





**PARKS CANADA AGENCY**

**SPECIFICATION**

**ISSUED FOR TENDER**

**Fortress of Louisburg, Louisburg, NS  
Armour Stone Placement, Route 22**

**Project # 578**

**March 31, 2022**

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**Discipline**

Joshua Pidgeon, P.Eng.  
**Marine**

**Seal**



**END OF SECTION**

**Part 1            General**

**1.1                WORK COVERED BY CONTRACT DOCUMENTS**

- .1        Work of this Contract comprises of site improvements and installation of shoreline protection (armour stone) the barrier beach located along Route 22 at the Fortress of Louisbourg Historic National site in Louisbourg, NS.

**1.2                WORK SEQUENCE**

- .1        This work is being constructed on Parks Canada Agency's (PCA), hereby referred to as the Owner, lands and water lot. Contractor to coordinate with PCA representative or another representative as designated by PCA, such as the Engineer or Consultant, for all construction activities as well as any design inquiries and submissions. This representative will hereby be referred to as the Departmental Representative.

**1.3                CONTRACTOR USE OF PREMISES**

- .1        Unrestricted use within the Limit of Construction to perform the work.
- .2        Co-ordinate use of premises under direction of Departmental Representative.
- .3        Obtain and pay for use of additional storage or work areas if required for operations under this Contract.
- .4        Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

**1.4                EXISTING SERVICES**

- .1        Contractor must notify Departmental Representative immediately if Human Remains, Archaeological Remains, and Items of Historical or Scientific Interest are discovered on the site to gain information on action to be taken before continuing with the work.
- .2        Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .3        Prior to beginning excavation Work, notify Departmental Representative or authorities having jurisdiction, to clearly mark such locations to prevent disturbance during Work.
- .4        Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .5        Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .6        Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

- .7 Provide temporary services when directed by Departmental Representative to maintain critical building systems.
- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.

**1.5 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy of each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**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, 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      Contractor to provide own washroom facilities and power as deemed necessary to complete the Work. Keep facilities clean. The existing onsite bathroom is not to be used.
- .3      Where security is reduced by work provide temporary means to maintain security.

**1.3      EXISTING SERVICES**

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

**1.4      SPECIAL REQUIREMENTS**

- .1      Work Hours are Monday to Friday from 07:00 to 21:30 hours,. Departmental Representative to approve work on Saturdays, Sundays and Statutory Holidays. PCA will not be authorizing additional payment for overtime.
- .2      Carry out noise generating work Monday to Friday from 07:00 to 20:00 hours. Departmental Representative to approve work on Saturdays, Sundays and Statutory Holidays.
- .3      Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, and security regulations.
- .4      Keep within limits of work.
- .5      Deliver materials to the Site Monday to Friday between 07:00 to 20:00 unless otherwise approved by Departmental Representative.
- .6      Other construction with various contractors may be occurring concurrent with the construction of this phase of the project at the Fortress of Louisburg. Contractor to coordinate with Departmental Representative to ensure a corridor for other contractors is available on to and off of the wharf at all times, or as deemed necessary by 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 GENERAL REQUIREMENTS OF THE TENDER FORM**

- .1 Lump Sum price bid are full compensation for the work necessary to complete the work as described in the drawing and specification documents in its entirety 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 Any quantities listed in the associated Tender Form are approximate only and are for the purpose of tendering. Should actual built quantities exceed those estimated in the contract documents, notice will be provided to the departmental representative prior to exceeding the estimated quantities.

**1.2 MEASUREMENT AND PAYMENT**

- .1 All items in this contract will be paid for by costs included in the Lump Sum Payment for costs not included in these items.
- .2 Item 1 – Division 1 Requirements
  - .1 Terms of Payment: Lump Sum
  - .2 This item includes:
    - .1 Mobilization, demobilization, permits, insurance, etc. 50% of this item to be paid when mobilization to site is complete. The remainder to be paid when the Work is complete and all materials, equipment, and other facilities have been removed from site, site cleaned and left in condition to the satisfaction of the Departmental Representative. Note that this item **does not** include the transportation of individual materials described in the itemized sections below.
    - .2 Provision, installation and maintenance of temporary traffic control devices, including detour signs, construction signage and electronic message boards.
    - .3 Provision and maintenance of detours.
    - .4 Vehicle, equipment, supplies and additional manpower required by traffic accommodation persons.
  - .3 Environmental procedures.
    - .1 Installation and general maintenance of all erosion control measures or as directed by Departmental Representative.
  - .4 Special project Features including Cultural Resource Protection.
  - .5 Testing and quality Control
  - .6 Construction Facilities
    - .1 Site Trailer
  - .7 Temporary Barriers and Enclosures.

- .8 Cleaning.
- .9 Construction/Demolition Waste Management and Disposal
- .10 Common Work Results
  - .1 Insurance and Bonding
  - .2 Municipal fees and Permits.
- .3 Item 2 - Section 31 23 33 – Excavation, Trenching and Backfilling
  - .1 Unit of Measurement: Cubic metre.
  - .2 This item includes: Excavation, hauling, transportation, and disposal of new material brought to site, and unsuitable material removed offsite. This includes, but is not limited to, the following: existing site material,
- .4 Items 3 - Section 31 32 19 – Geotextiles
  - .1 Unit of Measurement: sq. metre.
  - .2 This item includes: Supply of material including transportation to site, and placement of material per the drawing or as directed by Departmental Representative.
- .5 Items 4 - 32 92 19.16 – Hydroseeding
  - .1 Unit of Measurement: sq. metre.
  - .2 This item includes: Supply of material including transportation to site, and placement of material per the drawing or as directed by Departmental Representative.
- .6 Items 5 - Section 35 31 19 – Revetments
  - .1 Unit of Measurement: tonnes.
  - .2 This item includes: Supply of material including transportation to site, and placement of material per the drawing or as directed by Departmental Representative.
- .7 All and any items not specifically included in the Measurement and Payment and Pay item list are considered incidental to the work and are to be included in the tendered price for the 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            GENERAL**

- .1        Submit to the Departmental Representative the submittals listed for review. Submit promptly and in orderly sequence to not cause delay in the 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 by Departmental Representative.
- .3        Present shop drawings and product data 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        Keep one reviewed copy of each submission on site.

**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 drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada as required.
- .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 14 days for the Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the 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 and product data.
  - .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 the Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as the Departmental Representative may reasonably request.
- .11 Submit electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copy of test reports for requirements requested in specification

- Sections and as requested by the 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 3 years of date of contract award for project.
- .13 Submit electronic copy of certificates for requirements requested in specification Sections and as requested by the 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 copy of manufacturers instructions for requirements requested in specification Sections and as requested by the 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 copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the 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 copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, reviewed electronic copy 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.
- .21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that

pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

**1.3 DIGITAL COPY**

- .1 Provide digital copies in PDF format of all reviewed submittals.

**1.4 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

**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      REFERENCE STANDARDS**

- .1      Canada Occupational Health and Safety Regulations (1986). Amended.
- .2      Provincial legislation – Nova Scotia Occupational Health and Safety Act (1996). Amended.

**1.2      ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1      Results of site specific safety hazard assessment.
  - .2      Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3      Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4      Submit copies of incident and accident reports.
- .5      Submit WHMIS SDS - Safety Data Sheets.
- .6      The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor.
- .7      The Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8      Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.
- .9      On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

**1.3      FILING OF NOTICE**

- .1      File Notice of Project with Provincial authorities prior to beginning of Work. Provide the Departmental Representative with a copy of the filed Notice(s) prior to commencement of the work.

**1.4 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project.

**1.5 REGULATORY REQUIREMENTS**

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

**1.6 GENERAL REQUIREMENTS**

- .1 Contractors are required under Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act to have in place a Health and Safety Program. Compliance requirements for the content, detail and implementation of the program resides with the provincial authority. For the purpose of this contract the Health and Safety Program shall include a site-specific Health and Safety Plan (the “Plan”) that acknowledges, assesses and addresses hazardous substances and/or hazardous conditions known and identified and on-going hazard assessments performed during the progress of work identifying and documenting new or potential health risks and safety hazards not previously known and identified.
- .2 Provide one copy of the Health and Safety Program to the Departmental Representative prior to commencement of work on the work site. The copy provided to the Departmental Representative is for the purpose of review against the contract requirements related to the known hazardous substances and/or hazardous conditions. The review is not to be construed to imply approval by the Departmental Representative that the program is complete, accurate and legislatively compliant with the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act, and shall not relieve the Contractor of their legal obligations under such legislation.
- .3 The Health and Safety Program shall include no texting or cell phone use permitted when driving or operating heavy equipment.
- .4 The Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .5 Contractor shall ensure that all site personnel are familiar with the contents of the Plan and maintain records for proof.
- .6 Contractor shall employ measures to ensure all personnel entering the site are advised to abide by the Plan.
- .7 The Departmental Representative reserves the right to demand the removal of any persons not complying with the Plan. Any persons removed from the site shall not be permitted re-entry unless authorized by the Departmental Representative.

**1.7 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

- .2 Contractor will be responsible and assume the role Constructor as described in the Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.8 COMPLIANCE REQUIREMENTS**

- .1 Comply with the latest edition of the Occupational Health and Safety Act, and the Regulations made pursuant to the Act.
- .2 Observe and enforce construction safety measures required by:
  - .1 National Building Code of Canada (latest edition).
  - .2 Nova Scotia Health and Safety Act.
  - .3 Provincial Worker's Compensation Board.
  - .4 Municipal statutes and ordinances.
  - .5 In event of conflict between any provisions of above authorities the most stringent provision shall apply.
- .3 Provide and maintain Worker's Compensation Board coverage for all employees for the duration of the contract. Prior to commencement of the work, at the time of Interim Completion and prior to final payment, provide to the Departmental Representative a letter of Clearance from the Workers' Compensation Board indicating that the Contractor's account is in good standing.

## **1.9 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise the Departmental Representative verbally and in writing.
- .2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise the Departmental Representative verbally and in writing.

## **1.10 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, a competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related experience specific to activities performed under this Contract.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work and report directly to site supervisor.

### **1.11 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with the Departmental Representative.

### **1.12 ACCIDENT REPORTING**

- .1 Investigate and report incidents and accidents as required by the Nova Scotia Occupational Safety and Health Act, and the Regulations made pursuant to the Act.
- .2 For the purpose of this contract, immediately investigate and provide a report to the Departmental Representative on incidents and accidents that involve:
  - .1 A resulting injury that may or may not require medical aid but involves lost time at work by the injured person(s).
  - .2 Exposure to toxic chemicals or substances.
  - .3 Property damage.
  - .4 Interruption to adjacent and/or integral infrastructure operations with potential loss implications.
- .3 In the investigation and reporting of incidents and accidents, the Contractor is required to respond in a timely fashion to correct the action that was deemed to have caused the incident and/or accident and advise in writing on the action taken to prevent a re-occurrence of the incident and/or accident.

### **1.13 SITE CONTROL AND ACCESS**

- .1 Control all work site access points and work site activities. Delineate and isolate the work site from adjacent and surrounding areas by use of appropriate means of maintain control of all work site access points.
- .2 Make provisions for granting permission to access onto work site to all persons who require access. Procedures for granting permission to access are to be in accordance with the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act and the Contractor's Health and Safety Program.
- .3 Ensure persons granted access to the work site are in possession of and wear the minimum personal protective equipment (PPE) designated by the Contractor's Health and Safety Program. Ensure persons granted access to the work site are provided with, trained in the use of, and wear, appropriate PPE that are required above and beyond the designated minimums previously noted and as specifically related to the work site activity that they are involved in. Be responsible for the efficacy of the PPE that is provided above and beyond the designated minimums.
- .4 Erect signage at access points and at other strategic locations around the work site clearly identifying the work site area(s) as being "off-limits" to non-authorized persons. Signage must be professionally made with well understood graphic symbols and is not to be used as advertising but for the specific use as related to site safety and key contact information.
- .5 Secure the work site at all times to protect against un-authorized access.

**1.14 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Departmental Representative.
- .2 Provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**1.15 BLASTING**

- .1 Blasting or other use of explosives is not permitted.

**1.16 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for 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 Canadian Environmental Protection Act (1999) and relevant regulations. Amended.
- .2 Fisheries Act, 1985, and relevant regulations. Amended.
- .3 Migratory Birds Convention Act, 1994 and relevant regulations. Amended.
- .4 Species at Risk Act (SARA), 2002 and relevant regulations. Amended.
- .5 Canadian Environmental Assessment Act, 2012.
- .6 Federal Policy on Wetland Conservation, 1991.
- .7 Canada Occupational Health and Safety Regulations (1986). Amended.
- .8 Provincial legislation – Nova Scotia Endangered Species Act (1998). Amended.
- .9 Provincial legislation – Nova Scotia Water Act (1989). Amended.

**1.2               GENERAL**

- .1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation.
- .2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.
- .3 The Contractor will include in the bid all necessary costs to meet the environmental requirements. Request for extras will not be entertained.

**1.3               CONTRACTOR’S RESPONSIBILITIES**

- .1 It is the Contractor’s responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.
- .2 The Contractor is responsible to provide awareness training to site personnel with respect to spill response and sediment and erosion control.
- .3 The Contractor is required to furnish all materials, labour, tools and equipment and perform all operations necessary to meet regulatory requirements and the environmental protection requirements of this project.
- .4 The Contractor must comply with federal, provincial and local laws, ordinances, codes and regulations when handling, removing or disposing of impacted soil, water, waste materials, debris and rubbish.
- .5 Provide and maintain for the duration of the contract the control features as laid out in this contract. During the course of the work, evaluation of the control features may

indicate a requirement for additional features or modifications to existing control features. The Contractor will be required to implement changes as necessary to meet the environmental protection objectives. Do not remove the control features unless authorized by the Departmental Representative.

## 1.4 MITIGATION PROCEDURES

- .1 The Contractor shall ENSURE the following Mitigation procedures are followed:
  - .1 Petroleum, Oils and Lubricants
    - .1 Do not refuel equipment within 100 meters of any watercourse, wetland or storm water catchbasin unless protection against spills is in place and location is approved by the Departmental Representative.
    - .2 Use petroleum containers approved for products with no spill fill spouts for dispensing fuels. Ensure pour nozzle has a self closing valve; prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container, the slide valve closes to eliminate any fuel spill. Nozzles are to be equipped with automatic vent eliminating the need for the user to open or close air inlets on the pouring container.
    - .3 Nozzle must support the weight of the pouring container. Use Nozzles that automatically stop the flow when the receiving container becomes full.
    - .4 All spills of hydrocarbon-based products such as gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze no matter how small must reported to the Departmental Representative.
  - .2 Clearing and Grubbing
    - .1 Minimize stripping of topsoil and vegetation to prevent erosion and sedimentation of watercourses.
    - .2 Protect trees and plants on site and adjacent properties where required.
    - .3 Protect roots of trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
  - .3 Waste Management
    - .1 Do not bury rubbish and waste materials on site.
    - .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers. Ensure proper disposal procedures in accordance with CEPA, TDGA, all applicable provincial regulations.
    - .3 Fires and burning of rubbish on site not permitted.
  - .4 Surface Water Management
    - .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
    - .2 Do not pump water containing suspended materials or sediment into waterways, sewer or drainage systems.
    - .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
  - .5 Equipment Movement & Maintenance

- .1 Park equipment on level ground in locations away from watercourses/wetlands and as approved by Departmental Representative. Equipment with leaks must be removed from site.
- .2 When parking equipment on site, the equipment is to be secured from entry, inspected for leaks and the ground protected from leaks.
- .3 Oil changes or equipment repairs is not permitted on site.
- .4 Refuelling to be performed on level surfaces, PCC Portland cement concrete or HMAC surfaces when approved by the Departmental Representative.
- .6 Erosion & Sediment Control
  - .1 Exposed soil must be stabilized as soon as possible through compaction, spreading Hay and/or seeding/sodding.
  - .2 Place hay bales between stockpiles and catch basins to minimize sediment transport.
  - .3 All perimeter control structures (e.g. silt fencing) must to be installed prior to any land disturbance.
  - .4 Erosion control structures need to be maintained and shall not be removed until the area is stabilized after construction activities are complete.
- .7 Other Controls
  - .1 Ensure construction work does not adversely affect adjacent watercourses, wetlands, groundwater and wildlife.
  - .2 Maintain temporary erosion and pollution control features installed under this contract.
  - .3 Control emissions from equipment and plant to local authorities emission requirements.
  - .4 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
  - .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
  - .6 Ensure construction work does not contribute to excess air noise pollution exceeding municipal or any other applicable standards.
  - .7 Employ reasonable means necessary which has been approved by the Departmental Representative to protect salvaged materials from vandalism, theft, adverse weather, or inadvertent damage by heavy machinery.
  - .8 Use natural lighting to do Work where possible. Shut off lighting except those required for security purposes at end of each day.
  - .9 The Contractor shall remove all temporary structures at completion of work.

## **1.5 EMERGENCY & CONTINGENCY PLANNING**

- .1 The Contractor is responsible for emergency preparedness and contingency planning for all Environmental Incidences.
  - .1 The Contractor must have adequate supplies on site for clean up of any potential hazardous materials used for the completion of the work ie. fuel, oil, lubricants, etc.
  - .2 In the event of a spill the Contractor will immediately take corrective action to stop, contain and clean up the material.

- .3 All spills are to be reported immediately to the Departmental Representative. In the event of a spill of over one (1) litre of a hazardous material, the Contractor will immediately inform proper authorities.
- .4 Contractor employees to be trained in the use of the spill control kit and the equipment they contain.
- .5 Contractor is to protect all wells, catch basins, drywells, drains, wetlands and watercourses from contamination in event of a spill.
- .6 If a spill occurs, the Contractor must take necessary remedial action at no cost to the Owner and immediately remove as much of the contaminated soils as possible. Any remaining clean-up is to be performed at no cost to Owner. Clean-up shall be to the Departmental Representative's satisfaction.
- .7 Disposal of spilled materials is to be off-site at approved locations for the materials to be disposed of. Contaminated soils/materials are to be placed in containers compatible to the contaminants.

## **1.6 KEY CONTACT LIST**

- .1 Prior to commencing construction activities or delivery of materials to site, the contractor shall provide:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection requirements.
  - .2 Names and qualifications of persons responsible for training site personnel.
  - .3 Descriptions of environmental protection personnel training program.

## **1.7 HISTORICAL ARCHAEOLOGICAL CONTROL**

- .1 If during construction, historical, archaeological, cultural resources, biological resources and/or wetlands are discovered, the Contractor will give immediate notice to the Departmental Representative and await written instructions before proceeding with work.

## **1.8 NOTIFICATION**

- .1 The Departmental Representative will notify the Contractor in writing of observed noncompliance with Federal, Provincial or Municipal Environmental laws or regulations, permits, and this contract document. Most stringent shall apply.
- .2 Contractor: after receipt of such notice, inform the Departmental Representative of proposed corrective action and take such action for approval by the Departmental Representative.
- .3 The Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

**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               PERMITS**

- .1 Contractor shall apply for and obtain all construction related permits as required to complete the Work.

**1.2               REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (latest edition) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

**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 01 33 00 – Submittal Procedures.

**1.2                INSPECTION**

- .1        Allow the Departmental Representative and Engineer access to Work. This will include transportation to and from Georges Island to inspect the work, as deemed required by the Departmental Representative. 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 the 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        The 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, the Departmental Representative shall pay cost of examination and replacement.

**1.3                TESTING AGENCIES**

- .1        Contractor shall engage a third-party materials testing agency for purpose of testing portions of Work as normally required under each Section.
- .2        If defects are revealed during inspection and/or testing, the Departmental Representative will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to Owner. Pay for costs of re-testing and re-inspection.

**1.4                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.

**1.5                PROCEDURES**

- .1        Notify appropriate agency and the 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.

## **1.6 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 the 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.
- .3 If in opinion of the Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Departmental Representative.

## **1.7 REPORTS**

- .1 Submit inspection and test reports in PDF format to the Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

## **1.8 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.

## **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                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.2                INSTALLATION AND REMOVAL**

- .1        Indicate use of supplemental or other staging area.
- .2        Provide construction facilities in order to execute work expeditiously.
- .3        Remove from site all such work after use.

**1.3                HOISTING**

- .1        Provide, operate and maintain hoists required for moving of workers, materials and equipment.
- .2        Hoists to be operated by qualified operator.

**1.4                SITE STORAGE/LOADING**

- .1        Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2        Do not load or permit to load any part of Work with weight or force that will endanger Work.

**1.5                CONSTRUCTION PARKING**

- .1        Parking will not be required on site as work is taking place on an island. However, storage of construction vehicles will be permitted for the duration of the work.
- .2        Provide and maintain adequate access to project site.

**1.6                SECURITY**

- .1        Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays as deemed necessary by Contractor.

**1.7                OFFICES**

- .1        Not required under this contract and at the discretion of the Contractor.

**1.8                EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1        Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials if deemed necessary to perform the Work.
- .2        Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

**1.9 TEMPORARY WATER AND SEWER**

- .1 Provide any temporary water and sanitary facilities for work force in accordance with governing regulations and ordinances.

**1.10 TEMPORARY COMMUNICATIONS FACILITIES**

- .1 Provide any temporary telephone, fax, data hook up lines and equipment as required to complete the work.

**1.11 CONSTRUCTION SIGNAGE**

- .1 No other signs or advertisements, other than warning signs, are permitted on site unless approved or instructed by the Departmental Representative.
- .2 Signs and notices for safety and instruction in both official languages. Graphic symbols to CAN/CSA-Z321.
- .3 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 the Departmental Representative.

**1.12 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.
- .5 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**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 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

**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 HOARDING**

- .1 Temporary construction site fencing is not required.
- .2 Protect existing trees and landscaping elements from damage by equipment and construction procedures.

**1.4 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

**1.5 DUST TIGHT SCREENS**

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

**1.6 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, and ramps as may be required for access to Work.

**1.7 FIRE ROUTES**

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

**1.8 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.

**1.9 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Be responsible for damage incurred due to lack of or improper protection.

**1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**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                QUALIFICATIONS OF SURVEYOR**

- .1        Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to the Departmental Representative.

**1.2                SURVEY REFERENCE POINTS**

- .1        Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .2        Make no changes or relocations without prior written notice to the Departmental Representative.
- .3        Report to the Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .4        Require surveyor to replace control points in accordance with original survey control.

**1.3                SURVEY REQUIREMENTS**

- .1        Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2        Establish lines and levels, locate and lay out, by instrumentation.
- .3        Stake for grading, fill and landscaping features.
- .4        Stake slopes and berms.

**1.4                EXISTING SERVICES**

- .1        Before commencing work, establish location and extent of service lines in area of Work and notify the Departmental Representative of findings.
- .2        Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by the Departmental Representative.

**1.5                LOCATION OF EQUIPMENT AND FIXTURES**

- .1        Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2        Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3        Inform the Departmental Representative of impending installation and obtain approval for actual location.

- .4 Submit field drawings to indicate relative position of various services and equipment when required by the Departmental Representative.

## **1.6 RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a survey showing dimensions, locations, angles and elevations of Work. Record survey must be provided in both of the following formats:
  - .1 NAD83 UTM Zone 20 with CGVD2013 for vertical datum.
  - .2 NAD83(CSRS) Zone 5 with chart vertical datum.
- .3 Record locations of maintained, re-routed and abandoned service lines.

## **1.7 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 On request of the Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .2 Submit certificate signed certifying those elevations and locations of completed Work that conform and do not conform with Contract Documents.

## **1.8 SUBSURFACE CONDITIONS**

- .1 Promptly notify the Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should the Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

## **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      Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2      Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative.
- .3      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4      Provide on-site containers for collection of waste materials and debris.
- .5      Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .6      Dispose of waste materials and debris off site.
- .7      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**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 including that caused by Owner or other Contractors.
- .5      Remove waste materials from site at regularly scheduled times or dispose of as directed by the Departmental Representative.
- .6      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7      Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .8      Remove dirt and other disfiguration from exterior surfaces.
- .9      Sweep and wash clean paved areas.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**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 01 33 00 – Submittal Procedures.

**1.2                REFERENCES**

- .1      Definitions:
  - .1      Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority.
  - .2      Approved disposal area: Disposal area as designated by the Owner.
  - .3      Class III: non-hazardous waste - construction renovation and demolition waste.
  - .4      Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities.
  - .5      Inert Fill: inert waste - exclusively asphalt and concrete.
  - .6      Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
  - .7      Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
  - .8      Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
  - .9      Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
    - .1      Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
    - .2      Returning reusable items including pallets or unused products to vendors.
  - .10     Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
  - .11     Separate Condition: refers to waste sorted into individual types.
  - .12     Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:
  - .1      Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.

- .2 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.
- .3 Submit prior to final payment the following:
  - .1 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

#### **1.4 USE OF SITE AND FACILITIES**

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility.

#### **1.5 WASTE PROCESSING SITES**

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.
- .2 See Section 02 50 00 – Site Remediation for removal of impacted soils.

#### **1.6 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled, and salvaged in locations so as to not interfere with Work.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to designated disposal facility.
- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .8 Separate and store materials produced during project in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
  - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

#### **1.7 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.

- .2 Do not dispose of waste type into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
  - .1 Number and size of bins.
  - .2 Waste type of each bin.
  - .3 Total tonnage generated.
  - .4 Tonnage reused or recycled.
  - .5 Reused or recycled waste destination.
- .4 Remove materials on-site as Work progresses.

## **1.8 SCHEDULING**

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

### **3.2 CLEANING**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 01 78 00 – Closeout Submittals.

**1.2                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 the Departmental Representative's inspection.
  - .2            Departmental Representative's 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 that tasks have been performed as follows:
    - .1            Work: completed and inspected for compliance with Contract Documents.
    - .2            Defects: corrected and deficiencies completed.
    - .3            Equipment and systems: tested, adjusted, balanced and fully operational.
    - .4            Operation of systems: demonstrated to Owner's personnel.
    - .5            Work: complete and ready for final inspection.
  - .4            Final Inspection:
    - .1            When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
    - .2            When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
  - .5            Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
  - .6            Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
  - .7            Final Payment:
    - .1            When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
    - .2            When Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

**1.3 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools, and equipment.
- .2 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

**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 01 77 00 – Closeout Procedures.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3                FORMAT**

- .1            Provide CAD files in dwg format on CD or memory stick.
- .2            Provide redline as-built drawing mark-ups in PDF format on CD or memory stick.
- .3            Provide other documentation in PDF format on CD or memory stick.

**1.4                CONTENTS - PROJECT RECORD DOCUMENTS**

- .1            Table of Contents for Each Volume: provide title of project;
  - .1            Date of submission; names.
  - .2            Addresses, and telephone numbers of the Departmental Representative and Contractor with name of responsible parties.
  - .3            Schedule of products and systems, indexed to content of volume.
- .2            For each product or system:
  - .1            List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3            Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4            Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5            Typewritten Text: as required to supplement product data.
  - .1            Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

**1.5                AS -BUILT DOCUMENTS AND SAMPLES**

- .1            Maintain, at site for the 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 in the field apart from documents used for construction.
- .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 available for inspection by Departmental Representative.

## **1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of black line drawings.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Record information in AutoCAD dwg files.
- .5 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities 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.
- .6 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .7 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .8 Provide digital photos, if requested, for site records.

## **1.7 FINAL SURVEY**

- .1 Submit final site survey certificate certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
  - .1 Prepare a complete in-trench survey for all utilities.
  - .2 Prepare a complete as-built topographical survey to capture all surface features.

- .2 Locate all walks, roadways, pads, buildings, trees, shrubs, poles, bollards, posts, abandoned utilities, capped utilities and new utilities within the construction area.
- .3 Locate manholes and storm drainage catchbasins c/w inverts indicated by north, south, east, west location.
- .4 Locate electrical manholes, poles, transformers, switching cubicles and specialty lights.
- .5 Survey to be completed by a Construction Surveyor and be a registered Nova Scotia Land Surveyor.
- .6 Provide survey on CD or memory stick in AutoCAD dwg format along with CSV or ASCII file of raw data points.

## **1.8 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan to Departmental Representative.
- .3 Warranty management plan to include required actions and documents to assure that Owner receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Assemble approved information on CD or memory stick as follows:
  - .1 Separate each warranty or bond to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .6 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .7 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Owner to proceed with action against Contractor.

## **1.9 DELIVERY SCHEDULE**

- .1 Accompany Record Information submissions with a transmittal containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Other pertinent data.

- .2 Within four (4) weeks of substantial completion, or as otherwise agreed, the Contractor shall deliver the Record Information package with the data required as identified herein.
  - .1 Allow ten working days for the Departmental Representative's or Owner's review of each submission.

**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 35 31 19 - Revetments

**1.2 REFERENCE STANDARDS**

- .1 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specifications (most recent version).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
  - .1 Allow continual sampling by Departmental Representative during production.
  - .2 Provide Departmental Representative with access to source and processed material for sampling.
  - .3 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
  - .4 Provide front end loader or other suitable equipment including trained operator for stockpile sampling as necessary. Move samples to storage place as directed by Departmental Representative.
  - .5 Supply new or clean sample bags or containers according appropriate to aggregate materials.
  - .6 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
  - .7 Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section [with manufacturer's written instructions.
- .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

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**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 minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
  - .2 Reclaimed asphalt pavement.
  - .3 Reclaimed concrete material.
- .3 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
- .4 Granular sub-base material Tpye 2.

**2.2 SOURCE QUALITY CONTROL**

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 4 weeks minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Departmental Representative 4 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
  - .1 Visually inspect substrate in presence of Departmental Representative]
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with work only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 PREPARATION**

- .1 Aggregate source preparation:

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
  - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
  - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
  - .4 When excavation is completed dress sides of excavation to nominal [1.5:1] slope, and provide drains or ditches as required to prevent surface standing water.
  - .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
  - .6 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.
- .2 Processing:
- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
- .5 Stockpiling:
- .1 Stockpile aggregates on site in locations as directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces. Stockpile aggregates in accordance with NSTIR Standard Specifications DIV 3 Section 2.
  - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
  - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
  - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300mm of pile into Work.
  - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials.
  - .7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
  - .8 Do not cone piles or spill material over edges of piles.
  - .9 Do not use conveying stackers.
  - .10 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .7 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

**END OF SECTION**

Approved: 2012-06-30

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33 – Excavating, Trenching, and Backfilling.

**1.2 REFERENCE STANDARDS**

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

**1.3 EXISTING CONDITIONS**

- .1 Establish precise field locations of underground services prior to commencement of work.
- .2 Refer to dewatering in Section 31 23 33.- Excavating, Trenching and Backfilling.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Fill material: in accordance with of Section 31 23 33 - Excavating, Trenching and Backfilling.
- .2 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.

**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 rough grading 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 TESTING**

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory. Costs of tests will be paid by Departmental Representative in accordance with Section 01 45 00 - Quality Control.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

**3.4 PROTECTION**

- .1 Protect existing trees fencing, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 35 31 19 - Revetments

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m<sup>3</sup>).
  - .5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Nova Scotia Transportation & Infrastructure Renewal (NSTIR) Standard Specification for Highway Construction and Maintenance.
- .4 Canadian Environmental Protection Act (1999) and relevant regulations. Amended.
- .5 Provincial legislation – Nova Scotia Occupational Health and Safety Act (1996). Amended.
- .6 Canada Occupational Health and Safety Regulations (1986). Amended.

**1.3 DEFINITIONS**

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
  - .1 Rock: solid material in excess of 1.0 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material not classified as rock.
  - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

- .3 Topsoil:
  - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
  - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
  - .1 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.
- .5 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
- .6 Unsuitable materials:
  - .1 Weak, chemically unstable, and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2.
    - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
    - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

#### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field and location plan of relocated and abandoned services, as required.

## **1.5 QUALITY ASSURANCE**

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

## **1.6 EXISTING CONDITIONS**

- .1 Buried services:
  - .1 Before commencing work, verify or establish location of buried services on and adjacent to site by approved methods. Location of services shown on plans are approximate only and not deemed accurate.
  - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
  - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
  - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .5 Prior to beginning excavation Work, notify Departmental Representative and establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.
  - .6 Confirm locations of buried utilities by approved methods.
  - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Contractor.
  - .9 Record location of maintained, re-routed and abandoned underground lines.
  - .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative, a condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey benchmarks and monuments which may be affected by Work.

- .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

For material specifications, see Section 31 31 19 - Revetments

## **Part 3 Execution**

### **3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.2 SITE PREPARATION**

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

### **3.3 PREPARATION/PROTECTION**

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

### **3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING**

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the Provincial Health and Safety Act.
- .2 Construct temporary Works to depths, heights and locations as approved by Departmental Representative.

- .3 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.
- .4 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .5 Upon completion of substructure construction:
  - .1 Remove cofferdams, shoring and bracing.
  - .2 Remove excess materials from site.

### **3.5 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative's approval, the details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
  - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .6 Pump sediment laden water into vegetation a minimum of 30 meters from stream or wetland. Ensure no sediment laden water reaches sewers, watercourses, wetlands or drainage areas. If necessary, provide flocculation tanks, settling basins, geotubes or other treatment methods and facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses, wetlands or drainage areas.

### **3.6 EXCAVATION**

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
  - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 For trench excavation, do not excavate more than 30 m of trench in advance of

installation operations. All excavations shall be filled at end of workday prior to leaving site.

- .6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of all excavated material as unsuitable material in approved location.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.
- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove unsuitable material from trench bottom and as directed by Departmental Representative.
- .14 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.

### **3.7 FILL TYPES AND COMPACTION**

- .1 Use types of fill as indicated on drawings.

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

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

### **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 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 300 mm.

### **3.10 TESTING**

- .1 Refer to Section 01 45 00 – Quality Control.
- .2 Contractor shall carry out compaction testing of all bedding and backfill materials and submit testing results to Departmental Representative for review and approval as they become available. The Departmental Representative will not consider payment for placement of any granulars unless satisfactory test results are submitted by the Contractor.
- .3 Final testing procedure and frequency of tests to be determined by the testing agency.

### **3.11 RESTORATION**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

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

**1.2                REFERENCES**

- .1        ASTM International
  - .1        ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2        ASTM D3786, Standard Test Method for Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method
  - .3        ASTM D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Zenon Arc-Type Apparatus.
  - .4        ASTM D4491, Standard Test Method for water Permeability of Geotextiles by Permittivity.
  - .5        ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
  - .6        ASTM D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
  - .7        ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
  - .8        ASTM D5261, Standard Test Method for Measuring Mass per Unit Area of Geotextiles.

**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.

**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 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.
- .3 Packaging Waste Management: remove for reuse by manufacturer of pallets, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIAL**

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
- .2 Properties:
  - .1 Weight: Minimum 800 g/m<sup>2</sup> to ASTM D5261.
  - .2 Grab Tensile Strength: Minimum 1200 N to ASTM D4632.
  - .3 Grab Elongation: 50 % to ASTM D4632.
  - .4 Tear Resistance: Minimum 333 N to ASTM D4533.
  - .5 Puncture Resistance: Minimum 1000 N to ASTM D4833.
- .3 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m<sup>2</sup> to ASTM A123M.
- .4 Factory seams: sewn in accordance with manufacturer's recommendations.
- .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

## **Part 3 Execution**

### **3.1 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 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 Departmental Representative.

### **3.2 INSTALLATION**

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

- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Join successive strips of geotextile by sewing.
- .6 Pin successive strips of geotextile with securing pins at midpoint of lap.
- .7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .8 After installation, cover with overlying layer within 4 hours of placement.
- .9 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .10 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

### **3.3 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.

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**END OF SECTION**

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**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures.
- .2        Section 01 74 11 – Cleaning.

**1.2                SCHEDULING**

- .1        Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.
- .2        Scheduling:
  - .1        Schedule hydraulic seeding to coincide with preparation of soil surface.

**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 seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
- .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.

**1.4                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 fertilizer 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        Store fertilizer in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2        Replace defective or damaged materials with new.

**1.5                WASTE MANAGEMENT AND DISPOSAL**

- .1        Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

## **1.6 WARRANTY**

- .1 For seeding, 12 months warranty period is extended to 1 full growing season.
- .2 End-of-warranty inspection will be conducted by PCA Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
    - .1 Mixture composition:
      - .1 40 % Kentucky Blue Grass.
      - .2 40 % Creeping Red Fescue.
      - .3 20% Annual Rye Grass.
  - .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
    - .1 Type I mulch:
      - .1 Made from wood cellulose fibre.
      - .2 Organic matter content: 95% plus or minus 0.5%.
      - .3 Value of pH: 6.0.
      - .4 Potential water absorption: 900%.
  - .3 Tackifier: water dilutable, liquid dispersion.
  - .4 Water: free of impurities that would inhibit germination and growth.
  - .5 Fertilizer:
    - .1 To Canada "Fertilizers Act" and Regulations.
    - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for hydraulic seeding.
  - .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.

### **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.
- .2 Fine grade areas to be seeded free of humps and hollows.
  - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25 mm.
- .4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .5 Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

### **3.4 FERTILIZING PROGRAM**

- .1 Fertilize prior to fine grading, during establishment and warranty period in accordance with manufacturer's recommendations. Fertilizing program shall be submitted to and approved by the Departmental Representative.

### **3.5 PREPARATION OF SLURRY**

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After materials are in seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

### **3.6 SLURRY APPLICATION**

- .1 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
  - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture shall be applied to surface in accordance with manufacturer's instructions.

- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
  - .1 Using correct nozzle for application.
  - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent grass areas or sodded areas or previous applications to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.

### **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 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .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.

### **3.8 PROTECTION**

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Departmental Representative.

### **3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD**

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative.
- .2 Grass Mixture:
  - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
  - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass.
  - .3 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.
  - .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
  - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

### **3.10 ACCEPTANCE**

- .1 Seeded areas will be accepted by Departmental Representative provided that:
  - .1 Seeded areas are free of rutted, eroded, bare or dead spots.
  - .2 Areas have been mown at least twice.

- .3 Areas have been fertilized.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

**3.11 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 PCA Representative.
  - .2 Mow areas seeded and remove clippings that will smother grassed areas as directed by PCA Representative.
  - .3 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 01 35 43 – Environmental Procedures.

**1.2                DEFINITIONS**

- .1            Erosion: deterioration, displacement, or transportation of land surface by wind or water, intensified by land clearing practices related to construction work.
- .2            Sediment: particulate matter transported and deposited as a layer of solid particles within a body of water.

**1.3                REFERENCE STANDARDS**

- .1            Refer to laws, by laws, ordinances, rules, regulations and orders or authority having jurisdictions, and other legally enforceable requirements applicable to Work at that area, or become in force during Work performance
- .2            Canada Water Act (R.S.C., 1985, c. C-11)
  - .1            Comprehensive Water Resource Management
- .3            Canada Labour Code, Part 2, Canada Occupational Health and Safety Regulations.
  - .1            Canadian Centre for Occupational Health and Safety (CCOHS), OSH Answers Fact Sheets, Working on or near water.
- .4            Fisheries Act (R.S.C., 1985, c. F-14)
  - .1            Fisheries and Oceans Canada (DFO)
- .5            Species at Risk Act (S.C. 2002, c. 29)
- .6            Migratory Birds Convention Act, p 1994, S.C. 1994, c. 22.
- .7            Canadian Environmental Protection Act, 1999 (CEPA 1999).
- .8            Canada National Parks Act (S.C. 2000, c. 32).

**1.4                COORDINATION**

- .1            Coordinate the requirements by authority having jurisdictions of each province/territory to Departmental Representative, as applicable, to achieve compliance during work performance.
- .2            Province of Nova Scotia
  - .1            Environment Act, Protected Water Areas.

**1.5                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Sustainable Design Submittals:

- .1 Erosion and Sedimentation Control: Provide copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

## **1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Operation of construction equipment in water is prohibited. Only the bucket/boom shall enter the water as necessary during sub sea work. Tracks of the excavator, as well as other equipment on site shall be clear of water at all times.
- .2 Ensure a dewatered condition for operation of equipment within watercourses. Operation of construction equipment in water is prohibited.
- .3 Install stabilized entrances at equipment access points to dewatered watercourses.
- .4 Use borrow material from watercourse beds only after receipt of written approval from Departmental Representative.
- .5 Design and construct temporary crossings to minimize environmental impact to watercourse.
- .6 Constructing temporary crossings of watercourses where spawning beds are indicated is prohibited.
- .7 Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Silt Fencing:
  - .1 Consisting of non-woven geotextile with manufactured seams as resistant as the geotextile material itself. The geotextile shall be in one piece.
  - .2 Stakes to be natural wood, minimum 1.5 metres in length, sized to withstand peak flows.

## **Part 3 Execution**

### **3.1 EXISTING CONDITIONS**

- .1 Maintain existing flow pattern in natural watercourse systems.
- .2 In natural systems maintain existing riffle pool and step pool patterns.
- .3 In wetland systems, maintain existing hydrological conditions.

### **3.2 SITE CLEARING AND PLANT PROTECTION**

- .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 sediment and erosion control plan, specific to site, that complies with EPA-833-R-06-004 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 once disturbed areas have been restored and stabilized.
- .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
- .3 Existing saturated logs along base of shoreline to be disturbed to be collected and secured within a floating boom system. Logs to remain saturated at all times. Upon completion of watercourse alterations, reinstate logs along base of slope in a manner similar to existing conditions.
- .4 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
- .5 Protect roots of designated trees to dripline or as instructed by Departmental Representative during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .6 Leave cuttings from trees and other vegetation on site as brush piles to allow for natural degradation.
  - .1 Secure large piles with degradable materials to prevent interference with watercourse.
- .7 Remove only trees that may offer future blockage problems as instructed by Departmental Representative.
- .8 Leave roots mass and stumps in place.
- .9 Maintain temporary erosion and pollution control features installed under this contract.

### **3.3 DRAINAGE**

- .1 Pumping water containing suspended materials into watercourse is prohibited.
- .2 Establish rock chute spillways to accommodate safe surface water entry to watercourse as directed by Departmental Representative.

### **3.4 REMOVAL OF SEDIMENT CONTROL MEASURES**

- .1 Sediment control measures to remain in place at all times during the work in order to catch and filter any run-off from the worksite before it reaches the watercourse.
- .2 Measures to remain in place until the growth of seed, sod or other surface cover is sufficient to retain sediments from being mobilized in runoff.
- .3 Method of removal of sediment control measures to be submitted for approval by Departmental Representative.
- .4 For in-water sediment control measures, allow minimum 1 day for settlement of suspended sediments before removal.

**3.5 SITE RESTORATION**

- .1 Restore the original watercourse bed grades and materials upon completion of in-water works.
- .2 Establish vegetated buffer zones with suitable vegetation to minimum 3 m along edge of watercourse banks as determined by Departmental Representative.
- .3 Plant non-invasive, locally native or naturalized vegetation natural to area, suitable for application without requirement for fertilizers, pesticides and other chemicals.
- .4 Control stream bank erosion in lower section of watercourse with irregular shaped rip rap underlain with non-toxic filter cloth.
- .5 Control stream bank erosion in upper section of watercourse by planting suitable vegetation as directed by Departmental Representative.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 29 00 – Payment Procedures

**1.2 MEASUREMENT PROCEDURES**

- .1 Core fill and Armour stone will be measured in accordance with Section 01 29 00.
- .2 Excavation below low normal tide will be in accordance with Section 01 29 00. The Contractor will perform a pre-excavation survey of the area to the satisfaction of the Departmental Representative to be used for calculating excavated quantities in combination with the cross-section survey as they apply. The contractor will

**1.3 REFERENCE STANDARDS**

- .1 American Association of State Highway and Transportation Officials (AASHTO)/Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 25th Edition, 2005.
  - .1 AASHTO M 288-05, Geotextile Specification for Highway Applications.
- .2 ASTM International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C127-04, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
  - .3 ASTM C535-03e1, Standard Test Method for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .4 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .5 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/f3(600kN-m/m<sup>3</sup>)).
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

**1.4 Submissions**

- .1 Product Data / Samples:
  - .1 Provide samples proposed for the work.
- .2 Methodology:
  - .1 Provide methodologies proposed for carrying out of the work. Describe work sequence, schedules and methods.

**1.5 Source Sampling**

- .1 Inform the Departmental Representative of the proposed source of the materials and provide access for inspection / sampling at least 2 weeks prior to commencing of work.

**Part 2 Products**

**2.1 Armour Stone**

- .1 General
  - .1 All stone shall be dense, hard, sound close-grained durable quarried fill, free from overburden material and highly resistant to weathering and disintegration under freezing/thawing and wetting / drying conditions and shall be of a quality to ensure permanence of the structure in the climate for which it is to be used.
  - .2 All stone shall be free from detrimental cracks, 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 fill properties and will not be accepted
  - .3 The stone shall 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 10% 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.
  - .4 Miscellaneous stone materials excavated from the site may be suitable for reuse in the new structures if they meet the requirements for gradation, quality and shape specified herein. Reuse of excavated stone materials requires the approval of the Departmental Representative.

.2 Stone Quality / Durability Tests

- .1 Stone materials to be used in the Work shall be tested for quality/durability during quarry start-up and production operations at the Contractor's expense.
- .2 The following Fill durability test specifications must be met or exceeded by all stone materials.

<b>.3</b>	<b>Description</b>	<b>Test Method</b>	<b>Acceptance Criteria</b>
	Specific Gravity	ASTM C127	minimum 2.65
	Absorption	ASTM C127	maximum 2%
	LA Abrasion 500 revolutions	ASTM C131	maximum 20% loss after
	MgSO4 Soundness 5 cycles	ASTM C88	maximum 10% loss after

If these test results suggests borderline or questionable material, the following additional tests shall be conducted:

<b>.4</b>	<b>Description</b>	<b>Test Method</b>	<b>Acceptance Criteria</b>
	Freeze-Thaw cycles	ASTM D5312	max. 0.5% loss after 40 cycles
	Wet-Dry cycles	ASTM D5313	max. 0.5% loss after 80 cycles
.5	Test samples of the proposed stone shall be obtained by the Contractor at his own expense. Samples selected for testing shall be representative of material formations in the quarry to be used for this project. The Departmental Representative must be present for and agree upon the selection of all test samples prior to shipment. The Departmental Representative may personally select all samples if he so elects.		
.6	The samples shall be shipped or delivered by the Contractor, at his expense, to a suitable testing facility.		
.7	The Contractor is responsible for allowing sufficient time for the testing to be completed such that there are no delays in the start of construction. Previous test results for stone materials quarried from the same area (ie. the same working face and fill unit) of the quarry may be accepted at the discretion of the Departmental Representative.		
.8	Submit stone quality test results at least one week prior to shipment of stone to site.		

.3 Gradation and Shape Requirements

- .1 Material meeting the gradation and shape requirements listed below shall be placed in the work at the locations as shown on the Contract Drawings. Gradation limits are in-place requirements. Adjustments in production, transportation and placement methods shall be made as necessary to assure final placed materials are within specified ranges. Stone shall be well graded, and shall not exhibit gap grading or scalping from individual size ranges
- .2 Armour Stone
  - .1 All armour stone shall be angular in shape, with the ratio of maximum to minimum dimensions (aspect ratio) not exceeding 2.5
  - .2 **Armour Stone shall range in weight from 4 to 6 tonne, with a median stone weight (W50) of 5 tonne.**

**2.2 Bedding Layer**

- .1 The source of bedding layer Material shall be a high quality blasted material from an approved quarry meeting the physical requirements of armour stone  
  
All bedding layer material shall be angular in shape, with the ratio of maximum to minimum dimensions (aspect ratio) not exceeding 3.
- .2 Bedding layer stone, nominally 1 to 75 kg, shall be well graded and fall within the following gradation limits:

Weight (kg)	Percent less than by Weight	
	Fine (Upper) Limit	Coarse (Lower) Limit
1	5	-
5	35	0
10	60	15
30	100	50
75	-	100

- .3 Bedding layer material shall consist of clean, hard, sound, durable stone, free of organic or other deleterious materials, having a density of not less than 2.65 t/m<sup>3</sup>
- .4 Bedding layer material when tested by the Micro-Deval Test Method in accordance with MTO LS-618, shall have a Micro-Deval loss not greater than 35%.
- .5 When tested by the Freeze/Thaw Test Method in accordance with MTO LS-614 shall have a Freeze/Thaw loss not greater than 15%.
- .6 Absorption, 2% maximum as determined by ASTM C127 test procedure
- .7 Sulphate Soundness Determination, maximum 12% by ASTM C88-73.

### **Part 3 Execution**

#### **3.1 Preparation**

- .1 Take and record soundings of the area in advance of the revetments construction.
- .2 It is expected that upon placement of the core fill and bedding layers, the existing marine deposits in the extents of the groynes will either fully or partially displace outwards under the weight of the core and subsequent layers.
  - .1 Assure the core and subsequent layers are placed in such a way that the marine deposits can displace outwards away from the stone placement as the groynes are constructed.
  - .2 Placement/removal of any excavated material as per the direction of the Departmental Representative.
- .3 Assure throughout the stone placement that the new groyne structure is stable and safe for equipment, workers and material loads.
- .4 Take no risks and be aware that marine sediments under the new work may displace or may settle in a non-uniform manner.
- .5 Excavation for groynes must be excavated to lines and grades shown on the drawings.
- .6 Any excavated material shall be hauled to a disposal site approved by the Departmental Representative.

#### **3.2 Placement**

- .1 Submit proposed access to construct, methods of material placement, and construction sequence for review and consideration prior to starting work.
- .2 The contractor may build a working surface (out of approved material by Departmental Representative) to provide access for construction equipment. Any additional stone material required to build the working surface must be removed to the satisfaction of the Departmental Representative.
- .3 Bedding Material shall be placed according to the following:
  - .1 Place material to lines, grades and dimensions indicated on the plan. Harbour bottom should be free from kelp, debris, snow, ice, etc.

- .2 Execute work in such a manner to protect 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. Material may be placed by end dumping. However, Contractor shall note that due to the side slopes of the groynes that mechanical placing of the material will be necessary to produce the slopes and shapes required.
- .3 Grades, lines, dimensions, slope and quantity, to be captured by a licensed surveyor and digitally presented for review and approval by the Departmental Representative before proceeding with overlaying layers.
- .4 Armour Stone layers shall be placed according to the following:
  - .1 Place each Armour stone layer to lines, grades and dimensions indicated on the drawings.
  - .2 Place each Armour stone individually using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump units into place. Commence placement at toe of slope and proceed up the slope towards the crest. Place each stone so that it is stable, secure on slope and supported by units below. Control placement of stone so as to produce a uniform and continuous cover over the underlying layer.
  - .3 Handle Armour stone with care. Do not damage units during placement. Replace damaged or broken units at no additional cost to the contract.
  - .4 For all materials, grades, lines, dimensions, slopes and quantity of stones to be reviewed and approved by the Departmental Representative before proceeding with the overlying layer.
  - .5 Replacement or resetting of Armour material lost or displaced due to storm will be the responsibility of the contractor with no additional cost to the contract.
  - .6 Choose stones and place them in such a way that the whole structure will be bonded and consolidated to as great an extent as nature of fill will allow. Fills should vary in size so they don't create steep slopes when placing the grade lines as indicated on the drawings.
  - .7 Armour stone is to be mechanically placed so as to knit together with adjacent stones.

### **3.3 Tolerances**

- .1 Armour Stone layers to be within 1250mm of lines and grades shown.
- .2 Bedding material layer to be within 100mm of lines shown.

### **3.4 Protection**

- .1 Take into account anticipated weather conditions and degree of exposure of site in setting requirements for protection.
- .2 Schedule and carry out construction so that the bedding layer is never built any longer than 10.0 out before they are protected by armour.
- .3 The Contractor should note that the work site is subject to water level variations due to tidal action and that the bedding layer may be submerged by times during the construction season depending on the tide cycle.
- .4 The Contractor will be responsible to replace any materials lost due to storms, tidal erosion or by their own activities.

### 3.5 Cross Sections

- .1 During construction the Contractor shall submit digital cross-sections compiled by a licenced surveyor to the Departmental Representative showing the following:
  - .1 Cross-sections as-built at stations every 10 metres along the reventment slopes.
- .2 After construction is complete and before the Final Certificate of Completion will be paid, Contractor to submit detailed as-built survey plan to Departmental Representative to show that contract grades and elevations have been achieved. Provide an electronic file of the cross-sections and two sets or prints. Divers will be required to assist with the survey for elevations required below the low water level. The following minimum requirements to be met:
  - .1 Cross-sections every 10 meters along the centerline of the groynes and at every grade change along the centerline.
  - .2 All survey work to be in meters referenced to monument shown on drawings.

### 3.6 QA/QC Program

- .1 Quality Control (QC) Program
  - .1 The Contractor is responsible for, and shall establish and maintain, Quality Control for all work performed at the job site to assure compliance with the specifications.
  - .2 The Contractor shall maintain records of all Quality Control tests, surveys, inspections, and corrective actions, and shall submit copies to the Departmental Representative.
  - .3 The Contractor shall handle, transport and shore materials to ensure that stockpiles are not contaminated with other soils and materials and to limit the segregation of material sizes.
  - .4 The Contractor shall provide range poles, marker buoys, templates, batter boards and/or any other means of guidance and control as necessary to excavate/place materials to the required lines and grades within the specified tolerances.
  - .5 The Contractor shall maintain temporary vertical and horizontal control monuments in the immediate vicinity of the work being performed.
  - .6 The Contractor shall provide and install a water level staff gauge, with stilling tube if necessary, to allow Contractor and Departmental Representative to read water levels at any time during the project. Number staff gauge in 0.05 m increments and provide gradation marks every 0.05 m. Install staff gauge such that water level can be read directly. Staff gauge type and location must be approved by the Departmental Representative.
  - .7 The Contractor shall perform construction surveys as necessary to perform the work required by the Contract Documents. Equipment and methods by which construction surveys are performed at the Contractor's option, and shall be consistent throughout the project.
- .2 Quality Assurance (QA) Activities:
  - .1 In addition to the QC program and construction surveys, the Contractor shall perform verification surveys as the work progresses to verify that lines, grades and thicknesses for the completed work are within the specified tolerances. Verification surveys shall be performed with a total station survey instrument and range pole – mounted prism; surveyor's level, range pole and surveyor's tape, tag line and sounding basket; or other methods that are consistent with the requirements of this section and subject to the approval of the Departmental Representative. Range poles, if used, shall be fitted with a

- flat, durable, 0.3 metre diameter base. The Contractor shall provide personnel and other equipment necessary to adequately and safely perform verification surveys.
- .2 Verification surveys shall be conducted by the Contractor in the presence of the Departmental Representative unless waived by the Departmental Representative.
  - .3 Survey excavated areas upon completion of excavation work. The same survey methods and survey line locations will be used for both pre- and post-construction surveys.
  - .4 Survey beach and dune fill areas upon completion of placement and grading operations. The same survey methods and survey line locations will be used for both pre- and post-construction surveys.
  - .5 All verification surveys shall be referenced to the monument shown on the drawings.
  - .6 Before any fill placement over the existing grade, excavated grade or previously placed material, surveys of the existing grade, excavated grade or previously placed material must be verified by Departmental Representative.
  - .7 Approval of a cross-section shall not constitute final acceptance

**END OF SECTION**