and put through the asphalt plant.
3.25. Vehicle covers shall be securely fastened.

Air Quality Mitigations

3.26. Asphalt plants should be 500 meters from buildings with human habitation.
3.27. Emissions from the asphalt plant and paving project equipment will comply with End Product Specifications (EPS) emission control standards and other provincial emissions regulations. Stack test results provided to the ESO by the operator or surveillance contractor may be required when the asphalt plant is at full capacity to ensure the plant is operating within the required standards. If the plant is not operating within the appropriate levels, production will cease until the requirements are met.
3.28. Sludge removed from the clarifier that is free of chemical contamination will be contained to prevent fine dust particles from becoming airborne during windy periods.
3.29. Unannounced stack tests will be conducted throughout the project. If the plant does not meet requirements, operation will cease until the requirements can be met.

Disposal and Clean Up of Other Waste Products

3.30. To ensure regular clean-up of waste asphalt and petroleum spills, a defined clean up schedule will be established during the preconstruction meeting.
3.31. Leaks will be collected in drip-trays, the collected material will either be removed from the park, or recycled back through the Asphalt Plant. For any material removed outside the park to an approved facility, a detailed receipt will be provided to the ESO.
3.32. Used oil, filters, grease cartridges, oil cans and other waste products of plant servicing will be collected and disposed of at the nearest industrial waste facility.

4. Concrete Handling Mitigations Module

Concrete is a common construction material used in transportation infrastructure. Its use ensures longevity of the infrastructure and safety for public use. One litre of concrete wash water or leachate in 1000L of water will kill fish. Cement-based products including grouts and concrete are lethal to fish and many other aquatic organisms. Raw product or leachate entering a watercourse will alter water chemistry, making it more basic or alkaline.

Onsite Temporary Concrete Washout Facility

4.1. Temporary concrete washout facilities shall be located a minimum of 30m from storm drain inlets, open drainage facilities, and watercourses.
4.2. Temporary concrete washout facilities shall be temporary pit or bermed areas constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.
4.3. Straw bales, wood stakes, and sandbag materials can be used to construct temporary containment walls or “barriers”.

4.4. Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material.
4.5. The soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material.
4.6. Perform washout of concrete mixer trucks in designated areas only.
4.7. Wash concrete from mixer truck chutes into approved concrete washout facility or collect in an impermeable bag for disposal.
4.8. Pump excess concrete in concrete pump bin back into concrete mixer truck.
4.9. Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed offsite.
4.10. Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of per federal and provincial regulations.

Maintenance and Inspection of Temporary Concrete Washout Facilities

4.11. Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 100 mm (4 inches) for above grade facilities and 300 mm (12 inches) for below grade facilities.
4.12. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition.
4.13. Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
4.14. Temporary concrete washout facilities shall be inspected for damage (i.e. tears in PVC liner, missing sand bags, etc.).
4.15. Onsite concrete waste storage and disposal procedures should be monitored at least weekly or as directed by the ESO.

Removal of Temporary Concrete Washout Facilities

4.16. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and restored.

Onsite Concrete Management

4.17. Rolling concrete mixers with surplus concrete in amounts less than one cubic metre of wet concrete may waste this concrete in the grade right-of-way as directed by the Parks Canada Representative in areas that drain well away from watercourses. Surplus amounts in excess of one cubic metre are to be returned to the batching yard.
4.18. Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
4.19. The concrete batching plant must be operated pursuant to applicable dust, air emission, and water quality control regulations.

4.20. Waste, solidified concrete from rolling concrete mixers in amounts less than 1 cubic meter and waste solidified concrete from construction pour shall be buried in the grade within 48 hours of the pour, subject to approval and direction from the Departmental Representative

5. Paving, Resurfacing, Grading Mitigations Module

Highway surface management activities are undertaken to ensure public safety on Parks Canada Agency highways by maintaining clean, level, and unbroken road surface conditions through activities such as pavement cleaning, patching, application of surface treatments, and pavement crack sealing. Grading is used to address drainage issues, vegetation encroachment, potholes and rough surfaces.

Timing of Works

5.1. Works are preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of contaminated runoff and sediment.

5.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

Grading

5.3. During grade construction conducted close to any watercourse, water body or wetland ensure materials are not pushed, fall or are eroded into the water or wetlands.

5.4. No grade building shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.

5.5. Materials shall be placed at storage sites or on the grade without spillage outside the work limits. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.

5.6. Retain a 30 metre vegetated buffer around water bodies or install runoff management structures.

5.7. If possible grade roads early in the spring before vegetation develops seed heads or late in season after vegetation has set seed and is dormant to minimize non-native vegetation propagation.

5.8. Ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminates.

Paving and Resurfacing

5.9. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface waters.

5.10. Minimize application of seal coats in wet conditions. Attempt to apply only to dry surfaces and not prior to (within 24 hrs.) or during rainfall. If unforeseen rain arrives ensure runoff from recently seal coated surfaces are prevented from entering surface waters.

5.11. For asphalt handling and management see the Asphalt Mitigation Module of the BMP.

Pavement Marking and Barrier and Guardrail Reinstatement

5.12. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface water Pavement marking shall be undertaken pursuant to standard methods applied in National Parks for control of paint products, both in transport and handling. The Contractor shall present a description of methods to be employed for transporting and controlling paint and hazardous products, application of paint, cleaning of equipment, containment and disposal of waste paint and cleaning products, etc. the satisfaction of the Parks Canada Representative.

5.13. Where concrete barriers or guard rails are temporarily removed, for highway improvements, temporary glow posts shall be installed, at 20.0 m intervals on straight sections and at 10.0 m intervals on curves and shall remain in place until permanent barrier system has been installed.

6. Barriers and Guardrails Mitigations Module

Repair, installation and upgrade of barriers and guardrails involves laydown/staging areas, equipment operations, minor excavation (e.g., for barrier post holes) and use of concrete. Potential adverse effects include destruction of vegetation and erosion and sedimentation.

Timing of Works

6.1. Where excavation is required, schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

6.2. If the work schedule requires working in the rain, appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Repairs, Replacement and Upgrades

6.3. An Erosion and Sedimentation Management Plan shall be prepared for the components of the work undertaken within 100m of watercourses, wetlands or riparian environments. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger.

6.4. Where use of concrete is required for guardrail post holes, Concrete Handling Mitigations apply.

6.5. If vegetation removal is required for barrier or guardrail works, Vegetation Removal Mitigations apply.

6.6. Where concrete barriers or guardrails are temporarily removed, temporary glow posts shall be installed, at 20.0 m intervals on straight sections and at 10.0 m intervals on curves and shall remain in place until permanent barrier system has been installed.

7. Vegetation Removal Mitigations Module

Roadside vegetation management activities include mowing, brushing, and landscape maintenance activities undertaken to maintain clear sight lines for highway users, control noxious weeds, facilitate effective drainage, and reduce possible fire hazards. Mature timber

may need to be removed for improving road alignments, improving sight linesor replacing or repairing associated infrastructure. Grubbing (stump and root removal) may be required to prepare the ground surface for other activities.

Timing Windows

7.1. Vegetation clearing can negatively impact nesting birds and/or bats in spring and summer. Avoid all vegetation removal during this time. If vegetation removal is scheduled to occur within these times a qualified professional biologist/ecologist should further clarify the species presence and timing particular to the work site and any occupied bird nests, eggs, or nests of species protected under the Migratory Bird Convention Act (MBCA). See appendix on regulatory guidance for further detail on the MBCA and SARA.

7.2. If a nest is found during the pre-work surveys, the vegetated area will be left intact with a suitable sized buffer of shrubs/trees around it until the young have fledged and left the nest. Size of buffer species dependent, to be determined in consultation with professional biologist or park ecologist.

7.3. Grass mowing and trimming should not occur during peak spring or fall reptile/amphibian migrations and hatching. Consult a local biologist/ecologist for site and species specific timing windows.

Vegetation Removal Mitigations

7.4. Vegetation removal should be limited to the minimum Clear Zone Distance[1] dependent on type and size of road and maximum height needed to meet the road safety objectives.

7.5. Minimize full removal and retain vegetation when possible to reduce erosion.

7.6. Prior to the commencement of any vegetation removal, the worksite must be surveyed for species at risk. If species at risk are found, work must be stopped until site-specific mitigations to address potential adverse effects are developed.

7.7. Survey vegetation for non-native species, clear vegetation areas with non-native vegetation in spring and early summer to avoid further spread and development of the non-native seed bank.

7.8. Clearing activities shall be avoided during nesting seasons for birds, reptiles and amphibian species in the project area.

7.9. If wildlife is observed during work, if possible, give animals the opportunity to escape the work area to the surrounding forest or elsewhere to seek new shelter.

7.10. Avoid ground vegetation removal during dry, windy periods to prevent erosion of topsoil and reduction of air quality with dirt/dust.

7.11. Retain 30 metre vegetated buffer around water bodies, where disturbance is necessary and unavoidable restoration is required.

7.12. Debris will not be deposited in water bodies.

7.13. Ensure tree limbs/stumps are flush cut as close to the ground or stem as possible.

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[1] A clear zone is an unobstructed, traversable roadside area designed to enable a driver to stop safely or regain control of a vehicle that has accidentally left the roadway. The selection and design of appropriate clear zone dimensions is project-specific and should be the responsibility of professionals trained in roadside design.

7.14. Logs and other salvage materials are to be conveyed to and placed at a storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.
7.15. During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport to a designated pit.
7.16. Where possible preserve identified wildlife trees by limbing or topping if they are not assessed as hazard trees.

Disposal of Vegetation Debris

7.17. All vegetation debris must be removed as soon as possible from the right-of-way, either by transporting off-site for disposal or piling and burning on-site.
7.18. All vegetation containing non-native species will be piled and burnt or bagged and removed off site to disposal facility.
7.19. Piles will be made where trees are felled, piles will be 1.2-1.8 (4 to 6 feet) in diameter and no more than 1.2 m (4 feet) high (approximately 1 to 3 trees per pile) or as instructed by local fire and vegetation specialists.
7.20. Piles are to be located so that they do not scorch surrounding live trees and measures must be in place to ensure that fires do not spread (i.e., conduct burning on snow or on mineral soil).
7.21. Piles will be left until fall for burning to allow for curing of green fuels.
7.22. Provincial regulations for air quality must be met.
7.23. Where fire fuel loading is not a concern vegetation debris of limited amounts will be dragged in the forest to mimic natural tree fall.
7.24. If removal or burning are not feasible a chipper may be used for less than 50 boles per hectare. Chip depth is to be a maximum of 5 cm (2 inches), spread over area no greater of 5m x 5m per hectare so as to not cover underlying vegetation, prevent new native seedlings from sprouting, and cause soil/seed bank sterilization. Spreading of chips may extend beyond these parameters with permission from Parks Canada.
7.25. To facilitate chipping of woody debris, all trees/shrubs/vines can be left temporarily along the road shoulders and laid facing the same direction.
7.26. In some cases, logs from newly cut trees may be set aside for use elsewhere as directed by local park site managers and the ESO.
7.27. Store removed vegetation on already disturbed areas to minimize disturbance area.
7.28. In appropriate areas re-establish native vegetation where it has been completely removed/damaged.

Integrated Pest Management

7.29. A Field Unit Integrated Pest Management Plan (IPMP) must be completed and approved prior to the use of herbicides to ensure the most effective and least harmful substances are properly used.

8. Excavations, Soil Stripping and Overburden Removal Mitigations Module

Construction projects often involve excavations. To successfully complete reclamation of disturbed areas, and protect areas from erosion proper soil handling and backfilling procedures must be followed. Post excavation and stripping soil and vegetation restoration mitigations should be applied. See section of this BMP for Soil and Vegetation Restoration.

Timing of Works

8.1. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

8.2. If the work schedule requires working in the rain, appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Excavation

8.3. Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation.

8.4. All sediment control measures must be in place before starting work in the vicinity of rivers, water bodies, watercourses, and wetlands.

8.5. Special precautions may have to be taken during excavation in the vicinity of intermittent or active drainage channels.

8.6. Excavation plans must be compared to local archaeological resource inventories, if available. If no archaeological information is available for the work area, an Archaeological Overview Assessment (AOA) may be required to determine the archaeological potential of the work area. Based on the results from the AOA, an Archaeological Impact Assessment might be required. It would be time and cost efficient to refer the plan to Parks Canada's Terrestrial Archaeology section before conducting any excavation to determine the appropriate course of action.

8.7. If cultural resources (eg. archaeological resources) are discovered, immediately cease work, and alert SO.

8.8. Minimize changes to the ground surface that affects its infiltration and runoff characteristics and maintain/re-establish effective surface drainage on completion of the project

8.9. Backfill and compact excavations as soon as possible. Optimize degree of compaction to minimize erosion and allow for re-vegetation.

8.10. All trenches or ditches left unattended overnight must be fenced or covered to prevent wildlife entrapment.

Soil Stripping

8.11. Strip topsoil under dry conditions, whenever possible.

8.12. No stripping shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest.

8.13. In the event of a work program shutdown during inclement weather (e.g. winter conditions unfavourable for construction, heavy rain events, construction delays, etc.) erosion control of bared soils or excavated material stockpiles is required.
8.14. Stripping close to any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, do not fall or erode into the water or wetlands.
8.15. Work within a 100 metre buffer from the high water mark of waterways or wetlands will require a site specific sediment and erosion control plan.
8.16. An erosion control plan is also needed to control dust generated from the construction site.

Topsoil Salvage

8.17. Salvage topsoil at all excavation sites for reclamation purposes.
8.18. Usually the upper 15 cm of soil, below the sod layer if present, is considered topsoil, where depths exceed 15cm salvage the entire depth of topsoil.
8.19. Remove stumps and woody debris from topsoil, wherever possible.

Excavated Material Storage

8.20. Allow space for separate storage of topsoil and spoil; where space is available separate stored topsoil from spoil by at least 1 m. Use appropriate material (e.g., geo-textile) to separate soil components where space is limited.
8.21. Topsoil may be stored on hardened surfaces, geo-textile material or directly on undisturbed vegetation. If storage occurs on vegetation, material recovery by hand may be required.
8.22. Cover all stockpiled material with heavy-duty plastic or filter cloth to prevent erosion during precipitation events.
8.23. Topsoil should be stockpiled on the uphill side of the disturbance on sloped terrain.
8.24. Construct barricades to prevent losses on steep terrain (>18°, 3:1) and within 100m of watercourses.

Excess Materials and Waste (Overburden Removal)

8.25. Remove excess excavated material from site where it cannot be used for the final grading of the area. Site specific arrangements must be made for disposal locations and procedures of overburden.
8.26. Surplus excavated material may be used to fill depressions around the project site providing topsoil is stripped before filling, with approval from SO.

9. Slope Stabilization, Drilling and Blasting Mitigations Module

Where standard excavation is not sufficient, scaling, hydraulic hammers, drilling units or trim blasting are used to break up rock or soil for removal. Accumulations of debris in ditches reduce their effectiveness at trapping rock fall and reduce public safety. Ditches will be cleaned using a loader and back hoe. Guardrails and rock fences may be temporarily removed to permit this activity.

Timing of Works

9.1. Time any vegetation removal work should adhere to the Migratory Bird windows for the area.
9.2. Time work to reduce impact to mammals, amphibians and reptiles using rock faces during sensitive life stages such as birthing and rearing of young. This often occurs during the spring. Confirm timing windows with local wildlife ecologists.
9.3. Avoid ditch clearing during wet periods and wait until ditches are dry to reduce impacts to amphibians and reptiles and limit sedimentation.

Slope Stabilization-Scaling, Hydraulic Hammers

The use of hydraulic hammers attached to excavators is considered the ideal solution for rock disintegration. It avoids rock blasting where the parent rock is no longer rippable by the excavator's bucket but still has enough planes of weakness for economical operation and effective use of the hydraulic hammer. Scaling is the manual removal of loose material on rock slopes using pry bars, hydraulic press, brooms, shovels and power equipment operated by personnel using roped access to a rock face.

9.4. For vegetation clearing refer to the vegetation removal mitigation module of this BMP.
9.5. For slope-stabilization in soils, please refer to the Excavation section.
9.6. Survey the work site for cultural resources such as rock art (ex. pictographs, petroglyphs, etc. prior to the work commencing, establish site specific mitigations for their protection.
9.7. Measures shall be taken to control dust as much as possible during the removal and falling of rock materials down slope.
9.8. Placement of rip rap and backfill on shorelines shall be undertaken without contacting the watercourse, wetted margins and must not be below the High Water Mark.
9.9. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately- sized, clean rock is used, and rock is installed at a similar slope to maintain a uniform bank.
9.10. Direct concentrated surface water (runoff) away from cut and fill slopes.
9.11. Immediately stabilize banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through vegetation restoration with native species suitable for the site-refer to soil and vegetation restoration section of BMP.

Drilling and Blasting for Slope Stabilization and Geotechnical Investigations

Trim blasting is used for controlled blasts in which explosive charges are placed in predetermined pattern of holes drilled into the rock face and then detonated. Potentially unstable masses of rock can sometimes be stabilized using rock bolts and long steel rods drilled into the rock to bind it together. Drilling is a common method of investigation to obtain geotechnical reports required for engineering design.

Drilling

9.12. Debris from drilling will be contained (screened or settle out) so it will not cover the surrounding area or enter any water course. All debris will be removed, see section on overburden removal for further mitigations.

9.13. The cuttings from all drilling will be contained so they can be removed entirely from the site. If contaminated, the cuttings are to be disposed at an approved waste disposal facility.

9.14. Control of spoil and sediment loaded water is required on the drill site. Dyking will be required to retain the deposit on non-vegetated surfaces. If contaminated, the spoil pile must be disposed at an approved waste disposal facility.

9.15. During aquifer tests, the water must be piped so it does not erode any soil or any part of the ground. If the water from the tests is piped to a creek, stream, or river, the pipe is to be situated so that there is no erosion of the stream bank or bed. If any sand or similar material is discharged during the aquifer test, care must be taken that the sand does not cover any vegetation.

9.16. All test wells will be filled in after the testing is completed. The proponent will be responsible for rectifying any future problems associated with any of the wells or test wells.

Blasting

9.17. The Parks Canada Representative will identify a magazine location for explosives should a factory site or "ready-to-use" explosives storage site be required

9.18. The blasting supervisor will ensure no damage to infrastructure, people, surrounding vegetation or wildlife by mitigating risk of fly rock.

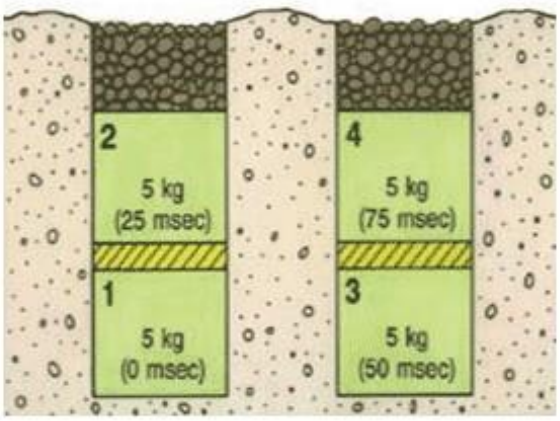
9.19. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.

9.20. If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a bridge or culvert), the potential for impacts to fish and fish habitat will be minimized by implementing the following measures:

- Time in water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries **timing windows**.
- Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
- Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting.
- Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e. Decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).

- Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
- Place blasting mats over top of holes to minimize scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products. Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: Sample Blasting Arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes and decking of charges within holes. (Fisheries and Oceans Canada, 2015)

10. Soil and Vegetation Restoration Mitigations Module

Almost all projects activities included in this BMP will require some ecological restoration- *the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed*. The restoration plan can be a simple application of the following mitigations and can be at the site or both at the site and in concert with another site designated to offset the permanent impact of a project. For disturbance areas greater than a hectare a restoration plan is required. The restoration works can be often be considered projects in and of themselves. Soil and vegetation restoration must apply the principles of effective, efficient and engaging solutions.

Timing Windows

10.1. Develop restoration plan as part of the project scoping and specifications prior to project approvals.

10.2. Vegetation restoration is most effective if seeded in the fall, this allows for full scarification of the seed over the winter and adequate moisture available. Spring and early summer will also work, consider using seed that requires shorter scarification times for these applications. Transplants will do best in the spring and summer and will require adequate watering.

Topsoil Replacement

10.3. Implement restoration plan for the disturbed area immediately following completion of construction.

10.4. Replace topsoil to all areas immediately following fine grading.

10.5. Do not compact topsoil.

10.6. Where insufficient topsoil is available imported soil may be used as a last resort. Imported topsoil must be certified completely free of non-native seeds and compost developed from sewage treatment plants. Methods of improving vegetation succession using locally sourced, weed and contaminant free materials are preferred.

10.7. Slopes to be seeded should be no steeper than 2 horizontal to 1 vertical (2:1) and covered with a minimum of 5 cm (2 inch) of topsoil. Finish grading should always follow top soil placement.

10.8. Where remaining soils are unstable due to steepness or soil characteristics, immediate installation of sod or erosion control blanket is required.

10.9. Methods of bioengineering such as terracing, willow staking, live pole drain systems should be assessed as solutions where soils are steeper or remain unstable.

Soil Amendments

Fertilizer Application

10.10. Avoid use of fertilizer to limit non-native vegetation growth and allow for local species to use available nutrients.

10.11. If needed use locally sourced mycorrhizae compost teas to improve vegetative success.

Topsoil substitute

10.12. Apply an organic cellulose only amendment as a soil substitute if reclamation standards are not being met within the defined time frame.

10.13. Determine the type of organic amendment based on the site-specific requirements (e.g., peat moss, compost).

Seedbed Preparation

10.14. The seedbed will be scarified by hand or, with the approval of the SO, by machine on large areas (i.e., roadbeds) where it is accessible and appropriate.

10.15. The seedbed will be scarified if seeding takes place more than 7 days after final grading or if there has been a rainfall between final grading and the seeding date.
10.16. The cleats of a tracked vehicle or a harrow device will be used, where possible, to prepare an adequate seedbed with seedling safe-sites (microsites) substantially free of soil crusts.
10.17. Align cleat marks at right angles on slopes to trap seed and sediment and reduce erosion.

Species Selection

10.18. When selecting species and varieties:
- Use species of local native plant communities.
- Species viability in proposed environment and climatic conditions.
- Capability to effectively control erosion, where required.
- Adaptation to the variable site conditions of undulating topography.
- Consider palatability of some species to herbivores and avoid growing attractants in areas of increased risk to wildlife and visitors.
- Variable life expectancy to produce variable, delayed die-out of seeded species and replacement with indigenous native plants.

Seed Lot Selection

10.19. Select seed lots based on indigenous species variety and quality (guaranteed weed seed free content and highest purity and germination), consult with vegetation restoration specialist or fire/vegetation ecologist.
10.20. Reject any seed lots containing any seed of undesirable crop or weed species.

Seed Mixture Composition

10.21. The proportion of each species should be calculated to provide an adequate quantity of pure live seed (PLS) per unit area of each key component.
10.22. Aim for density of about 140 seedlings/m^2 at the end of the first growing season to provide adequate ground cover and allow native species to re-colonize the site over time.
10.23. Consider that parameters such as seed lot purity, seed germination, seedling establishment, seed size and seeding method affect the final stand composition.

Seeding

10.24. Use approved native seed mixes developed for site-specific conditions for various elevations.
10.25. Seed and stabilize (e.g. mulch/tackifier) bare areas as soon as possible after disturbance, preferably as soon as a significant area is graded and finished and before the next rain event. If there is a risk of seedling mortality as a result of fall frost stabilize until appropriate growing conditions exist.
10.26. Use sod in high traffic areas or places that need extra erosion control. Source sod grown from native species (often called fescue sod) and ensure adequate anchoring and watering is in place.
10.27. Use temporary seeding when outside the seeding dates for permanent vegetation
10.28. Apply a seed mixture which is appropriate for the climate, soil, and drainage conditions of the site.

10.29. Apply seed at a rate appropriate to the seed mixture, seeding method and existing vegetation conditions.
10.30. Conduct broadcast seeding under calm wind conditions. Hydro-seeding is acceptable where access is available.
10.31. Do not exceed 30 kg/ha for the broadcast method, ensure seed is integrated with the soil by light rake or harrow. Broadcast method seeding rate is 25 kg/ha (2.5g/m^2) (e.g., 1x25 kg bag will cover 10,000m^2 or 1 hectare).
10.32. For hydro-seeding do not exceed 75 kg/ha with light mulch rates (500 kg/ha- of mulch with hydro-seeding) and 150 kg/ha with heavy mulch rates (1500 kg/ha of mulch with hydro-seeding).
10.33. Do not increase the seeding rate to compensate for poor seedbed conditions.
10.34. Monitor temporary erosion control measures to prevent seed loss.
10.35. Some seeding procedures may have to be completed or repeated in subsequent years.

Alternatives to Seeding

10.36. Use topsoil seed bank in small areas when there is no risk of erosion or competition from invasive species (i.e., natural regeneration).
10.37. Use native transplants in areas where conventional seeding applications are not applicable or where slope stability is an issue.
10.38. Use conventional forestry planting methods for container grown transplants, see website for guidance.

Reclamation Standards

10.39. Minimum standard for plant density is 25 plants/m^2, with 90% frequency.
10.40. Minimum standard for plant cover is 80% ground cover, with 90% frequency.
10.41. Minimum standard for plant community composition standard is 50% cover and 90% frequency of native species.
10.42. Exclude species designated as weeds in the work sites from the plant density standard consult local vegetation ecologist for current site specific non-native vegetation management program.
10.43. Rock, plant litter and non-vascular species are included in the cover standard.
10.44. Remaining plant cover of seeded native species is acceptable.

Reclamation Plot Evaluation

10.45. Select any site within reclamation area measuring 10 x 10 m, providing 100 plots of 1 square meter.
10.46. Measure the plant density, cover and composition in each of the 100 square meter plots.
10.47. The reclamation standard will have been met if 90 of the 100 plots match or exceed the criteria.
10.48. No fertilizer will be applied one year before the reclamation standard is evaluated.

Time Limits

10.49. Inspect site annually during the growing season.
10.50. Minimum reclamation standard, as above, to be met within one season post planting.

10.51. Apply amendments annually, depending on reclamation progress.
10.52. Re-seed site if the plant density standard is not expected to be achievable within 5 years.

- A new restoration plan will be prepared and implemented when reclamation standards have not been met after 5 years.

11. Drainage Structures Mitigations Module

Drainage structures on roadway, highway and parkways are structures such as culverts, ditches and drains. Drainage structure management activities are undertaken to ensure that surfaces are safe and efficiently drained, water is efficiently channeled to ditches and watercourses, and erosion of highways and adjacent properties is prevented. These mitigations include the cleaning and maintenance of drainage structures and related hardware, as well as the repair or replacement of existing and installation of new drainage structures.

Timing of Works

11.1. Time work in water to respect **timing windows** to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. Contact your local aquatics specialists and DFO offices for further information on **timing windows** in your region.
11.2. Conduct in-stream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.
11.3. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.
11.4. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Drainage Structures

11.5. Isolate your work area from any flowing water that may be present. Ensure any flows are temporarily diverted around the portion of the ditch or watercourse where you are working.
11.6. Select appropriate equipment and work access routes to reduce damage to riparian vegetation and watercourse banks when using earth-moving equipment.
11.7. For smaller scale debris and sediment removal activities, remove materials by hand.
11.8. To assist with bank stability and invasive plant prevention, leave topsoil and root systems intact on channel banks surrounding your work area.
11.9. Ensure any works to repair damaged structures retain the pre-repair channel conditions (e.g., streambed profile, substrate, channel cross section) and do not constrict the stream width.
11.10. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

Culverts

If a proposed culvert crosses a stream where fish are present, the crossing should be designed or upgraded to provide fish passage and avoid interference with fish habitat. To mitigate the impact of culverts on fish movement technical assessment of the water flows and fish species is required to establish a culvert design that will allow for passage of fish. Often there are regional or provincial best practices available online and qualified professionals can assist with designs. Some best management practices for installation or replacement of culverts follows.

Culvert Design and Alternatives

Utilize alternative crossing structures (e.g. clear span bridges, lock blocks and concrete decks) as a replacement for culverts, where possible.

11.11. Ideally, crossings should have natural streambed material through them to allow continuous substrate that matches the streambed below and above the crossing. Open bottom crossings are ideal for maintaining natural substrate.

11.12. Utilize a single large culvert design over a multiple culverts design (i.e. several smaller culverts) to reduce debris blockage and increased fish and wildlife passage, where hydrologically feasible

11.13. Design culvert bottoms to be placed at least 30cm below the stream bed elevation to ensure culverts remain passable by fish and wildlife by preventing culverts from becoming perched.

11.14. A minimum water depth of 200 mm should be provided throughout the culvert length. To maintain this water depth at low flow periods an entrance/downstream pool can be constructed. In some cases, an upstream pool may also be necessary.

11.15. The culvert slope should follow the existing streambed slope where possible.

11.16. The culvert, inlet(s) and outlet(s) should be adequately protected with rip-rap to prevent erosion and scour around the culvert during high runoff events. The following measures should be incorporated when using replacement rock to stabilize the culvert:

- Place appropriately-sized, clean rocks into the eroding bank area by hand or machinery operating outside the water course.
- Do not obtain rocks from below the ordinary high water mark of any water body.
- Where possible, install rock at a slope similar to the stream bank to maintain a uniform stream profile and natural stream alignment. Otherwise, install the rock at the closest slope required to ensure it is stable.
- Ensure rock does not interfere with fish passage or constrict the channel width.

11.17. Trash racks should not be used near the culvert inlet. Accumulated debris may lead to severely restricted fish passage and potential injuries to fish. Where trash racks cannot be avoided in culvert installations, they must only be installed above the water surface indicated by bank full flow. A minimum of 9 inches clear spacing should be provided between trash rack vertical members. If trash racks are used, a long term maintenance plan must be provided along with the design, to allow for timely clearing of debris.

11.18. Natural or artificial supplemental lighting should be considered in new or replacement culverts that are over 150 feet in length.

11.19. Ensure designs locate culvert structures in areas that minimize impacts to riparian vegetation and associated wildlife.

Culvert Installation

11.20. It may be necessary to exclude fish from the immediate construction site while a culvert is being installed. If this practice is necessary, fish shall be salvaged by a qualified aquatics professional from within the exclusion area.

11.21. If dewatering is required refer to the dewatering mitigation module of this BMP for appropriate mitigations.

11.22. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

11.23. Remove any old structures to a suitable upland disposal facility away from the riparian area and floodplain to avoid waste material from re-entering the watercourse

Wildlife Considerations for Culverts

At times, culverts are placed along portions of highways that bisect wetlands or specific habitats that support an abundance of wildlife. Consider building natural rock ledges through culverts to allow for small and medium-sized animals to walk on during periods of high flow.

12. Bridge Maintenance Mitigations Module

Bridge structure management activities include the cleaning and painting of bridge structures as well as the repair, rehabilitation, and replacement of bridge elements including decks, railings, abutments, and bearings. Works may include asphalt, concrete works, chipping, painting, grouting, timber truss, abutment and piling maintenance. These activities help ensure bridge structures remain structurally sound and safe for public use.

Timing of Works

12.1. Time work in water to respect **timing windows** to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. Contact your local aquatics ecologists, provincial jurisdictions and DFO offices for further information on **timing windows** in your region.

12.2. Conduct in-stream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

12.3. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

12.4. Cover or otherwise contain stockpiled materials during heavy rain events or extended absences.

12.5. If the work schedule requires working in the rain, the area of work must be isolated with appropriate sediment controls installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Bridge Cleaning

12.6. Schedule bridge-cleaning activities to coincide with the watercourse's spring freshet when possible. At freshet or during periods of high flow a large watercourse will often have its highest background levels of sediment. At this time, the introduction of a small amount of sediment to a watercourse (from bridge cleaning) will have a lower risk of potential impact when considered against those high natural background levels.

12.7. If works are planned outside the freshet or if your region does not experience a freshet, discuss the protocol and timing of these works with your local aquatics ecologist and/or DFO Officer.

12.8. Dry sweep and collect loose material off bridge surfaces before washing the bridge. Adequately seal drains and any open joints on the bridge deck before sweeping or washing to prevent material or sediment-laden wash water from entering any watercourse

12.9. If dry sweeping and preventing direct runoff to waterway is not a feasible way to clean the surface, discussion and planning with local aquatic ecologists will be required.

12.10. Use water alone. If your cleaning activities require degreasers or any other chemical, approval for use must be obtained from local aquatics specialists and/or DFO.

12.11. Contain any wash water or runoff to the bridge deck. Direct wash water towards the bridge approaches and away from the watercourse, then to a vegetated area or contained settling area (e.g., dry ditch channel unconnected to a watercourse) where it can infiltrate.

12.12. If superstructure cleaning is undertaken above or on the bridge deck level, prevent potentially harmful materials from entering into road drains. Block deck drains with suitable barriers (e.g., polyethylene or drain blocks) to prevent direct discharge to a watercourse, or re-route runoff through temporary piping onto adjacent settling pond or structure, using a hydro vacuum would be another option.

12.13. If water for cleaning is extracted from a watercourse, refer to water withdrawal section of this BMP.

Repairs Using Treated Wood Products

12.14. Untreated wood products are recommended, if treated wood is to be used, ensure it has been treated with a wood preservative appropriate for the project. Refer to the *Parks Canada Guide for the Use, Handling and Disposal of Pressure Treated Wood 2009* and any further updates from Parks Canada Real Property – Environmental Management.

12.15. If treated timber must be cut to size, ensure cutting takes place away from the bridge and watercourse. Sawdust from treated wood is harmful to aquatic organisms and must be prevented from entering any watercourse.

12.16. Wood preservatives should be applied in a contained area and not be applied over or within 200m of water.

Bridge and Structure Painting

12.17. Ensure paint flakes, abrasive grits and abrasive/paint flake mixtures do not enter the watercourse as they may leach toxic heavy metals into receiving waters and/or be ingested by fish.

12.18. Install ground covers and/or vertical drapes such as sheets of plastic or air-permeable cloth (e.g., burlap or canvas) prior to removal activities to capture falling debris. Floating barges may be deployed in watercourses to capture falling debris, such as paint flakes and dust.

12.19. Waste materials collected during removal and application of protective coating operations (e.g., blasting abrasives, paint particles, rust and grease) should be

collected and retained for disposal at appropriate locations. Waste materials must not be deposited into watercourses or riparian areas.

12.20. Use hydro blasting or manual techniques, where possible, when removing road dirt, soluble salts and loose paint to minimize impacts to the watercourse.

12.21. Use water without cleaning agent additives if grease film removal is necessary.

12.22. Avoid use of toxic liquid paints, primers, solvents, degreasers and rust inhibitors.

12.23. Minimize spill potential by storing, mixing and transferring paints and solvents on land.

13. Water Withdrawal and Dewatering Mitigations Module

Construction often requires the use of water, many common methods of excavation and site isolation require dewatering. Temporary, short term water withdrawal provides an efficient uncontaminated water source for local project sites. Dewatering can allow sites to be effectively dry during construction, reducing the impact of sediment laden water entering fish bearing waters.

Timing Windows

13.1. As a general guide to prevent taking more water than aquatic system can support, limit total take of water to less than 5 successive days and less than 10 days in any period of 30 days.

13.2. Avoid water withdrawal during breeding seasons of amphibians and reptiles to avoid destruction of egg masses, consult local aquatics ecologist for site specific guidance.

Water Withdrawal

13.3. Water should not be withdrawn from a wetland or stream less than 5 metres wide at the surface or a lake less than one hectare in area.

13.4. Water withdrawal should follow the 10/90 rule which allows for up to 10% of the stream flow to be withdrawn, as long as the stream flow does not fall below the 90% exceedence flow (eg.1 in 10 chance in a given year).

13.5. No permanent or semi-permanent works for water withdrawal should be placed in the stream channel.

13.6. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish, amphibians and/or reptiles. Entrainment occurs when a fish or amphibian is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish, reptile or amphibian is held in contact with the intake screen and is unable to free itself.

Pump Screens

13.7. In freshwater, fish-bearing waters design and installation of intake end-of-pipe fish screens:

- Locate screen in areas and depths of water with low concentrations of fish throughout the year away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
- Orient the screen face in the same direction as the flow of water.

- Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
- Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
- Provide structural support to the screen panels to prevent sagging and collapse of the screen. Large cylindrical and box type screens should have a manifold installed to ensure even water velocity distribution across the screen surface. The end of the structure should be made of solid materials and the end of the manifold capped.
- Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where debris loading (woody material, leaves, algae mats, etc.) is a concern. A 150 mm (6 in.) spacing between bars is typical.
- Provision should be made for the removal, inspection, and cleaning of screens.
- Ensure regular maintenance and repair of cleaning apparatus, seals, and screens to prevent debris fouling and impingement of fish.
- Pumps must be shut down when fish screens are removed for inspection and cleaning.

Dewatering

13.8. A site specific dewatering plan is required be provided before commencing a pump-out sump to dewater excavation sites with specific details on how and where the water will be discharge.

13.9. Site specific mitigations may be required depending on the conditions of the discharge area, freezing conditions operation, overflow avoidance, decanting and settlement pond reclamation.

13.10. Water containing suspended materials shall not be pumped into watercourses, drainage systems or on to land, except with the permission of the SO.

13.11. Soil and vegetation erosion protection is required for water pumped on to land.

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Appendix 1 Regulatory Guidance

Jurisdictions

While all projects on lands managed by Parks Canada must adhere to Federal law and regulation, it is considered best practice to refer to local community, regional, provincial regulation and best practices where federal guidance is silent and/or attempt to meet those targets if it can reduce the overall impact of the project.

Some of the project activities reviewed have potential environmental impacts that are addressed by various provincial, federal and territorial acts and regulations. All activities must meet current environmental law and regulations in their design and construction. The following is a brief description of some of the key federal acts and regulations. Further review, understanding and application of other federal, provincial and territorial environmental laws are part of a rigorous approach to project planning and execution.

Canada National Parks Act and Regulations-Parks Canada

All work inside National Parks and Protected Areas must be performed in accordance with the laws and regulations set out in the *Canada National Parks Act* and Regulations. This includes the requirement for most activities described to only be done under a permit such as: business licence for contractor, disturbance of natural objects, travel in restricted areas, special events or use of disposal sites.

Fisheries Act - Fisheries and Oceans Canada

If a project is to be conducted near water, it is the proponent's responsibility to ensure they avoid causing serious harm to fish in compliance with the *Fisheries Act*. The advice in on the Fisheries and Oceans website will help a proponent avoid causing harm and comply with the Act.

If the water body in the project area has fish or is connected to waters at any time that have fish the project must meet the self assessment criteria on the Fisheries and Oceans website, if not a project review can be made by Fisheries and Oceans Canada to assess whether the project requires authorization or authorization can be requested directly. Given the level of detail required for a review and/or authorization request the EIA officer may need to consider a more involved EIA pathway in those circumstances.

Migratory Bird Convention Act – Environment Canada

The purpose of this Act is to implement the Convention by protecting and conserving migratory birds - as populations and individual birds - and their nests. Section 6 - prohibits the disturbance, destruction, or taking of a nest, egg, or nest shelter of a migratory bird.

In Canada, the general nesting period may start as early as mid-March and may extend until end of August. This is a general nesting period that covers most federally protected migratory bird species. This period varies regionally across Canada mainly due to differences in species assemblages, climate, elevation and habitat type. Generally, the nesting period is delayed in more northerly latitudes, corresponding to vegetation development and food availability. (Environment Canada, 2014). To help with determining regionally relevant periods where

nesting is likely to occur, Environment Canada is publishing estimated regional nesting periods within large geographical areas across Canada referred as "nesting zones". These periods are estimated for each zone and consider the time of first egg-laying until the young have naturally left the vicinity of the nest. Field Units may wish to refine this section and add their known local nesting periods.

Species at Risk Act

If a species listed under the *Species at Risk Act* (SARA) is found within the project area, any potential adverse effects from the proposed project to the individuals of the species, their residences and/or their critical habitat must be understood. Species at risk considerations require specific expertise, due to additional legal requirements under the SARA and CEAA 2012. If the projects or activities to be addressed by the BMP could affect a listed species or its critical habitat, the EIA officer may need to consider a more involved EIA pathway in those circumstances.

APPENDIX

B

BASIC IMPACT ANALYSIS – GULF SHORE PARKWAY SHORELINE PROTECTION PROJECT