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List of Drawings

<u>Drawing No.</u>	<u>Title</u>
	Cover
Sht. 1 of 3	Existing Conditions and Removals
Sht. 2 of 3	Plan and Sections
Sht. 3 of 3	Plan, Sections, and Details

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- 1.1 Scope .1 The work covered under this contract consists of the furnishing of all plant, labour, equipment and material for Concrete Launching Ramp Construction at Upper Whitehead, Guysborough County, Nova Scotia, in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of contract.
- 1.2 Site Examination .1 All parties tendering should visit the site of the work prior to submission of tenders and make themselves thoroughly acquainted with site conditions, conditions of existing objects to be removed, tides, degree of exposure and all information necessary for the proper carrying out of the work covered by the drawings and this Specification. Submission of Tender will be deemed that Contractor is conversant with site conditions.
- .2 The *Departmental Representative* will give no consideration whatsoever to any claim by the Contractor resulting from failure to have made all the necessary investigations prior to tendering.
- 1.3 Documents Required .1 Maintain at job site, one copy each of following:
- .1 Contract drawings;
 - .2 Specifications;
 - .3 Addenda;
 - .4 Reviewed shop drawings/submissions;
 - .5 Change orders;
 - .6 Other modifications to Contract;
 - .7 Field test reports;
 - .8 Copy of approved work schedule;
 - .9 Manufacturer's installation and application instructions; and
 - .10 Permits and orders
- 1.4 Work Schedule and Completion Dates .1 Prepare and submit to the *Departmental Representative* within five (5) days of notification of Contract award, one copy

of the construction schedule in the form of a bar chart showing the dates for commencement and completion of each major activity of the work, including the work of subcontractors; dates for submissions, review and return of shop drawings, etc.; the dates of Substantial and Final Completion. If the schedule as submitted is unacceptable in any way, submit without delay a revised schedule satisfactory to the *Departmental Representative*.

- .2 The *Departmental Representative* will notify the Contractor in writing of acceptance of the Construction Schedule. Comply with the Construction Schedule at all times. If, for any reason, the Construction Schedule is not followed, immediately notify the *Departmental Representative* of the change and submit a revised schedule for acceptance. Upon acceptance by the *Departmental Representative*, this schedule will become the Construction Schedule.
- .3 Whenever required, give further written particulars concerning this schedule. The submission to and acceptance by the *Departmental Representative* of the Contractor's Construction Schedule or the furnishing of details and particulars thereto will not relieve the Contractor of any duties and responsibilities under the Contract.
- .4 The work sequence must include the demolition, removal and stockpiling of armour stone and filter stone as the initial component of the project followed by the construction of the new containment cell. These components of the work must be completed prior to the construction of the launching ramp.

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- 1.5 Measurement Responsibilities .1 Notify *Departmental Representative* sufficiently in advance of operations to permit required measurements for payment purposes.
- 1.6 Contractor's Use of Site .1 The Contractor will not be permitted to use the existing wharf structures at the harbour for loading or offloading construction equipment.
- .2 Co-operate with users of existing facilities. Should interferences occur, take directions from *Departmental Representative*.
- .3 Do not unreasonably encumber site with materials or equipment.
- .4 Move stored products or equipment which interfere with operations of *Departmental Representative* or other Contractors.
- .5 Obtain and pay for use of additional storage or work areas needed for operations.
- .6 Comply with all regulations and authorities having jurisdiction over the work, whether on land or on water.
- .7 Ensure no damage occurs to existing structures as a result of operations. Any said damage will be repaired at Contractor's expense.
- .8 Provide temporary barriers and warning signs in location where work is adjacent to areas used by public.
- 1.7 Codes and Standards .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements will apply.

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- .2 Meet or exceed requirements of specified standards, codes and referenced documents. When a standard or code is outdated, the latest edition will supersede the referenced date.
 - .3 Observe and enforce construction safety measures by Canadian Construction Safety Code and Construction Safety Code of Nova Scotia. In the event of conflict between any provisions of above authorities the most stringent provision will apply.
- 1.8 Project Meetings
- .1 *Departmental Representative* will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- 1.9 Setting Out of Work
- .1 Do all detail surveys necessary for the work, including locating and maintaining working points, and establishing lines and elevations. Perform all layout work, and carefully preserve benchmarks, reference points and stakes.
 - .2 Provide such masts, scaffolds, batter boards, lines, straight edges, templates and other devices as may be necessary to facilitate layout, construction and inspection of the work. Whenever necessary, suspend work for such reasonable time as may be necessary to permit the *Departmental Representative* to check or inspect any portion of the Work. The Contractor will not be allowed any extra compensation or time for completion because of this suspension of work.
 - .3 Elevations for the various grades and features of the specified works to be referenced and properly related to a benchmark, which will be approved by the *Departmental Representative*.

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- .4 Verify all grades, lines, levels, and dimensions shown on the drawings and report any errors or inconsistencies to the *Departmental Representative* before commencing work. Provide and maintain well-built batter boards at all points to facilitate the progress of the work. Establish all other grades, lines, levels required to facilitate the work.
- 1.10 Existing Services
- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify *Departmental Representative* of findings.
- .3 Submit schedule to and obtain acceptance from *Departmental Representative* for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise *Departmental Representative* and confirm findings in writing.
- 1.11 Contract Documents
- .1 Contract Drawings:
- .1 The drawings for the Work consist of all drawings listed in these "Plans And Specifications" and any additional drawings issued at a later date by the *Departmental Representative*.
- .2 *Departmental Representative* may furnish additional drawings to assist in proper execution of work. These drawings will be issued for clarification only. Such drawings will have same meaning and intent as if they were included with plans

- referred to in Contract Documents.
- .3 The drawings indicate the extent and general dimensions of the work. Make all necessary measurements to ensure that the result of the work is in accordance with the intent.
 - .4 Verify all existing conditions in field prior to proceeding with work.
- .2 Contract Specifications:
- .1 The general requirements and technical specifications are written solely for the General Contractor. They are organized into the NMS format of separate divisions and sections.
 - .2 Specification language is of the 'Short Form type' for example, where the word "provide" occurs, interpret it to mean "the Contractor shall furnish all labour, material and equipment necessary to complete the work".
 - .3 This Specification and accompanying drawings are intended to describe and provide for a finished project. They are intended to be complementary, and what is called for by either will be as binding as if called for by both. The Contractor shall understand that the work herein described will be complete in every detail, notwithstanding that every item necessarily involved is not particularly mentioned, and Contractor will be held to provide all labour, materials and equipment necessary for the entire completion of the work and will not avail himself of any errors or omissions.
- 1.12 Permits and Regulations
- .1 Fisheries and Oceans Canada will obtain all federal and provincial permits required for the in-water works associated with the new works.

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- .2 Comply with all by-laws, ordinances and regulations of all authorities having jurisdiction.
 - .3 Pay for any Municipal or other permits required including any other permits required for construction methodology that is outside the limits of the new works.
 - .4 Submit to *Departmental Representative*, copy of application submissions and approval documents received for above authorities having jurisdiction.
- 1.13 Payment
- .1 Payment for all work under this contract to be according to the Contract.
 - .2 No separate payment will be made for work specified under this section. The cost of this work is to be considered as overhead and to be included in the unit prices of the Contract.
 - .3 Dimensional changes as directed by the *Departmental Representative* to suit existing conditions, but not resulting in additional work or materials, will not be considered as extra to the Contract.
- 1.14 Maintenance of Shipping
- .1 Liaise with the local Harbour Authority officials to coordinate activities such that any interference is minimized.
- 1.15 Cooperation & Assistance to Departmental Representative
- .1 Co-operate with *Departmental Representative* on inspection of work and provide assistance when requested.
 - .2 Provide small motor boat with operator for *Departmental Representative's* use when requested.
- 1.16 Datum
- .1 The datum referred to in this project is Chart Datum. Chart Datum is, by International Agreement, is a plane below which the tide will seldom fall. The Canadian Hydrographic Service (CHS) has

adopted the plane of the lowest normal tide (L.N.T.) as Chart Datum. As the rise, fall, and range of tides varies daily, the Canadian Tide and Current Tables, as issued by the CHS, should be consulted for tidal predictions and other tidal information relating to the work.

.2 Refer to drawings for existing benchmark information.

1.17 Contractor's Representative

.1 Continuously maintain on the site an authorized company representative to whom communication may be addressed and who will be competent to speak for the Contractor in discussing work methods and other matters.

1.18 Workers Compensation

.1 Contractor and all sub-contractors must be registered under the *Workers Compensation Act* and provide evidence of good standing.

.2 At completion of Contract and before final payment is made, the Contractor will present to the *Departmental Representative* a Letter of Certification from the Workers' Compensation Board of Nova Scotia, showing that all required assessments are paid in connection with all trades.

1.19 Laws, Standards Taxes and Fees

.1 Comply with all laws and standards governing all or any part of the work. Pay all applicable taxes and pay for all permits and certificates required in respect of the execution of the work, except those permits obtained by Fisheries and Oceans Canada. Where variances exist between the requirements of agencies governing all or any part of the work, the most restrictive will govern, but in no instance will the standards established by the drawings and this Specification, which exceed such requirements, be reduced.

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- 1.20 Protection and Repair
- .1 Take appropriate measures to protect exiting infrastructure and services.
 - .2 Do not operate tracked equipment on concrete or paved surfaces without suitable protection.
 - .3 Repair any damage resulting from operations under this contract.
- 1.21 Location of Equipment and Fixtures
- .1 Location of equipment, fixtures or any appurtenances indicated are to be considered 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 Submit field drawings to indicate relative position of various services and equipment when required by *Departmental Representative*.
 - .4 Exact locations of mooring cleats and ladders shall be coordinated and confirmed with the Harbour Authority prior to commencing work related to cleats and ladder installation.
- 1.22 Notice to Shipping / Mariners
- .1 Notify the Marine Communications and Traffic Services' Centre, of Fisheries and Oceans Canada, at (709) 772-2083, ten (10) days prior to commencement and upon completion of the work, in order to allow for the issuance of Notices to Shipping/Mariners.
 - .2 During construction any vessels or barges utilized must be marked in accordance with the provisions of the *Canada Shipping Act - Collision Regulations*.

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- .3 Material from the work shall not be permitted to go adrift or otherwise become a hazard or menace to navigation.
- 1.23 Inspection and Testing .1 The *Departmental Representative* may employ an Inspector and/or Testing Company to ensure work conforms with contract.
- 1.24 Relics and Antiquities .1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate notice to *Departmental Representative* and await written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain His Majesty's property.
- 1.25 Temporary Navigational Buoys .1 Maintain temporary buoys as required to mark any obstructions as construction proceeds.
- .2 The part of the buoy that shows above the surface of the water to be at least 15.25 cm wide and at least 30.5 cm high and equipped with radar reflectors.
- .3 Buoys, including buoy anchors, to be constructed and maintained in a manner and with materials that will ensure that they will remain in position after the buoys have been anchored.
- .4 Buoys to comply with the requirements set out in the section entitled "Floating Aids to Navigation (Buoys)" of TP 968, entitled *Canadian Aids to Navigation System* and published by the Canadian Coast Guard, as amended from time to time.

- .5 Coordinate the buoy installation with the local Harbour Authority.
- .6 Pay all costs associated with the supply, installation, maintenance and removal of temporary navigational buoys.

-----END of SECTION-----

Weigh Scales

Page 1

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- 1.1 Requirements of Regulatory Agencies .1 Prior to use, have weigh scales certified as meeting requirements of Statutes of Canada, Chapter 36, Weights and Measures Act, 1971 and subsequent amendments. Display certificate in a prominent position. No payment will be made for materials weighed on non-certified scales.
- 1.2 Equipment .1 Weigh Scales: of sufficient capacity to weigh loaded vehicles in a single operation.
- .2 Scale House:
- .1 To enclose mass indicator and in which *Departmental Representative's* representative can perform work and maintain records.
- .2 To be weatherproof and have minimum 750 lx of illumination, one sliding window facing scale platform, one other window for cross ventilation, shelf desk at least 0.6 x 1.8 m, and heat to maintain inside temperature at 20°C. Entrance door not to face onto scale platform.
- .3 Provide sufficient number of approved weigh tickets, in triplicate, with consecutive serial numbers.
- 1.3 Installation .1 Provide, install and maintain scales and scale house convenient to project site at location approved by *Departmental Representative*.
- .2 Certified weigh scales at the quarry will be acceptable in lieu of on-site weigh scales.
- .3 Ramps to be level for one truck length each side of scale.
- .4 Remove ramps scales and scale house when no longer required on site.
- 1.4 Operation .1 *Departmental Representative's*

representative at scales will weigh materials.

- 1.5 Maintenance
 - .1 Maintain scale platform and scale mechanism clean and free from gravel, asphalt, snow, ice and debris.
 - .2 Maintain approach ramps in good condition free from sags and ruts.
 - .3 Have scales retested and recertified if requested by *Departmental Representative*.
- 1.6 Measurement for Payment
 - .1 Weigh scales will be measured in accordance with Section 01 29 00.

-----END of SECTION-----

PART 1 - PROJECT PARTICULARS

- 1.1 Description of Work
- .1 In general, the work under this contract includes but will not necessarily be limited to:
- .1 Mobilization, demobilization and weigh scales.
 - .2 Sitework, salvage and reinstallation of existing armourstone, filterstone.
 - .3 Underwater excavation to accommodate new corestone installation.
 - .4 Load, supply, installation and compaction of approved core stone.
 - .5 Load, supply and installation of approved clear stone.
 - .6 Load, supply, installation and compaction of approved Type 1 gravel.
 - .7 Load, supply, installation and compaction of approved Type 2 gravel.
 - .8 Fabrication, supply and installation of pre-cast reinforced concrete slabs.
 - .9 Installation of cast-in-place reinforced concrete slab.
 - .10 Supply and installation of geotextile (filter fabric).
 - .11 Load, supply and placement of rip rap (shore and scour protection).
 - .12 Load, supply, placement of armourstone (2-4 tonne).

Part 2 - PROJECT MEASUREMENT

- 2.1 General
- .1 This section details the measurement method to be used for payment purposes. Incidental items covered in the various sections of the Specification are to be included in the pricing of each pay item as applicable.

2.2 Measurement for Payment

Division 1

- .1 Mobilization and demobilization to the site will not be measured but paid Lump Sum. Include in this item, the cost to deliver materials and equipment to the site and to carry out (install) the work. Weight scales to be included in this item.

Division 2

- .2 Sitework, demolition and removals not be measured but paid Lump Sum. Include into this item, the stock piling of existing armourstone, filterstone(rip-rap) for later use. Include in this item the removal, safe storage, and reinstallation of the waste oil tank and Harbour Authority sign at the *Departmental Representative's* direction. Include in this item underwater excavation and disposal in on-site containment area.

Division 3

- .3 Fabrication, supply and installation of five (5) pre-cast reinforced concrete slabs to the lines, grades and dimensions indicated on the plans will be measured per square meter (m^2).
- .4 Installation of reinforced cast-in-place concrete slabs will be measured by the square meter (m^2) of reinforced concrete calculated from the lines and nominal dimensions indicated on the plans.

Division 31

- .5 Load, supply and placement of approved core stone to lines, grades and elevations indicated on the plans will be measured per tonne incorporated into the work.

- .6 Load, supply and installation of approved clear stone to lines and grades indicated will be measured per tonne incorporated into the work.
- .7 Load, supply, installation & compaction of approved type I material to lines and grades indicated will be measured per tonne incorporated into the work.
- .8 Load, supply, installation & compaction of approved type II material to lines and grades indicated will be measured per tonne incorporated into the work.
- .9 Supply and installation of geotextile (filter fabric) to areas indicated on the construction drawings will not be measured but paid Lump Sum.
- .10 Load, supply and placement of filterstone (rip rap) to lines and grades indicated will be measured per tonne incorporated into the work.
- .11 Load, supply and placement of armourstone to lines and grades indicated will be measured per tonne incorporated into the work.

-----END of SECTION-----

1.1 General

- .1 Submit to *Departmental Representative* for review submittals listed, including shop drawings, samples, certificates and other data, as specified in other sections of these Specifications.
- .2 Submit with promptness and in orderly sequence so as to allow for *Departmental Representative's* review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions are reviewed by *Departmental Representative*.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units. Where items or information is not produced in SI Metric units, provide converted values.
- .5 Review submittals prior to submission to *Departmental Representative*. Ensure during review that necessary requirements have been determined and verified, required field measurements or data have been taken, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents.
 - .1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by *Departmental Representative* 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 and coordinate.

- .8 Contractor's responsibility for errors and omissions in submission is not relieved by *Departmental Representative's* review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by *Departmental Representative's* review.
 - .10 Submittal format: PDF format by email or hardcopy paper originals (alternatively clear and fully legible photocopies of originals). Facsimiles are not acceptable, except in special circumstances pre-approved by *Departmental Representative*. Poorly printed non-legible photocopies or facsimiles will not be accepted.
 - .11 Make changes or revision to submissions which *Departmental Representative* may require, consistent with Contract Documents and resubmit as directed by *Departmental Representative*. When resubmitting, notify *Departmental Representative* in writing of any revisions other than those requested.
 - .12 Keep one reviewed copy of each submittal document on site for duration of Work.
- 1.2 Shop Drawings
- .1 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
 - .2 Identify details by reference to sheet and detail numbers shown on Contract Drawings.
 - .3 Maximum sheet size 860 X 1120 mm.
- 1.3 Product Data
- .1 Certain Specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts,

illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

- 1.4 Samples
- .1 Submit samples in sizes and quantities specified.
 - .2 Construct field samples and mock-ups at locations acceptable to *Departmental Representative*.
 - .3 Accepted samples will become standards of workmanship and material against which, installed work will be checked on project.
- 1.5 Miscellaneous Data
- .1 Provide certificates, methodologies, designs and test results as required.
- 1.6 Coordination of Submissions
- .1 Review shop drawings, product data, samples and miscellaneous data prior to submission.
 - .2 Verify:
 - .1 Field measurements;
 - .2 Field construction criteria; and
 - .3 Catalogue numbers and similar data.
 - .3 Coordinate each submission with requirements of work and Contract documents. Individual submissions will not be reviewed until all related information is available.
 - .4 Contractor's responsibility for errors and omissions in submission is not relieved by *Departmental Representative's* review of submissions.
 - .5 Contractor's responsibility for deviations in submission from requirements in Contract documents is not relieved by *Departmental Representative's* review of submission, unless *Departmental Representative* gives written acceptance of specified deviations.

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- 1.7 Submission Requirements
- .6 Notify *Departmental Representative*, in writing at time of submission, of deviations from requirements of Contract documents stating reasons for deviations.
 - .7 After *Departmental Representative's* review, distribute copies.
 - .1 Schedule submissions at least fourteen (14) days before dates reviewed submissions will be needed.
 - .2 Submit number of copies of shop drawings, product data which Contractor requires for distribution, plus 2 copies which will be retained by *Departmental Representative*.
 - .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
 - .4 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Contractor
 - .2 Sub-Contractor
 - .3 Supplier
 - .4 Manufacturer
 - .5 Separate detailer when pertinent
 - .4 Identification of product or material.
 - .5 Relation to adjacent structure or materials.
 - .6 Field dimensions, clearly identified as such.
 - .7 Specification Section Number.
 - .8 Applicable standards, such as ASTM, CSA or CGSB numbers.
 - .9 A Contractor's stamp, initialled or signed, certifying review of

submission, verification of field measurements and compliance with Contract documents.

- 1.8 Shop Drawings Review .1 The review of shop drawings by Fisheries and Oceans Canada or its authorized consultant is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Fisheries and Oceans Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the work site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all sub-trades.
- 1.9 Other Reviews .1 As for shop drawings above, other reviews are for the sole purpose of ascertaining conformance with the general concept.

-----END of SECTION-----

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- 1.1 Related Sections
- .1 Section 01 35 20 - Special Procedures on Fire Safety Requirements
 - .2 Section 01 35 40 - Special Procedures for Lockout Requirements
- 1.2 Definitions
- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
 - .2 Competent Person: means a person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
 - .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
 - .4 PPE: Personal Protective Equipment
 - .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.
- 1.3 Submittals
- .1 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within five (5) workdays of notification of Bid Acceptance. Provide 2 copies.

- .2 *Departmental Representative* will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within five (5) workdays after receipt of comments.
 - .4 *Departmental Representative's* review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
 - .5 Submit revisions and updates made to the Plan during the course of Work.
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- .2 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
 - .3 Submit compliance certificates and other permits obtained.
 - .4 Submit copy of Letter in Good Standing from Provincial Workers Compensation Board.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
 - .5 Submit copies of reports or directions issued by federal, provincial and territorial health and safety inspectors.
 - .6 Submit copies of incident reports.
 - .7 Submit WHMIS MSDS - Material Safety Data Sheets.
 - .8 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

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- 1.4 Compliance Requirements
- .1 Comply with *Occupational Health and Safety Act* for Province of Nova Scotia, and Regulations made pursuant to the Act.
 - .2 Comply with *Canada Labour Code - Part II* (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant.
 - .3 Treasury Board of Canada Secretariat (TBS):
 - .1 Directive on the Management of Real Property (2021).
 - .4 Canadian Standards Association (CSA):
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
 - .5 Observe construction safety measures of:
 - .1 Part 8 of National Building Code
 - .2 Municipal by-laws and ordinances.
 - .6 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
 - .7 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
 - .8 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.
- 1.5 Responsibility
- .1 Contractor shall be responsible for health and safety of persons and safety of property on site and for protection of other employees and general public circulating adjacent to work operations to extent that they may be affected by conduct of Work.

- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.6 Site Control and Access
- .1 The harbour and facility shall have ongoing operations during construction including:
 - .1 Vessel traffic navigating and berthed to harbour facilities within the harbour basin.
 - .2 Regular vehicle traffic on the access road, wharf and service area.
 - .2 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 *Departmental Representative* will provide names of those persons authorized by *Departmental Representative* to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
 - .3 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.

- .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
 - .4 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
 - .5 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
 - .6 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.
- 1.7 Protection
- .1 Carry out work placing emphasis on health and safety of public, wharf users, site personnel and protection of the environment.
 - .2 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
 - .3 Provide temporary facilities for protection and safe passage of wharf users, public pedestrians and vehicular traffic around and adjacent to work site.
 - .4 Should unforeseen or peculiar safety-related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise *Departmental Representative* verbally and in writing.

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- 1.8 Filing of Notice
- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
 - .2 Upon request, *Departmental Representative* will provide name and mailing address of provincial department to whom the Notice of Project must be sent.
- 1.9 Permits
- .1 Obtain applicable permits, licenses and compliance certificates at appropriate times and frequency as stipulated by Authorities having jurisdiction.
 - .2 Post permits, licenses and compliance certificates at Work Site.
 - .3 Where a particular permit or compliance certificate cannot be obtained, notify *Departmental Representative* in writing and obtain approval to proceed before carrying out applicable portion of work.
- 1.10 Hazard Assessments
- .1 Perform site-specific health and safety hazard assessment of the Work and its site.
 - .2 Carry out initial assessment prior to start of Work with further assessments as needed during progress of Work.
 - .3 On-going hazard assessments performed during the progress of work identifying new or potential health risks and safety hazards not previously known. At a minimum, hazard assessments shall be carried out when:
 - .1 New sub-trade work, new subcontractor(s) or new workers arrive at the site to commence another portion of the work.
 - .2 The scope of work has been changed by Change Order.
 - .3 Potential hazard or weakness in current health and safety practices

are identified by *Departmental Representative* or by an authorized safety representative.

- .4 Hazard assessments to be project and site specific and based on review of the Contract Documents, site conditions and weather conditions. Record results and address in Health and Safety Plan.
 - .5 Each hazard assessment shall be made in writing. Keep documentation on site for entire duration of the Work.
- 1.11 Project/Site Conditions
- .1 Harbour on-gong operations during construction
 - .1 The work of this contract will take place at a commercial fishing harbor with ongoing operations from users at adjacent facilities.
 - .2 The following are known or potential project-related safety hazards at site:
 - .1 Overhead and underground electrical lines;
 - .2 Working over water;
 - .3 Working under water;
 - .4 Vehicle traffic;
 - .5 Pedestrian traffic;
 - .6 Vessel traffic;
 - .7 Slip and fall hazards;
 - .8 Debris;
 - .9 Noise;
 - .10 Adverse weather;
 - .11 Heavy equipment operation and stability
 - .3 Include above items in the hazard assessment of the Work Site.
 - .4 There are no known hazardous or controlled products stored on site.
 - .5 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered as a

result of Contractor's operations.

1.12 Meetings

- .1 Attend pre-construction health and safety meeting, convened and chaired by *Departmental Representative*, prior to commencement of Work, at time, date and location determined by *Departmental Representative*. Ensure attendance of:
 - .1 Superintendent of Work
 - .2 Designated Health & Safety Site Representative
 - .3 Subcontractors
- .2 Provide site safety orientation session to all workers and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site.
- .3 Conduct regularly scheduled toolbox and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
- .4 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:
 - .1 Progress of Work.
 - .2 New sub-trades arriving on site.
 - .3 Changes in site and project conditions.
- .5 Keep documents on site.

1.13 Health and Safety
Plan

- .1 Develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Health and Safety Plan shall include the following components:
 - .1 **Part 1:** - List of individual health

risks and safety hazards identified by hazard assessment(s).

- .2 **Part 2:** - List of specific measures to control or mitigate each hazard and risk identified in Part 1 of Plan. Describe the engineering controls, safe job procedures, and safe work practices and personal protective equipment to be implemented and followed when performing work related to each identified hazard or risk.

- .3 **Part 3:** - Emergency Measures and Communication Plan and Procedures as follows:

Emergency Measures:

- .1 On site operational procedures, evacuation measures and emergency response to be implemented in the event of an occurrence of an accident or incident.
- .2 Evacuation Plan: site plan layouts showing escape routes, marshalling areas and muster stations. Details on alarm notification methods, fire drills, location of fire-fighting equipment and other related data. Harmonize Plan with facility's Emergency Response and Evacuation Plan. *Departmental Representative* will provide pertinent data including facility management contacts.

Communication Plan and Procedures

- .1 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
- .2 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and

- subcontractors.
 - .2 Pertinent federal and provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - .3 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
 - .4 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
 - .5 Procedures for sharing of work-related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .6 List of critical construction activities to be communicated with the Facility Manager and designated Harbour Authority representative(s) that could affect facility and user operations or pose a risk to the health and safety of their employees and to the general public.
- .3 Prepare Health and Safety Plan in a three-column format, addressing the three parts specified above, as follows:

Column 1	Column 2	Column 3
Identified Hazard	Control Measures Implemented	Emergency Measures and Communication Procedures

- .4 Develop Health and Safety Plan in collaboration with all Subcontractors. Address all work and activities of Subcontractors as they arrive on site. Immediately update Plan and submit to *Departmental Representative*.
- .5 Implement, maintain and enforce compliance with requirements of the Health and Safety Plan until final completion of work and demobilization from site.
- .6 As work progresses, review and update Plan addressing additional health risks and safety hazards identified by on-going hazard assessments.
- .7 Submit revised versions of Plan to *Departmental Representative*.
- .8 Post a typed written copy, including all updates, of the Health and Safety Plan in a common visible location at work site.
- .9 Submission of the Health and Safety Plan, and updates, to the *Departmental Representative* is for review and information purposes only. Its submission shall not be construed to imply approval by *Departmental Representative*, be interpreted as a warranty of being complete, accurate or legislative compliant and shall not relieve the Contractor of legal obligations for the provision of Health and Safety on the construction project.

1.14 Safety Supervision

- .1 Employ Health and Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health and Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall

be assigned the responsibility and authority to:

- .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
- .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
- .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken. Follow-up and ensure corrective measures are taken.
- .6 Cooperate with facility's Occupational Health and Safety representative, should one be designated by *Departmental Representative*.
- .7 Keep inspection reports and supervision related documentation on site.

1.15 Training

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to *Departmental Representative* upon request.
- .3 When unforeseen or peculiar safety-related 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 *Departmental Representative* verbally and in writing.

1.16 Minimum Site Safety Rules

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
- .2 The following actions or conduct by Contractor, workers and Subcontractors shall be considered as non-conformance with the health and safety requirements of the contract for which a Non-Compliance Notification will be issued to the General Contractor by the *Departmental Representative*:
 - .1 Failure to follow the minimum site safety rules specified above.

- .2 Negligence resulting in serious injury or major property damage.
 - .3 Deliberate non-compliance with Federal and Provincial Acts and Regulations.
 - .4 Falsification of information in Workers' Compensation Reports, safety reports or other health and safety related documents submitted to *Departmental Representative* or to Authority Having Jurisdiction.
 - .5 Possession of firearms on site.
 - .6 Possession of non-prescriptive illegal drugs or alcohol.
 - .7 Action, or lack thereof, resulting in the issuance of warnings, fines or stop work orders from an Authority having jurisdiction.
 - .8 Violation of other specified health and safety rules and requirements as determined by the *Departmental Representative*.
-
- .3 The final decision as to what constitutes a safety violation or non-compliance issue will be made by *Departmental Representative*.
 - .4 Brief workers on site safety rules and on the disciplinary measures to be taken for violation or non-compliance of such rules. Post such information on site.
- 1.17 Correction of Non-Compliance
- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by *Departmental Representative*.
 - .2 Provide *Departmental Representative* with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 *Departmental Representative* will stop Work if non-compliance of health and safety

regulations is not corrected in a timely manner.

1.18 Incident Reporting

- .1 Investigate and report the following incidents to *Departmental Representative*:
 - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to another regulatory agency.
 - .2 Medical aid injuries.
 - .3 Property damage in excess of \$10,000.00,
 - .4 Interruptions to facility operations resulting in an operational lost to a federal department in excess of \$5,000.00.
- .2 Submit report in writing.

1.19 Tools and Equipment Safety

- .1 Implement and follow a scheduled tool and equipment inspection/maintenance program at the work site. Regularly check tools, equipment and machinery for safe operation and perform maintenance at pre-established time and frequency intervals as recommended by manufacturer. Include Subcontractor's equipment as part of the inspection process.
- .2 Do not modify tools or remove guards or safety devices.
- .3 Use appropriate PPE including safety glasses, safety goggles, gloves and hearing protection.
- .4 Use standardized checklists to ensure established safety checks are stringently followed.
- .5 Immediately tag and remove items found faulty or defective off site.
- .6 Maintain written documentation on each inspection. Make available to

Departmental Representative upon request.

- 1.20 Hazardous Products
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
 - .2 Keep MSDS data sheets for all products delivered to site.
 - .1 Post on site.
 - .2 Submit copy to *Departmental Representative*.

- 1.21 Confined Spaces
 - .1 Abide by occupational health and safety regulations regarding work in confined spaces.

- 1.22 Site Records
 - .1 Maintain on Work Site copy of safety-related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
 - .2 Upon request, make available to *Departmental Representative* or authorized Safety Officer for inspection.

- 1.23 Posting of Documents
 - .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.
 - .2 Post other documents as specified herein, including:
 - .1 Site-specific Health and Safety Plan
 - .2 WHMIS data sheets

-----END of SECTION-----

Environmental Protection Procedures
for Marine Work

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- 1.1 Related Sections
- .1 Section 31 11 00 - Site Work, Demolition and Removals
 - .2 Section 35 21 24 - Underwater Excavating
 - .3 Refer to other Specification Sections for related information.
- 1.2 References
- .1 Canada Shipping Act, 2001, amended 2013-12-01; Transport Canada
 - .2 Canadian Coast Guard Regulations, Fisheries and Oceans Canada
 - .3 Canadian Environmental Protection Act, 1999, amended 2014-03-28; Environment and Climate Change Canada
 - .4 Canadian Navigable Waters Act, 2019-08-28; Transport Canada
 - .5 Fisheries Act, 1985, amended 2019-06-21; Fisheries and Oceans Canada
 - .6 Impact Assessment Act, 2019-08-28; Environment and Climate Change Canada
 - .7 Migratory Birds Convention Act, 1994, amended 2010-12-10; Environment and Climate Change Canada
 - .8 Nova Scotia - Environment Act
 - .9 Species at Risk Act, 2002, amended 2013-03-08; Environment and Climate Change Canada and Fisheries and Oceans Canada
 - .10 The Federal Policy on Wetland Conservation, 1991; Environment and Climate Change Canada
 - .11 Transportation of Dangerous Goods Act, 1992, amended 2009-06-16; Transport Canada
 - .12 Workplace Hazardous Materials Information System; Health Canada.

1.3 Definitions

- .1 Archaeological resources: all tangible evidence of human activity that is of historical, cultural or scientific interest. Examples include features, structures, archaeological objects or remains at or from an archaeological site, or an object recorded as an isolated archaeological find.
- .2 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.
- .3 Deleterious substance: (a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
- .4 Fish habitat: spawning grounds and other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.

- .5 Hazardous material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .6 Invasive or alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.
 - .7 Navigable water: a canal and any other body of water created or altered as a result of the construction of any work.
 - .8 Surface watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.
 - .9 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands," and mineral wetlands that are influenced by excess water but produce little or no peat.
- 1.4 Transportation
- .1 Transport hazardous materials and hazardous waste in compliance with the *Transportation of Dangerous Goods Act*.
 - .2 It will be the Contractor's responsibility to gain access to all areas of the work site. Contractor to use public roadways and established access routes whenever possible and provide appropriate signage and traffic control personnel as required.

- .3 Prior to commencement of work, advise and obtain approval from the *Departmental Representative* of the existing roads and temporary routes / roads proposed to be used to access work areas and to haul material to and from the site.
- .4 All vessels and barges used in the work must comply with all *Canada Shipping Act* requirements for inspection, which includes certification of the vessel and adequate training and appropriate certificate of competency for the operators and codes and standards of practice for shipping.
- .5 Vessels are to be permitted safe access through the worksite at all times and assisted as necessary.
- .6 All materials and equipment used in construction must be marked in accordance with the Collision Regulations of the *Canada Shipping Act, 2001* when located on the waterway.

1.5 Work Site Access

- .1 It will be the Contractor's responsibility to gain access to all areas of the work site, including dredge areas.
- .2 Use public roadways and established access routes whenever possible and provide appropriate signage and traffic control personnel as required.
- .3 Ensure that public and private road surfaces remain free from dredge spoils, clay, mud, etc. throughout the hauling activities.
- .4 Prior to commencement of work, submit a site plan for any new terrestrial access roads on the site to the *Departmental Representative* for approval. Construction of new access roads will only commence after approval is received from the

Departmental Representative.

- .5 Limit impacts on riparian vegetation to those approved for the work:
 - .1 Limit access to banks or areas adjacent to waterbodies.
 - .2 Avoid tree removal/grubbing/uprooting and instream prune or top the vegetation.
 - .3 Limit grubbing on watercourse banks to the area required for the footprint of work.
 - .4 Construct access points and approaches perpendicular to the watercourse or waterbody.
 - .5 Use methods to prevent soil compaction and/or rutting, such as swamp mats or pads.
 - .6 Remove vegetation or species selectively and in phases.
 - .7 If required, re-vegetate the disturbed areas with native species suitable for the site.
- .6 Vegetation clearing required for access roads should be scheduled to avoid the regional migratory bird nesting period.
- .7 The construction and removal of temporary in-water access roads and causeways will be at the Contactor's expense and will be removed immediately after construction and/or clearance of the dredge area.
- .8 The construction of temporary in-water access roads and causeways below the mean high water mark will only be placed within the footprint of the approved work area or dredge boundaries.
- .9 All material used for construction of temporary in-water access roads and causeways must be clean and free from excessive fines, organics, debris and non-toxic (i.e., free of fuel, oil, grease and/or any other contaminants), non-ore

- bearing and from a provincially approved, non-water source.
- .10 No construction or infill material may be obtained from any coastal feature, namely a beach, dune or coastal wetland.
 - .11 Temporary in-water access roads and causeways shall be constructed to an elevation such that machinery and equipment are operating completely out of the water at all stages of the tide. If tidal work is being carried out, machinery and equipment shall be relocated back to a suitable elevation to prevent operating in submerged waters. Bidders are advised to consult the Canadian Tide and Current Tables issued by Fisheries and Oceans in order to make sure of the tidal conditions affecting work.
 - .12 Limit impacts on fish habitat components:
 - .1 Avoid sensitive habitats such as wetlands, eelgrass and spawning areas.
 - .2 Salvage, reinstate or match habitat structure (e.g., large wood debris, boulders, instream aquatic vegetation/substrate) to its initial state.
 - .3 Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the waterbody) to its initial state.
 - .4 Replace/restore any other disturbed habitat features and remediate any areas impacted by the work.
 - .13 All materials used to construct temporary in-water access roads and causeways must be reused in the work or disposed of in a provincially approved manner. For disposal, this may include transportation to and disposal at a registered environmental facility approved to accept the material or at a location

predetermined under the contract. It is the Contractor's responsibility to dispose of the material at its approved location. Disposal slips must be submitted to the *Departmental Representative* before final payment is to be made under the contract

- .14 Supply, install and maintain temporary buoys to mark the position of temporary access roads and causeways including the outer toe as construction proceeds. All buoys are to meet requirements for the applicable Canadian Coast Guard standards and be equipped with radar reflectors.
- .15 Any tools, equipment, vehicles, temporary structures or parts thereof used or maintained for the purpose of building or placing a work in navigable water are to be removed upon completion of the project.

1.6 Operation of Machinery

- .1 Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
- .2 Whenever possible, operate machinery on land above the high water mark in a manner that minimizes disturbance to the banks and bed of the water body.
- .3 Wash, refuel and service machinery and store fuel and other materials in such a way as to prevent any deleterious substances from entering the water.
- .4 Do not perform cleaning and wash down within a 30-metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

1.7 Containment and Spill Management

- .1 Comply with Federal (*CEPA Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*) and provincial regulations, codes, standards and guidelines for the storage of fuel and

petroleum products on site.

- .2 Do not dump petroleum products or any other deleterious substances on ground or in the water.
- .3 Be diligent and take all necessary precautions to avoid spills when handling petroleum products on site and during fueling and servicing of vehicles and equipment.
- .4 Maintain vehicles and equipment in good working order to prevent leaks on site. Hoses, couplings and tanks are to be inspected on a regular basis to prevent fractures and breaks.
- .5 All equipment to be used in or over the marine environment is to be free from leaks or coatings of hydrocarbon-based fluids and/or lubricants harmful to the environment. Hoses and tanks are to be inspected on a regular basis to prevent fractures and breaks.
- .6 Materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals are not to enter the watercourse or soils.
- .7 Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.
- .8 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre (55 gallon) overpack spill kit for containment and cleanup of spills. Develop a response plan that is to be implemented immediately in the event of a release or spill of a deleterious substance.

- .9 If using a floating barge:
 - .1 Associated vessels should be compliant with all *Canada Shipping Act, 2001*, requirements for inspection, which includes certification of the vessel and adequate training and appropriate certification of competency for the operator.
 - .2 Ensure that all vessels will have procedures in place to ensure safeguards against marine pollution: awareness training of all employees, means of retention of waste oil on board and discharge to shore-based reception facilities, capacity of responding to and clean-up of accidental spill caused by vessels involved in any particular part of the project.
 - .3 If heavy machinery is being operated from a barge, on-site crews to have emergency spill clean-up equipment, adequate for the activity involved, on the barge. Spill equipment will include, as a minimum, one 250 L (55 gallon) overpack spill kit containing items to prevent a spill from spreading; absorbent booms, pillows, and mats; rubber gloves; and plastic disposal bags. Take appropriate measures to contain and clean up any spills and all releases into the environment.
- .10 In the event of a petroleum spill and release into the environment, stop work and immediately notify the *Departmental Representative* and the Canadian Coast Guard 24-Hour Environment Emergencies Report System (1-800-565-1633). Contain spill and perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

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- 1.8 Hazardous Material Handling
- .1 Store and handle hazardous materials in accordance with applicable federal and provincial regulations, codes, standards and guidelines. Store in location that will prevent spillage into the environment.
 - .2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
 - .3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when stored.
 - .4 Store and handle flammable and combustible materials in accordance with National Fire Code.
 - .5 Workers in contact with hazardous materials must be provided with, and use regulated Personal Protective Equipment (PPE) and must have the necessary training to know how to handle the different hazardous materials in accordance with applicable health and safety and environmental regulations.
- 1.9 Disposal of Wastes
- .1 Do not bury construction and demolition-related debris (e.g., concrete, creosote timbers, steel, impacted soil, etc.) or other waste materials on site.
 - .2 Dispose and recycle construction and demolition-related debris and waste materials in accordance with provincial waste management regulations.
 - .3 Do not dispose of hazardous wastes (e.g., paints, batteries, cleaners, acids, etc.) including volatile materials (e.g., solvents, mineral spirits, aerosol cans, etc.) and petroleum products on the ground or into waterways, storm or sanitary sewers or in waste landfill sites.

- Dispose of hazardous wastes in accordance with applicable federal and provincial, regulations, codes, standards and guidelines.
- .4 All salvageable stockpiles of creosote timbers must be situated a minimum of 100 meters from any dwelling or potable water well and a minimum of 100 meters from any watercourse, wetland or other environmentally sensitive area. All stockpiles must be contained on federal land, unless approved by *Departmental Representative*. Prior to completion of the work, all salvageable/disposal material must be removed from the site as directed by the *Departmental Representative*.
 - .5 Dispose of hazardous waste in accordance with applicable federal and provincial, regulations, codes, standards and guidelines.
 - .6 Conduct daily clean-up of floating or sinking construction materials, litter, and other debris arising from the work site to ensure protection of the marine environment. Any construction debris/material that enters the marine environment must be removed immediately and be disposed of in a provincially approved manner.
 - .7 Concrete waste shall be handled as follows:
 - .1 Perform dumping of residual material and truck cleaning operations off site or as directed by the *Departmental Representative*.
 - .2 Do not perform washing and cleaning of concrete vehicles within 30 meters of a wetland, watercourse or other identified environmentally sensitive area.
 - .3 Immediately clean any accidental

release of concrete on site prior to solidification.

- .4 Follow environmental regulations and good practices as approved by Nova Scotia Department of the Environment and Climate Change and other authorities having jurisdiction.

1.10 Water Quality

- .1 Where work may affect water quality, schedule work in cooperation with the Harbour Authority as directed by *Departmental Representative* to minimize interference and impact on harbour users.
- .2 Contractor will be required to develop and implement an **Erosion and Sediment Control Plan** for the project site that minimizes risk of sedimentation of the water body during all phases of the work. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the water body or settling basin and runoff water is clear. The plan must be submitted to the *Departmental Representative* for approval and should, where applicable, include:
 - .1 Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
 - .2 Measures for managing water flowing to the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a water body. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
 - .3 Measures for containing and stabilizing waste material (e.g., excavated material, construction waste and materials, commercial logging waste, uprooted or cut

- aquatic plants, accumulated debris) above the high water mark of nearby water bodies to prevent re-entry.
- .4 Regular inspection and maintenance of erosion and sediment control measures and structures during the course of the work.
 - .5 Repairs to erosion and sediment control measures and structures if damage occurs.
 - .6 Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
- .3 Prior to the commencement of any in-water works **for the construction of the new concrete launching ramp only**, a turbidity curtain must be installed to prevent any suspended solids and/or debris from entering into the adjacent water body.
- .1 Contractor shall select turbidity curtain based on the size of the confined enclosure zone, gradation of material to be filtered in the water column, sea state conditions, current, wind exposure and tidal conditions at the site.
 - .2 At least two (2) weeks prior to start of work, submit details of turbidity curtain system to the *Departmental Representative* in accordance with Section 01 33 00. *Departmental Representative* may require independent certification of turbidity curtain system.
 - .3 Provide all personnel, materials and equipment to supply, install, operate and maintain the turbidity curtain in accordance with manufacturers' instructions.
 - .4 Do not install turbidity curtain in the path of any vessels nor as to affect navigation in the harbour.
 - .5 Install the turbidity curtain as close to the construction site as practical. Turbidity curtain shall be

- of sufficient length to permit work inside the enclosed area without restricting equipment, operations, and personnel from working.
- .6 Install and maintain turbidity curtain in a manner that avoids entry of equipment, other than hand-held equipment or small boats, to the outside water body.
 - .7 Notify and obtain permission from the *Departmental Representative* if turbidity curtain has to be removed due to damage, sea state conditions, sea ice conditions, interference with vessel traffic or any other reason. and obtain appropriate mitigation measures to be implemented.
 - .8 Upon completion of all in-water works, allow suspended sediment to settle out to the satisfaction of the *Departmental Representative* and regulatory authorities and take precautions when removing the turbidity curtain to minimize the release or re-suspension of accumulated sediment.
 - .9 Turbidity curtain will be measured as per Section 01 29 00.
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- .4 Any construction debris entering the marine environment will be immediately retrieved when it is safe to do so.
 - .5 The construction material used must be clean and non-toxic (free of fuel, oil, grease, and/or any contaminants).
 - .6 All rock and fill material that will be used for the project must be free of excessive fines, clean, non-ore bearing, non-toxic material (i.e., free from fuels, oil, grease and/or contaminants) from an approved non-watercourse, and approved for use in marine infilling projects.

- .7 Conduct excavation operations in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times:
 - .1 Maintain appropriate production speed and momentum of the excavation equipment. Make adjustments as required and as approved by *Departmental Representative*.
 - .2 Strategically position excavation equipment and haul vehicles to avoid over the water swings of finer excavated material whenever possible.
- .8 Where required, install effective sediment control measures before starting work to prevent the entry or re-suspension of sediment in the water body. Use biodegradable sediment control measures whenever possible.
- .9 Keep erosion and sediment control measures in place until all disturbed ground has been stabilized. Inspect sediment control measures regularly to ensure they are functioning properly, and make all necessary repairs if any damage occurs.
- .10 All soils resulting from the construction must be stabilized as soon as possible in order to control sediment runoff during and after construction. Upon completion of work, remove erosion and sedimentation controls in a way that prevents the escape of settled sediment and restore and stabilize areas disturbed during removal.
- .11 Weather conditions are to be assessed on a daily basis to determine the potential risk of extreme weather in the project area. Avoid work during periods which Environment and Climate Change Canada (ECCC) has issued rainfall or wave warning for the work area that may increase erosion and/or sedimentation.

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- .12 Water contamination by concrete placement shall be handled as follows:
 - .1 Stop placement operations during moderate to heavy rain [2.6-7.6 mm/hr or more] to prevent leaching contaminants into the aquatic environment.
 - .2 Use sealant on corners and seams of formwork to prevent leakage.
 - .3 Use splash panels and/or tarps during placement operations to prevent concrete from entering the water.
 - .4 Remove any accidental spill of concrete prior to solidification.
 - .5 Cease work until the spill is contained and the source of the leak can be identified.
 - .6 Notify the *Departmental Representative* of all accidental releases of concrete into fish bearing waters and contact applicable federal and provincial regulators immediately.

 - 1.11 Socioeconomic Restrictions
 - .1 Abide by municipal and provincial regulations for any restrictions on work performed during the nighttime and with flood lighting of the site. Obtain applicable permits.
 - .2 Place flood lights in opposite direction of adjacent residential and business areas. Use LED lights instead of other types of lights, where possible. LED light fixtures are less prone to light trespass (i.e., are better at directing light where it needs to be, and do not bleed light into the surrounding area).
 - .3 Work equipment and machinery must be adequately equipped with mufflers to reduce noise on site to lowest possible level. Maintain mufflers in good operating condition at all times.

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- .4 The Contractor will coordinate with the local Harbour Authority prior to commencement of the project activities such that the schedule with the least possible conflicts will be implemented.
- 1.12 Fish and Fish Habitat Protection
- .1 Monitor and assess weather forecast on a daily basis to determine the risk of extreme weather. Secure the work site and avoid work during periods for which Environment and Climate Change Canada has issued rainfall, storm surge or other weather warnings for the area.
- .2 Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
- 1.13 Invasive Species
- .1 Contractor shall be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced into the marine environment.
- .2 To minimize the possibility of fish habitat contamination and the spread of aquatic invasive/alien species, all construction equipment which will be immersed into the water of a watercourse, or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that it is free of marine growth and invasive/alien species. Equipment shall include boats, barges, rafts, cranes, excavators, haul trucks, pumps, pipelines and all other miscellaneous tools and equipment previously used in a marine environment.
- .3 Cleaning and washing of equipment shall be performed immediately upon arrival at the site and before use in or over the body of water.

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- .4 Conduct cleaning and washing operations as follows, at a minimum:
 - .1 Scrape and remove heavy accumulation of mud and dispose appropriately.
 - .2 Wash all surfaces of equipment by use of a pressurized fresh water supply.
 - .3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.
 - .4 Check and remove all plant, animal and sediment matter from all bilges and filters.
 - .5 Drain standing water from equipment and let fully dry before use.
 - .6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.
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- 1.14 Bird and Bird Habitat
 - .1 Become knowledgeable with and abide by the *Migratory Birds Convention Act (MBCA)* in regard to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.
 - .2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.
 - .3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves or ferrying supplies.
 - .4 During nighttime work, position flood lights in opposite direction of nearby bird nesting habitat.
 - .5 Do not use beaches, dunes and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the *Departmental Representative*.

- .6 Should nests of migratory birds in wetlands be encountered during work, immediately notify *Departmental Representative* for directives to be followed.
 - .1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
 - .2 Minimize work immediately adjacent to such areas until nesting is completed.
 - .3 Protect these areas by following recommendations of Canadian Wildlife Service.

- .7 All machinery must be well muffled. If necessary, trucks may be required to avoid the use of "hammer" braking along specific sections of the route.

- 1.15 Species at Risk and Marine Mammals
 - .1 A safety zone for leatherback sea turtles and marine mammals must be established at the work site. The safety zone shall consist of a circle with a radius of at least 500 meters as measured from the center of the site.
 - .2 Maintain periodic visual surveys for leatherback sea turtles and marine mammals within the safety zone.
 - .3 If leatherback sea turtles or marine mammals are observed within the safety zone while in-water activities are underway, all in-water activities must cease until the animals leave the safety zone and are not observed within the safety zone for a minimum period of 30 minutes.
 - .4 Work may start or restart if marine mammals are not observed within the safety zone within the 30-minute period.

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- 1.16 Air Quality
- .1 Keep airborne dust and dirt resulting from the work on site to an absolute minimum.
 - .2 Dust suppression by the application of water must be employed, when required. Apply dust control measures to roads, parking lots and work areas. The *Departmental Representative* shall determine locations where water is to be applied, the amount of water to be applied, and the times at which it shall be applied.
 - .3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the work.
 - .4 Do not use oil or any other petroleum products for dust control.
- 1.17 Fires
- .1 Fires and burning of rubbish on site are not permitted.
- 1.18 Archaeological
- .1 All construction personnel are responsible for reporting any unusual materials unearthed during construction to the construction supervisor. If the find is believed to be an archaeological resource, the Construction Supervisor will immediately stop work in the vicinity of the find and notify the *Departmental Representative*.
 - .2 If an archaeological and/or historically significant item is discovered during the work activities, work in the area will be stopped immediately and the *Departmental Representative* will be contacted as well as the provincial Archaeological Services Unit.
 - .1 Nova Scotia - Department of Communities, Culture, Tourism and

Heritage, Special Places Program,
telephone: (902) 424-6475.

- .3 Work can only resume in the vicinity of the find when authorized by the *Departmental Representative* and Construction Supervisor, after approval has been granted by the Nova Scotia Department of Communities, Culture, Tourism and Heritage.
- .4 In the event of the discovery of human remains of evidence of burials, excavation work will immediately cease, and nearest law enforcement agency will be contacted immediately by the *Departmental Representative* and/or the Construction Supervisor.

-----END of SECTION-----

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- 1.1 Related Requirements .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by *Departmental Representative* are specified under various sections.
- 1.2 Appointment and Payment .1 *Departmental Representative* will appoint and pay for services of testing laboratory except for the following:
- .1 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment, and other systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of *Departmental Representative*.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as *Departmental Representative* may require to verify the acceptability of corrected work.
- 1.3 Contractor's Responsibilities .1 Furnish labour and facilities to:
- .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify *Departmental Representative* sufficiently in advance of operations to

allow for assignment of laboratory
personal and scheduling of test.

- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by *Departmental Representative*.

-----END of SECTION-----

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| 1.1 <u>Access</u> | .1 | Provide and maintain adequate access to project site. |
| | .2 | If authorized to use existing roads or structures for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads. |
| | .3 | Maintain full access to the work site. Should a court injunction be required ordering a person or group to refrain from impeding access to the site, such as a demonstration, picketing or union action, then obtaining the injunction and any associated costs will be considered incidental to this contract. Any delays associated with such activity will be considered incidental to this contract. |
| 1.2 <u>Contractor's Site Office</u> | .1 | Not Required. |
| | .2 | Keep on site a copy of contract documents, all letters, orders, notices and other communications as well as all other materials as specified under Section 01 10 10 - General Instructions. |
| 1.3 <u>Departmental Representative's Site Office</u> | .1 | Not Required. |
| | .2 | Provide outside sanitary facilities to approval of <i>Departmental Representative</i> . Maintain in clean condition. |
| 1.4 <u>Storage Sheds</u> | .1 | Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment, which are subject to damage by weather. |
| | .2 | Contractor to make own arrangements for on-site laydown and storage areas. |
| 1.5 <u>Sanitary Facilities</u> | .1 | Provide sanitary facilities for work force in accordance with governing regulations and ordinances. |

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- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
 - 1.6 Parking
 - .1 Contractor to make own arrangements to provide parking space for employees.
 - 1.7 Power
 - .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations.
 - .2 Install temporary facilities for power such as poles, lines and cables to approval of local electric utility.
 - 1.8 Barricades
 - .1 Provide and maintain sufficient barricades, fencing, notices, warning signs, light signals, etc. for the protection of adjoining property and to warn others and workmen engaged on the job of the dangers caused by the work.
 - .2 Types and location of barricades, etc. to be in accordance with local regulations and to the satisfaction of *Departmental Representative*.
 - .3 The presence of such barricades, lights, etc. shall not relieve the Contractor of the responsibility for any damages.
 - 1.9 Security
 - .1 Contractor to make his own arrangements for security of his equipment, materials, damages resulting from fire and theft.
 - 1.10 Site Signs and Notices
 - .1 Only Project Identification and Consultant/ Contractor signboards and notices for safety or instruction are permitted on site.
 - .2 Format, location and quantity of site signs and notices to be accepted by *Departmental Representative*.

- .3 Signs and notices for safety or instruction to be in English and French languages, or commonly understood graphic symbols.
- 1.11 Removal of Temporary Facilities
 - .1 Remove temporary facilities from site when directed by *Departmental Representative*.
 - .2 If project is closed down for a period of time, keep temporary facilities operational until no longer required by *Departmental Representative*.

-----END of SECTION-----

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- 1.1 General
- .1 Use new material and equipment unless otherwise specified.
 - .2 Submit following information for any or all materials and products proposed for supply within seven (7) days of request by *Departmental Representative*:
 - .1 name and address of manufacturer;
 - .2 trade name, model and catalogue number;
 - .3 performance, descriptive and test data;
 - .4 manufacturer's installation or application instructions; and
 - .5 evidence of arrangements to procure.
 - .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
 - .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- 1.2 Manufacturer's Instructions
- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
 - .2 Notify *Departmental Representative* in writing of any conflict between these specifications and manufacturer's instructions. *Departmental Representative* will designate which document is to be followed.
- 1.3 Delivery and Storage
- .1 Deliver, store and maintain packaged material and equipment with manufacturer's seal and labels intact.
 - .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
 - .3 Store material and equipment in accordance

with supplier's instructions.

1.4 Conformance

- .1 When material or equipment is specified by standard or performance specifications, upon request of *Departmental Representative*, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.5 Substitution

- .1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.
- .2 Proposals will be considered by *Departmental Representative* if:
 - .1 Products selected by tenderer from those specified, are not available, or
 - .2 Delivery date of products from those specified would unduly delay completion of Contract, or
 - .3 Alternative products to those specified, which are brought to attention of, and considered by *Departmental Representative* as equivalent to those specified and will result in a credit to Contract amount.
- .3 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.
- .4 Amounts of all credits arising from approval of substitutions will be determined by *Departmental Representative* and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of *Departmental Representative*.

- .5 *Departmental Representative* reserves the right for acceptance or rejection of substitution of materials.

- 1.6 Construction
Equipment and Plant
 - .1 On request, prove to the satisfaction of *Departmental Representative* that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
 - .2 Maintain construction equipment and plant in good operating order.

- 1.7 Damaged and Rejected
Materials
 - .1 Immediately replace, repair or otherwise make good any material damaged, broken or defaced during construction to the satisfaction of *Departmental Representative*.
 - .2 Remove rejected materials from site.

-----END of SECTION-----

- 1.1 Record Drawings
- .1 *Departmental Representative* will provide two (2) sets of white prints for record drawing purposes.
 - .2 Maintain project record drawings and accurately record deviations from contract documents caused by site conditions and changes ordered by *Departmental Representative*.
 - .3 Mark changes in red coloured ink.
 - .4 Record following information:
 - .1 Elevations of various elements in relation to Chart Datum.
 - .2 Field changes in dimensions and details.
 - .3 Changes made by Change Order.
 - .5 Make Contractor's set of marked-up Record Drawings available for *Departmental Representative's* review on a regular monthly basis and more frequently if requested.
 - .6 At completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to *Departmental Representative*. An electronic version of the Record Drawings to be submitted to *Departmental Representative*.

-----END of SECTION-----

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- 1.1 General
 - .1 Conduct cleaning and disposal operations to comply with ordinances and laws.
 - .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
 - .3 Prevent accumulation of waste which create hazardous conditions.
 - 1.2 Cleaning During Construction
 - .1 Maintain the work, at least on a daily basis free from accumulations of waste material and debris.
 - .2 Provide on-site containers for collection of waste materials, and debris.
 - .3 Remove all waste and debris from site.
 - .4 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet concrete or newly painted surfaces.
 - 1.3 Final Cleaning
 - .1 In preparation for acceptance of the project on an interim or final certificate of completion perform final cleaning.
 - .2 Remove grease, dust, dirt, stains, and other foreign materials from finished surface.
 - .3 Remove surplus materials, rubbish, tools and equipment.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 03 30 00 - Cast-in-Place Concrete
- .2 Section 03-31 00 - Precast Structural Concrete
- 1.2 Reference Standards .1 All reference standards in this section shall be current issue or latest revision at the first date of project tender advertisement.
- .2 American Society for Testing and Materials International (ASTM):
- .1 ASTM C1107/C1107M (R2020), Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
- .3 Canadian Standards Association (CSA International)
- .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.
- .2 CSA-S269.1-2021, Falsework and Formwork.
- .3 CSA-S269.3-M92 (R2003), Concrete Formwork
- .4 CSA-A3001, Cementitious Materials for Use in Concrete
- .5 CSA-O86-09, Engineering Design in Wood.
- .6 CSA-O121-08, Douglas Fir Plywood.
- .7 CSA-O151-04, Canadian Softwood Plywood.
- .8 CSA-O153-M1980 (R2008), Poplar Plywood.
- 1.3 Submittals .1 Shop Drawings:
- .1 Submit to *Departmental Representative* for review two (2) sets of formwork and falsework shop drawings at least four (4) weeks prior to erection. **All such drawings to be stamped and signed by a Professional Engineer registered in the Province of NS.**

- .2 Prepare shop drawings in accordance with CSA S269.1 for formwork and falsework.
 - .3 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
 - .4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special exposed finishes, ties, liners, anchorages, and locations of temporary embedded parts.
 - .5 Indicate sequence of erection and removal of formwork and falsework.
- .2 Product Data/Samples:
 - .1 Provide product data and samples for form ties.
 - .3 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4 Delivery, Storage and Handling
- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect formwork from damages.
 - .3 Replace defective or damaged materials with new.
 - .4 Handle waste in accordance with Waste Management Plan as per Section 01-74 19 - Waste Management and Disposal.

- 1.5 Measurement for Payment .1 No measurement for payment will be made under this section. Include costs in items for which concrete forming and accessories are required.

PART 2 - PRODUCTS

- 2.1 Materials .1 Formwork materials:
.1 Formwork materials to be to CAN/A23.1/A23.2.
.2 Wood and wood product formwork materials to be to CSA-O121, CSA-O86 and CSA-O153.
.2 Falsework materials to CSA S269.1.
.3 Form stripping agent: colourless mineral oil free from petroleum products, non-toxic, and biodegradable. Viscosity between 70 and 110 s Saybolt Universal, 15 to 14 mm²/s at 40DC, flash-point minimum 150DC, open cup.
.4 Form ties:
.1 removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
.5 Form- tie hole filler: non-shrink cementitious grout, pre-bagged, preblended, 35 MPa at 28 days to ASTM C1107/C1107M.

PART 3 - EXECUTION

- 3.1 Fabrication and Erection .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
.2 Fabricate and erect falsework in accordance with CSA S269.1.
.3 Fabricate and erect formwork in accordance with CSA-S269.3 to produce finished

concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

- .4 Line forms with material only as approved by *Departmental Representative*.
- .5 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .6 Use 25 mm chamfer strips on all external concrete corners.
- .7 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .8 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections.
- .9 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 Formwork Removal

- .1 Leave formwork in place for minimum of seven (7) days after placing concrete unless otherwise approved by the *Departmental Representative*.
- .2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.
- .4 All holes from form ties and rods to be plugged with non-shrink grout to requirements of CSA A23.1. **When forms are removed, no metal ties shall be less than 50 mm from the surface of the concrete.**

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 01 61 00 - Materials and Equipment
 - .2 Section 03 10 00 - Concrete Forming and Accessories
 - .3 Section 03 30 00 - Cast-in-Place Concrete
 - .4 Section 03 41 00 - Precast Structural Concrete
- 1.2 Reference Standards
- .1 All reference standards in this section shall be current issue or latest revision at the first date of project tender advertisement.
 - .2 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
 - .3 American Society for Testing International (ASTM)
 - .1 ASTM A1064/A1064M-18a, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .4 Canadian Standards Association (CSA Group)
 - .1 CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction/Methods and Standard Practices for Concrete.
 - .2 CSA-A23.3-04, Design of Concrete Structures.
 - .3 CSA-G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement
 - .4 CSA G30.3-M1983 (R1998), Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .5 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .6 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction.

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- .5 Reinforcing Steel Institute of Canada (RSIC)
 - .1 2020 Reinforcing Steel Manual of Standard Practice.
 - 1.3 Submittals
 - .1 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Nova Scotia at least four (4) weeks prior to commencing fabrication for review and approval. The Contractor retains responsibility for correctly detailing reinforcement, but the shop drawings must be approved for conformity with the design. Fabrication shall not proceed until the final approval of shop drawings.
 - .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI SP-66-04, except as noted herein.
 - .3 Clearly indicate placing of reinforcement and:
 - .1 Bar bend details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 sizes, spacings, location of reinforcement and mechanical splices, if approved by *Departmental Representative*, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangars.
 - .4 Detail placement of reinforcing where special conditions occur.
 - .5 Design and detail lap lengths and bar development lengths to CSA A23.1, unless otherwise specified on drawings.
 - .6 Indicate position and size of openings in slabs and walls.

Coordinate with trades requiring openings.

- .2 Product Data/Samples:
 - .1 Provide product data for supports and spacers.
- .3 Certifications:
 - .1 Upon request, provide *Departmental Representative* with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis details and lists.
 - .2 Submit in writing to *Departmental Representative* proposed source of reinforcement material to be supplied.
- .4 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.4 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Materials and Equipment and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Do not store reinforcing steel in direct contact with the ground. Store reinforcing steel in a dry location on racks or sills that will permit easy access for identification and handling and prevent it from becoming coated with material which would adversely affect bond.
- .4 Replace defective or damaged materials with new.

1.5 Measurement for Payment

- .1 No measurement for payment will be made under this section. Include costs in items of concrete work for which reinforcing is required.

- .2 Wire ties, chairs, spacers, dowels, etc. to be considered incidental to supply and placing of reinforcement.

PART 2 - PRODUCTS

2.1 Materials

- .1 Substitute different size bars only if permitted in writing by *Departmental Representative*.
- .2 Reinforcing steel: carbon steel, having a yield stress of 400 MPa, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .4 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1.
- .6 Plain round bars (dowels) to: CSA G30.18-09 (R2014).

2.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1 and RSIC Reinforcing Steel Manual of Standard Practice.
- .2 Fabricate reinforcing steel using maximum practical lengths to minimize lap splices.
- .3 Obtain *Departmental Representative's* approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .5 Upon approval of *Departmental Representative*, weld reinforcement in accordance with CSA W186-M1990.

PART 3 - EXECUTION

3.1 Preparation

- .1 All steel reinforcing bars shall have the necessary net sectional area, and shall be cut to the exact lengths, and bent cold to the exact forms and dimensions, shown on the approved plans, or otherwise required, before being placed in position. Bending shall be accurately done, in a bending machine and no welding or heating of any bars shall be allowed, except with written approval from the *Departmental Representative*. All stirrups and hoops shall accurately fit the rods, and all bends shall be taken out of bars to be used as straight members.
- .2 Reinforcement, at time concrete is placed, to be free from mud, oil or other non-metallic coatings that adversely affect bonding capacity.
- .3 Clean reinforcing steel before placing concrete.

3.2 Field Bending

- .1 Do not field bend reinforcement except where indicated or authorized by *Departmental Representative*.
- .2 When authorized, bend reinforcement without heat, by applying slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.3 Placing Reinforcement

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1.
- .2 Use plain round bars as slip dowels and place in concrete as indicated on the plans.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

- .2 Apply thick even film of mineral lubricating grease when paint is dry.
- .3 Prior to placing concrete, obtain *Departmental Representative's* approval of reinforcing material and placement.
- .4 Provide *Departmental Representative* at least two (2) days' notice prior to placement of concrete for scheduling of inspection of reinforcement steel.
- .5 All reinforcing bars shall be placed and held rigidly in the exact positions in the forms as shown on the plans, or otherwise required, and there shall be no displacement of the same by the placing tamping or vibrating of the concrete. Adjusting or moving the bars, while the concrete is being placed, shall not be permitted, unless specified on the plans. Concrete protection required for reinforcing steel shall be in accordance with the Contract Documents, or as directed by the *Departmental Representative*. All bars shall be tied and properly braced to prevent displacement. No concrete shall be placed until the reinforcement, after being cleaned and placed in position, has been examined and approved by the *Departmental Representative*.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 01 35 44 - Environmental Protection Procedures for Marine Work
 - .2 Section 01 45 00 - Testing and Quality Control
 - .3 Section 03 10 00 - Concrete Forming and Accessories
 - .4 Section 03 20 00 - Concrete Reinforcing
- 1.2 Reference Standards
- .1 All reference standards in this section shall be current issue or latest revision at the first date of project tender advertisement.
 - .2 American Concrete Institute (ACI):
 - .1 ACI 355.4-19 (R2021), Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary.
 - .3 American Society for Testing and Materials International (ASTM):
 - .1 ASTM C260/C260M-10a (R2016), Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-19, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1107/C1107M (R2020), Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
 - .5 ASTM D412-16 (R2021), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
 - .6 ASTM D1751-04 (R2018), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

- .4 Canadian Standards Association (CSA Group):
 - .1 CSA-A23.1-19/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA-A3000-18, Cementitious Materials Compendium.
 - .4 CSA-A5-98 Portland Cement
 - .5 CSA-G40.20-13/G40.21-13 (R2018) General requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
 - .5 International Code Council-Evaluation Service (ICC-ES):
 - .1 ICC-ES AC308 - Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements.
- 1.3 Submissions
- .1 Shop Drawings:
 - .1 Upon request, submit placement drawings for miscellaneous items.
 - .2 Product Data/Samples:
 - .1 Provide technical data and/or samples for curing compounds (winter/ summer /green /white /red), evaporation retardant and finishing aids, non-shrink admixture, form-ties, construction joint and sawcut joint materials/sealants, grouts.
 - .3 Certifications:
 - .1 Minimum two (2) weeks prior to starting concrete work submit to *Departmental Representative* manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Admixtures.

- .2 Provide certification that plant, equipment and materials to be used in concrete comply with requirements of CSA-A23.1.
- .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1 and this specification. **Mix design to be prepared by and stamped by an engineer licensed to practice in the Province of Nova Scotia.**
- .4 Provide certification that only compatible components, non-reactive synthetic macro-fibres, and nonreactive aggregate will be used in the concrete mix designs. Use of admixtures to neutralize or mitigate potential alkali-aggregate reactivity (AAR) will not be accepted.
- .4 Methodology:
 - .1 Submit methodology for cold weather concreting, including protection and curing.
 - .2 Submit methodology for hot weather concreting, including protection and curing.
 - .3 Submit methodology for concrete placement operations including details of placement sequence and proposed layout of construction joints. Unless otherwise approved, the spacing of control joints shall not exceed 13.5 m.
 - .4 Submit methodology for concrete deck finishing operations.
 - .5 Submit methodology for supporting reinforcing steel.
 - .6 Submit methodology for curing and crack control.
- .5 Submit in accordance with Section 01 33 00 - Submittal Procedures.

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- 1.4 Storage of Materials
- .1 Store all materials to prevent contamination or deterioration, whether at the plant or at the job site.
 - .2 Store cement in watertight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment whether at the plant or at the job site.
 - .3 Prevent stored liquid admixtures and compounds from freezing and powdered admixtures and compounds from absorbing moisture.
- 1.5 Source Sampling
- .1 At least four (4) weeks prior to commencing work, inform *Departmental Representative* of proposed source of aggregates and provide access for sampling.
- 1.6 Ready-Mix Concrete Supply
- .1 Provide, with each load of concrete delivered to site, duplicate delivery slips containing following:
 - .1 Name of ready-mix batch plant.
 - .2 Serial number of ticket.
 - .3 Date and truck number.
 - .4 Project identification.
 - .5 Class of concrete or mix.
 - .6 Amount of concrete in cubic metres.
 - .7 Time of loading or first mixing of aggregate, cement and water.
 - .8 Time of discharge of concrete.
 - .9 Admixtures added at plant.
 - .10 Amount of water added at plant.
- 1.7 Measurement for Payment
- .1 Concrete work will be measured in accordance with Section 01 29 00.
 - .2 No deductions will be made for volume of concrete displaced by reinforcing steel.
 - .3 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.

- .4 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.
- .5 Supply and installation of concrete additives as recommended by the supplier will not be measured but considered incidental to work.
- .6 Supply of anchor bolts, washers and nuts, lag bolts, drop-in concrete anchors, will not be measured but considered incidental to work. Bolt grouting will be considered incidental to the work.
- .7 Supply and installation of falsework, formwork, reinforcing steel, reinforcement dowels, corrugated metal (galv.) sleeves / ducts, rigid PVC sleeves, construction / sawcut joints/sealants and curing compounds, or other compounds, filling of form-tie holes, etc. will be considered incidental to the work.

PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregates: to CSA-A23.1/A23.2. Coarse aggregate normal density for C-1 exposure.
- .2 Portland Cement: to CSA A5 - Normal Type 10.
- .3 Supplementary Cementing Materials: to CSA-A3001.
- .4 Water: to CSA-A23.1.
- .5 Air Entraining Admixture: to ASTM C260.
- .6 Chemical Admixtures: to ASTM C 494/C 494M. *Departmental Representative* to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Concrete Retarders: to ASTM C 494/C 494M water-based, low VOC, solvent free. Do not allow moisture to come in contact with the retarder film.

- .8 Curing Compound:
 - .1 To ASTM C309 and CSA A23.1, Type 1, 1D, or 2.
- .9 Isolation/Control Joint Filler:
 - .1 Polyethylene closed-cell foam filler. To be Deck-O-Foam by W.R. Meadows, or approved alternate.
- .10 Joint Sealant: self-levelling (non-sag for vertical joints in wheel guard), two component sealant capable of remaining resilient over temperatures ranging from -25° C to 35° C. Material will be capable of an elongation of 300%, have tensile recovery of 90% ASTM D412 hardness of 25-35 Shore A and have a high bond strength to the concrete faces.
- .11 Adhesive Anchoring System: to be injectable, two-component, fast-cure hybrid adhesive tested in accordance with ACI 355.4 and ICC-ES AC308 for use in cracked and uncracked concrete: Acceptable Products:
 - .1 HY200 A/R MAX Injection Adhesive System by HILTI.
 - .2 AT-XP by Simpson Strong-Tie.
 - .3 AC200+ by DeWalt.
- .12 Non-shrink Grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents, of pouring consistency, capable of developing compressive strength of 50 MPa at 28 days.
- .13 Substitution of alternate materials to be in accordance with 01 61 00 - Material and Equipment.

2.2 Mix Design

- .1 The contractor shall be responsible for the concrete mix design.
- .2 It shall be the responsibility of the Contractor to ensure that the mixture

proportions shall be properly batched, mixed, placed and cured such that the concrete conforms to the specifications.

- .3 Use ready mix concrete designed to produce air entrained concrete to comply CSA A23.1.
- .4 Do not use calcium chloride or compounds containing calcium chloride.
- .5 Prior to starting concrete work, submit to the *Departmental Representative* the proposed mix design(s) for approval. Mix design(s) to be in accordance with Alternative 1 of Table 5 in CSA A23.1. Comply with additional requirements of CSA A23.1, for concrete placed with exposure to sea water.
- .6 Unless otherwise noted, use concrete mix designed and proportioned to produce air entrained concrete meeting the following requirements:
 - .1 Minimum compressive strength at 28 days: 35 MPa.
 - .2 Minimum cement content: 390 kg/m³ of concrete.
 - .3 Maximum water/cement ratio: 0.40.
 - .4 Class of exposure: C-1.
 - .5 Nominal size of coarse aggregate: 20 mm sieve size.
 - .6 Air content: 5 to 8 %.
 - .7 Slump at time and point of discharge 20 to 80 mm except 150 -200 mm for tremie pours. Where the nature of the work requires larger slumps, they are to be obtained by the use of admixtures rather than increasing the water content. The use of such admixtures and the increase in slump to be approved by the *Departmental Representative* prior to implementation in the work.
 - .8 Modify concrete mix to the approval of the *Departmental Representative* to

- accommodate pumping.
- .9 Admixtures to the approval of the *Departmental Representative* and the recommendation of the manufacturer. Admixtures must be dispersed separately into mixing water.
 - .7 Weigh aggregates, cement, water and admixtures separately when batching. Inspect and test scales for accuracy as directed. Accuracy to be such that successive quantities can be measured to within one percent of desired amounts. Test certificates to be submitted to *Departmental Representative* upon request.
 - .8 Where seven-day strength is less than 70% of specified 28 day strength, provide additional protection curing and make changes to mix proportions to the satisfaction of the *Departmental Representative*.

PART 3 - EXECUTION

3.1 Construction

- .1 Place, consolidate, finish, cure and protect concrete to CSA A23.1 except where specified otherwise.
- .2 Comply with additional requirements of CSA A23.1 except where specified otherwise, for concrete exposed to seawater environment.

3.2 Preparation

- .1 Provide 48 hours' notice to *Departmental Representative* prior to placing of concrete.
- .2 During concreting operations ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or work.
- .3 Pumping of concrete is permitted only after review of equipment and mix by

Departmental Representative.

- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
 - .5 Prior to placing of concrete advise *Departmental Representative* of proposed method for protection of concrete during placing and curing in adverse weather.
 - .6 Do not commence placing concrete until *Departmental Representative* has inspected/reviewed forms, inserts, dowels, reinforcing steel, joints; conveying, spreading, consolidation, finishing, curing and protective methods.
 - .7 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
 - .8 Do not place load(s) upon new concrete until *Departmental Representative* is satisfied that the Contractor has carried out all calculations and tests necessary to confirm that the load(s) will not cause damage or create a safety hazard. Calculations and tests to be stamped by a Professional Engineer registered in the Province of Nova Scotia.
- 3.3 Placement of Concrete
- .1 Place and consolidate concrete to CSA A23.1, Clause 4.1.1.5, for concrete exposed to seawater environments.
 - .2 Place concrete continuously from joint to joint.
 - .3 Minimum concrete cover over reinforcing steel bars to be 75 mm.
 - .4 If permitted by *Departmental Representative*, pump concrete to following requirements:
 - .1 Arrange equipment so that no

vibrations result which might damage freshly placed concrete.

- .2 Where concrete is conveyed and placed by mechanically applied pressure, provide suitable equipment.
- .3 Operate pump so that concrete, without air pockets, is produced.
- .4 When pumping is discontinued and concrete remaining in pipe line is to be used, void pipe line in a manner that prevents contamination of concrete or separation of ingredients.

- .5 Place concrete in all cases as neatly as practicable, directly in its final position, and will not be caused to flow in a manner to permit or cause segregation.

- .6 Each layer of concrete will be vibrated and tamped with an appropriate vibrator as allowed by the *Departmental Representative*. The concrete must be compacted to the maximum practicable density, free of air pockets, and until it is in complete contact with the reinforcement and formwork.

3.4 Inserts

- .1 Set galvanized sleeves and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 X 100 mm not indicated on drawings must be approved by *Departmental Representative*.
- .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of all modifications from *Departmental Representative* before placing of concrete.
- .3 Galvanized items embedded in concrete to be fully isolated from reinforcing steel.

- .4 Anchor bolts:
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With *Departmental Representative's* concurrence, grout anchor bolts in pre-formed holes or holes drilled after concrete has set. Formed holes to be at least 100 mm in diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used. Anchor holes shall be drilled dry with a hammer drill, wire brushed and blown free of dust with oil-free compressed air lance.
 - .3 Protect anchor bolt holes from water accumulations.
 - .4 Set bolts and fill holes with non-shrink grout.

- 3.5 Finishing
 - .1 Finish in accordance with CSA-A23.1.
 - .2 Use only ACI (American Concrete Institute) certified or other pre-approved concrete finishers in finishing all concrete works.
 - .3 Concrete Surfaces:
 - .1 When concrete has hardened sufficiently, give deck surface a uniform finish free from porous spots, irregularities, depressions, small pockets or rough spots using a float. Following use of a float, provide coarse broom finish using stiff, coarse, fibre broom. Use broom to produce transverse ridges satisfactory to *Departmental Representative*.
 - .1 Brooming will be delayed until concrete is sufficiently hard to retain ridges.
 - .2 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

- .4 Grind off fins, nibs and other raised protuberances with an approved hand stone.
 - .5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise detailed.
- 3.6 Protection and Curing
- .1 Provide protection and curing in accordance with CSA A23.1.
 - .2 Protect concrete with methodology approved by *Departmental Representative*.
 - .3 Cure concrete by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least seven (7) days after placement. After finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by whatever curing medium is applicable to local conditions and approved by the *Departmental Representative*. The edges of concrete slabs exposed by removal of forms shall be protected with continuous curing treatment equal to the method selected for curing the slab and curb surfaces. Have the equipment needed for adequate curing at hand and ready to install before concrete placement begins.
 - .4 When air temperature is at or below 5°C or when there is a probability of its falling to that limit within 24 hours of placing (as forecast by the nearest official meteorological office) cold weather protection as per CAN/CSA-A23.1 will be provided. Supply approved heating equipment capable of keeping inside air at a constant temperature sufficiently high to maintain concrete at following curing temperatures.:
 - .1 For an initial three days, at not less than 10° C nor more than 25° C at surfaces.
 - .2 At not less than 10° C for an additional 4 consecutive days or for

the time necessary to attain 70% of the specified 28-day compressive strength of the concrete.

.3 Reduce temperature near end of curing period at rate not exceeding 20° C per day.

.4 **Do not overheat.**

.5 Keep concrete surfaces continuously moist during protection stage and allow concrete to dry before removal of protection.

.6 Freshly deposited concrete will be protected from premature drying and excessively hot and cold temperatures, will be maintained without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete. It will be protected from harmful effects of sunshine, drying winds, cold weather, running or surface water and mechanical shock.

.7 Wood floating, broom finishing, placing of burlap and inspection of concrete to be done from transverse bridges of rigid construction free from wobbles and springing under use, unless other methods have been submitted and accepted.

3.7 Site Tolerance

.1 Concrete tolerance in accordance with CAN/CSA-A23.1.

.1 Slab surface to Table 22 Class B, non-slip, straight edge, value ± 6 mm.

3.8 Joint Fillers

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by *Departmental Representative*. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

- .2 Locate and form separation joint as indicated. Install joint filler.
 - .3 Unless indicated otherwise, use 13 mm thick joint filler to separate deck slabs and extend joint filler from bottom of slab to within 13 mm of finished concrete surface.
- 3.9 Field Quality Control
- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by *Departmental Representative* in accordance with CSA-A23.1 and Section 01 45 00 - Testing and Quality Control.
 - .2 *Departmental Representative* will pay for costs of tests as specified in Section 01 45 00.
 - .3 *Departmental Representative* will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
 - .4 If tests do not meet requirements of the *Departmental Representative*, take such measures as indicated in CSA A23.1 and CSA A23.2.
 - .5 Non-destructive methods for testing concrete shall be in accordance with CSA-A23.2.
 - .6 Inspection and testing by *Departmental Representative* will not augment Contractor's quality control program or relieve him or her of contractual responsibility.
- 3.10 Defective Work
- .1 Concrete is defective when:
 - .1 It fails to meet any requirement of this specification.
 - .2 Concrete contains honeycombing or embedded debris.

- .3 28-day strength in any area is less than 95% of specified minimum.
- .2 Repair or remove and replace defective work as directed by the *Departmental Representative*. Submit proposed remediation plan to *Departmental Representative* for preliminary review prior to auctioning.
- .3 Any repair must be accompanied by a certification by a Professional Engineer registered in the Province of Nova Scotia that the repair will be equal to or better than the original specified product in all aspects including but not limited to loading, exposure resistance, life expectancy and durability. Only complete submissions covering all aspects listed above will be considered.
- .4 Take corrective measures as directed by the *Departmental Representative* to prevent occurrence of further defective concrete.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification sections for related information.
- 1.2 Source Approval .1 Source of materials to be incorporated into work or stockpiled requires acceptance.
- .2 Inform *Departmental Representative* of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .3 If, in opinion of *Departmental Representative*, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements.
- .4 Should a change of material source be proposed during work, advise *Departmental Representative* 4 weeks in advance of proposed change to allow sampling and testing.
- .5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- 1.3 Product Sampling .1 Aggregate will be subject to continual sampling during production.
- .2 Provide *Departmental Representative* with ready access to source and processed material for purpose of sampling and testing.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, or other deleterious substances.
 - .2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.
 - .3 Fine aggregates satisfying requirements of applicable section shall be one, or a blend of following:
 - .1 Natural sand
 - .2 Manufactured sand
 - .3 Screening produced in crushing of quarried rock, boulders, gravel, or slag.
 - .4 Coarse aggregates satisfying requirements of applicable section shall be one of following:
 - .1 Crushed rock or slag
 - .2 Gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

- 3.1 Development of Aggregate Source
- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by the *Departmental Representative*.
 - .2 Clear, grub and strip an area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .3 When operating in stratified deposits use excavation equipment and methods that will produce a uniform, homogeneous aggregate.

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- .4 When excavation is completed, provide drains or ditches as required to prevent surface standing water.
 - .5 Trim off and dress slopes of waste material piles and leave site in a neat condition.
- 3.2 Processing
- .1 Process aggregate uniformly using methods that prevent contamination, segregation, and degradation.
 - .2 Blend aggregate if required to obtain gradation requirements specified. Use approved methods and equipment.
 - .3 Blending to increase percentage of crushed particles or decrease percentage of flat and elongated particles is permitted.
 - .4 Wash aggregates if required to meet specifications. Use only equipment accepted by *Departmental Representative*.
- 3.3 Handling
- .1 Handle and transport aggregates to avoid segregation, contamination, and degradation.
- 3.4 Stockpiling Tolerances
- .1 Stockpiling aggregates on stabilized, clean, and well drained surfaces.
 - .2 To ensure that no material other than stockpiled aggregate is used, do not incorporate bottom 250 mm of stockpile into work, if aggregates are stockpiled on ground.
 - .3 Stockpile far enough apart to prevent intermixing.
 - .4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed within 48 hours of rejection.

- .5 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1 m for coarse aggregate and base course materials.
 - .2 Max 2 m for fine aggregate and subbase materials.
 - .3 Max 1.5 m for other materials.
- .6 Complete each layer over entire stockpile area before beginning next layer.
- .7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .8 Coning of piles or spilling of material over edges of pile will not be permitted.
- .9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Description of Work
- .1 This Section includes but is not limited to the following:
 - .1 All normal demolition and removals as required to complete the work in accordance with the plans and these specifications.
 - .2 Temporary removal and reinstatement of used oil tank and concrete slab as directed by *Departmental Representative*. Used oil tank and concrete slab to be relocated and stored on site during construction prior to reinstatement. **Used oil tank to be emptied by others prior to handling.**
 - .3 Temporary removal and reinstatement of Harbour Authority sign and sign posts as directed by *Departmental Representative*. Sign and sign posts to be relocated and stored on site during construction prior to reinstatement.
 - .4 Removal, sorting, stockpiling and re-installation of armour stone and filter stone as directed by the *Departmental Representative*.
 - .5 Removal of excess soils and other granular material not to be reused in the new work.
- 1.2 Related Sections
- .1 Section 01 35 44 - Environmental Protection Procedures for Marine Work
 - .2 Section 01 74 00 - Cleaning
 - .3 Refer to other Specification sections for related information.
- 1.3 Submissions
- .1 Methodology:
 - .1 When requested by *Departmental Representative*, provide methodology for carrying out the work.

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- .2 Provide submission in accordance with Section 01 33 00.
- 1.4 Protection
- .1 Protect existing harbour facilities throughout the execution of the work.
- .2 Prevent movement, settlement or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of *Departmental Representative* and at no additional cost to *Departmental Representative*.
- .3 Prevent debris from going adrift and becoming a menace to navigation.
- .4 All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the *Departmental Representative*.
- 1.5 Measurement for Payment
- .1 Sitework, demolition and removals will be measured in accordance with Section 01 29 00.
- PART 2 - PRODUCTS** Not applicable.
- PART 3 - EXECUTION**
- 3.1 Preparation
- .1 Inspect site and verify with *Departmental Representative* items designated for removal and items to be preserved.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Provide temporary power and lighting as required to carry out the work.
- 3.2 Removals
- .1 Remove all items as indicated.
- .2 Do not disturb adjacent structures

designated to remain in place.

- .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.

3.3 Salvage
Stockpiling and
Reinstallation

- 1. Remove, sort, salvage and stockpile existing armour stone and filter stone within designated areas shown on the drawings. Salvaged armour and filter stone to be incorporated into the new work as specified (where suitable).

3.4 Disposal of
Material

- .1 Disposal of excess soils and other materials not designated for salvage or re-use in work, shall be the contractor's responsibility and these materials must be disposed of off-site.
- .2 Material designated for disposal shall be transported and disposed of in an environmentally acceptable manner to the satisfaction of the *Departmental Representative*, and in accordance with any provincial, federal, or municipal regulations or by-laws.
- .3 Dispose off-site all timbers treated with creosote or other preservatives at a facility approved by the Nova Scotia Department of Environment and Climate Change and pay for all associated costs.

3.5 Restoration

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification sections for related information.
- 1.2 Reference Standards .1 All reference standards in this section shall be current issue or latest revision at the first date of project tender advertisement.
- .2 American Society for Testing and Materials International (ASTM):
- .1 ASTM D4595-17, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .2 ASTM D4491/D4491M-22, Standard Test Methods for Water Permeability of Geotextiles Permittivity.
- .3 ASTM D4533/D4533M-13 (R2016), Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
- .4 ASTM D4632/D4632M-15a (R2016), Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- .5 ASTM D4751-21a, Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
- .3 Canadian General Standards Board (CGSB):
- .1 CGSB-4.2 No.14-2005, Textile Test Methods: Quantitative Analysis for Fibre Mixtures.
- .2 CGSB-148.1, Methods of Testing Geosynthetics.
- 1.3 Submittals .1 At least two (2) weeks prior to start of work, furnish *Departmental Representative* with copies of mill test data and certificate that filter fabric delivered to job site meets requirements of this section.
- .2 Submit in accordance with Section 01 33 00 - Submittal Procedures.

Geotextiles

- 1.4 Approval .1 Obtain written approval of *Departmental Representative* for geotextile fabric before installation of material in work.
- 1.5 Measurement for Payment .1 Geotextile fabric will be measured in accordance with Section 01 29 00.

PART 2 - PRODUCTS

- 2.1 Materials .1 Synthetic fiber: rot proof, unaffected by action of oil or salt water and not subject to attack by insects or rodents.
- .2 Fabric: nonwoven polyester and/or polypropylene fabric.
- .3 Seams: sewn in accordance with manufacturer's recommendations.
- .4 Physical properties:
.1 Tensile Strength: 1100 N
.2 Tear Strength: 440 N
.3 Elongation at break: 50%
.4 Filtration Opening Size: .180mm
.5 Permeability: 1.2×10^{-1} cm sec⁻¹.

PART 3 - EXECUTION

- 3.1 Preparation of Base .1 Fine grade area to be covered with geotextile fabric to a uniform surface area. Fill depressions with suitable material.
- 3.2 Placing Geotextile Fabric .1 Place geotextile fabric on prepared surface loosely from top of the slope to the bottom allowing fabric to conform easily to contours of the slope.
- .2 Allow one (1) metre of fabric for overlapping and anchoring purposes, 700 mm at the top and 300 mm at the bottom of the slope.
- .3 Longitudinal seems will have a minimum of 450 mm overlap and will be pinned/stitched

every 600 mm with 100 mm galvanized nails.

- .4 Anchor top of fabric at 1 metre-intervals with 15 mm diameter steel rods 600 mm in length. Anchor bottom of fabric by folding fabric and placing stone on top.
- .5 Place well graded crushed rock material over geotextile fabric as indicated. No equipment will be permitted on fabric.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Related Work .1 Section 31 05 17 - Aggregates General
- .2 Refer to other Specification sections for related information.
- 1.2 Reference Standards .1 American Society for Testing and Materials International (ASTM):
- .1 ASTM D698-12 (R2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) - Method C.
- .2 ASTM D1557-12 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- 1.3 Measurement for Payment .1 Granular sub-base will be measured in accordance with Section 01 29 00.
- .2 Rockfill will be measured in accordance with Section 01 29 00.

PART 2 - PRODUCTS

- 2.1 Materials .1 Granular sub-base material to Section 31 05 17 and following requirements:
- .1 Crushed stone or gravel consisting of hard durable angular particles free from clay lumps, cementation, organic material, frozen material, and other deleterious materials.
- .2 Type 2 (Class 'C') granular material gradation will be within the following limits:

ASTM SIEVE SIZE	% PASSING BY MASS
56 mm	100
28 mm	60 - 80
5 mm	25 - 45
0.160 mm	0 - 10

- .3 Rockfill material gradation will be within the following limits:

ASTM SIEVE SIZE	% PASSING BY MASS
150 mm	100
100 mm	75 - 100
50 mm	25 - 60
25 mm	10 - 30
No. 4	0 - 10
No. 200	0 - 5

PART 3 - EXECUTION

- 3.1 Inspection of Existing Sub-Base Surface
- .1 Do not place new granular sub-base until underlying material is proof-rolled, compacted, inspected and approved by the *Departmental Representative*.
- 3.2 Placing
- .1 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow or ice.
- .2 Place Type 2 (Class 'C') and underlying material to full width in uniform layers not exceeding 150 mm compacted thickness. *Departmental Representative* may authorize thicker lifts (layers) if specified compaction can be achieved.
- .3 Place rockfill material to full width in uniform layers not exceeding 300 mm compacted thickness. *Departmental Representative* may authorize thicker lifts (layers) if specified compaction can be achieved.
- .4 Shape each layer to a smooth contour and compact to specified density before the succeeding layer is placed.
- .5 Remove and replace portion of a layer in which material has become segregated during spreading.

- 3.3 Compacting
- .1 Compact Type 2 material above LNT elevation to density of not less than 98% maximum dry density in accordance with ASTM D698.
 - .2 Compact rockfill above LNT elevation to 95% Modified Proctor Density in accordance with ASTM D1557.
 - .3 Shape and roll alternately to obtain a smooth, even, and uniformly compacted sub-base.
 - .4 Apply water as necessary during compaction to obtain specified density. If sub-base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .5 In areas not accessible to rolling equipment above LNT elevation, compact to specified density with approved mechanical tampers.
 - .6 During freezing weather where it is impractical to add water, replace Type 2 gravel with 50 mm clear stone.
- 3.4 Finish Tolerances
- .1 Granular sub-base compacted thickness shall be as indicated.
 - .2 Underlying material will be compacted to the thickness as required to attain the grades indicated on the drawings.
 - .3 Finish compacted surface to within plus or minus 25 mm of established grade but not uniformly high or low.
 - .4 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.5 Maintenance
- .1 Maintain finished sub-base in condition conforming to this section until

succeeding base is constructed, or until granular sub-base is accepted by *Departmental Representative*.

- .2 *Departmental Representative* will pay costs for inspection and testing. Refer to Section 01 45 00.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Related Work .1 Section 31 05 17 - Aggregates General
- .2 Refer to other Specification sections for related information.
- 1.2 Reference Standards .1 American Association of State Highway and Transportation Officials (AASHTO):
- .1 AASHTO T 180-21, Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Drop Rammer and a 457-mm (18-in.) Drop.
- .2 AASHTO T 193-22, Standard Method of Test for the California Bearing Ratio.
- .2 American Society for Testing and Materials International (ASTM):
- .1 ASTM D698-12 (R2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) - Method C.
- .2 ASTM C 117-17, Standard Test Method for Materials Finer than 75-µm (No 200) Sieve in Mineral Aggregates by Washing.
- .3 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .4 ASTM C 136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .5 ASTM D4318-17, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- 1.3 Measurement for Payment .1 Granular base will be measured in accordance with Section 01 29 00.

PART 2 - PRODUCTS

2.1 Materials

- .1 Granular base material to the following requirements:
 - .1 Crushed stone or gravel consisting of hard durable angular particles free from clay lumps, cementation, organic material, frozen material, and other deleterious materials.
- .2 Type 1 (Class 'A') granular gradation will be within the following limits when tested to ASTM C136 and ASTM C117 and giving a smooth curve without sharp breaks when plotted on a semi-log chart:

ASTM SIEVE SIZE	% PASSING BY MASS
20 mm	100
14 mm	50 - 85
5 mm	20 - 50
0.160 mm	0 - 10
0.080 mm	0 - 7

- .3 Clear Stone graded within the following limits when tested to ASTM C136 and ASTM C117 and giving a smooth curve without sharp breaks when plotted on a semi-log chart:

ASTM SIEVE SIZE	% PASSING BY MASS
28 mm	100
25.4 mm	-
19 mm	90 - 100
10 mm	0 - 40
5 mm	0 - 10

- .4 Physical requirements for Clear Stone:
 - .1 Liquid Limit ASTM D4318: Maximum 0.
 - .2 Plasticity Index ASTM D4318: Maximum 0.
 - .3 Los Angeles Abrasion ASTM C131
Maximum % loss by weight: 35.

- .4 Crushed Fragments: 50%. The percent of crushed particles will be determined by examining the fraction retained on the 4.76 mm sieve and dividing the weight of the crushed particles by the total weight retained on the 4.76 mm sieve.
- .5 California Bearing Ratio: ASSHTO T193 Min 100 when compacted to 100% of AASHTO T180 - Method D.
- .5 Clear Stone shall be processed by crushing and, when necessary, to eliminate surplus fines passing the 4.76 mm sieve, shall be screened and washed.

PART 3 - EXECUTION

- 3.1 Inspection of Existing Sub-Base Surface
 - .1 Do not place granular base until finished sub-base surface is inspected and approved by *Departmental Representative*.
- 3.2 Placing
 - .1 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow or ice.
 - .2 Place using methods which do not lead to segregation or degradation of aggregates.
 - .3 Place material to full width in a uniform layer to 200 mm compacted thickness.
 - .4 Shape each layer to a smooth contour and compact to specified density before succeeding layer is placed.
- 3.3 Compacting
 - .1 Compact to density of not less than 98% maximum dry density in accordance with ASTM D698. Compaction required to be carried out to LNT elevation.
 - .2 Shape and roll alternately to obtain a smooth, even, and uniformly compacted base.

- .3 Apply water as necessary during compaction to obtain specified density. If sub-base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .4 In areas not accessible to rolling equipment above LNT elevation, compact to specified density with approved mechanical tampers.
 - .5 During freezing weather where it is impractical to add water replace Type 1 gravel with clear stone.
- 3.4 Finish Tolerances
- .1 Finished base surface shall be within plus or minus 10 mm of established grade but not uniformly high or low.
 - .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.5 Maintenance
- .1 Maintain finished base in a condition conforming to this section until succeeding material is applied or until acceptance by *Departmental Representative*.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Description
- .1 This section specifies requirements for excavating underwater materials in areas and to dimensions and coordinates indicated on plan, and for loading, transporting and disposing of excavated materials to specified location.
 - .2 Contract drawings indicate those areas that require underwater excavating at the time of the most recent surveys. Actual extent of excavating within the areas may vary slightly from those indicated on the drawings.
- 1.2 Related Requirements
- .1 Section 01 35 44 - Environmental Protection Procedures for Marine Work
 - .2 Section 01 74 00 - Cleaning
 - .3 Refer to other Specification sections for related information.
- 1.3 Price and Payment Procedures
- .1 Measurement and Payment:
 - .1 Underwater excavating will be measured in accordance with Section 01 29 00.
 - .2 The dredge areas are defined by coordinates and dimensions, as indicated on the drawings.
 - .3 Only material excavated above grade plane and within side slopes indicated or specified will be measured.
 - .4 Operations in connection with field positioning of dredging equipment will not be measured separately for payment.
 - .5 No separate payment will be made for Contractor's survey vessel, equipment and crew or diving services.
 - .6 Payment will include disposal of dredge material at the disposal cell, and in the manner specified.
 - .7 There will be no additional payment for land-based disposal of debris not

deemed suitable for the containment cell.

- .8 No separate payment will be made for temporary structures used in the operations.
- .9 No additional payment for delays incurred during fishing seasons.
- .10 No additional payment for downtime and for delays caused by vessel traffic.
- .11 No additional payment for downtime and for delays caused by navigational buoys in the dredge area(s).
- .12 Removal of infilling material during dredging operations and prior to areas being cleared will not be measured for payment.
- .13 Once designated dredge areas have been dredged and cleared, all subsequent infilling shall be deemed as additional to the contract if removal is required.

1.4 Definitions

- .1 Average of Instantaneous Plan: hydrographic survey plan in which average sounding in an appropriate group of matrix blocks is plotted.
- .2 Box Cut: dredging channel area with vertical side slopes and allowing side slope of excavation collapse to a natural equilibrium slope.
- .3 Class A Material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes 1.5 m³ or more.
- .4 Class B Material: loose [or shale] rock, silt, sand, quick sand, mud, shingle, gravel, clay, sand, gumbo, boulders, hardpan and debris of individual volumes less than 1.5 m³.
- .5 Chart Datum: permanently established plane from which soundings or tide heights are referenced, usually Lowest Normal Tide (LNT).

- .6 Cleared Area: area of dredging accepted as complying with plans and specifications.
- .7 Co-ordinates:
 - .1 U.T.M.: Universal Transverse Mercator projection.
 - .2 M.T.M.: Modified Transverse Mercator projection.
 - .3 U.T.M. or M.T.M. Co-ordinates: plane rectangular co-ordinates used in grid system in which grid network is applied to U.T.M. or M.T.M. projection. Horizontal control information as indicated.
- .8 Debris: pieces of wood, wood chips, bark logs, submerged logs, tree branches, scrap vehicles or vessels or parts, tires, concrete, steel cable, steel chain, wire rope, scrap steel, etc.
- .9 Dredging: excavating, transporting and disposing of underwater materials for the primary purpose of facilitating navigation.
- .10 Dredging Area: a rectangle or polygon, defined by coordinates in which dredging is to take place.
- .11 Estimated Quantity:
 - .1 Volume of material calculated to be above sub-grade and within specified side slopes unless otherwise specified.
 - .2 Areas in square metres of material calculated horizontally to exist above grade and within dredge limits, unless otherwise specified.
- .12 Grade: plane above which material is to be dredged.
- .13 Instantaneous Mode: mode of operation of hydrographic survey equipment where only sounding observed at predetermined distance interval is retained in memory.

- .14 Least of Minimum Plan: hydrographic survey plan in which least sounding in grouping of matrix blocks is plotted.
- .15 Lowest Normal Tide (LNT): plane so low that tide will seldom fall below it.
- .16 Matrix Block: each dredge area is presented as number of [1.2 x 10] m long blocks. Dependent on position of sounding, block may have [0 to 4] soundings contained within it.
- .17 Measurements:
 - .1 CPM: cubic metres place measurement at dredging site.
 - .2 CPM: cubic metres truck measure
- .18 Mechanical Dredging: equipment comprising of the following: clamshell, dragline, dipper or backhoe dredging equipment operating from a land-based or floating platform
- .19 Mechanical Sweep: clearing dredged areas to grade depth using a mechanical device suspended from barge.
- .20 Minimum Mode: mode of operation of hydrographic survey equipment where minimum sounding over length of travel between position updates will be retained in memory. Soundings taken in this mode may be shallower than actual bottom elevations due to variations in water depths due to wave action.
- .21 Obstructions: material other than class A, having individual volumes of 1.5 m³ or more.
- .22 Side slope: inclined surface or plane from subgrade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as ratio of horizontal to vertical.
- .23 Sub-grade: plane parallel to and 300 mm below grade.

- .24 Underwater Excavating: dredging, transporting and disposing of underwater materials for the purpose of facilitating construction.
 - .25 Universal Transverse Mercator Projection (UTM) or Modified Transverse Mercator Projection (MTM) Co-ordinates: plane rectangular coordinates used in grid system in which grid network is applied to UTM. or MTM. projection. Horizontal control information as indicated.
- 1.5 Administration Requirements
- .1 Co-ordination:
 - .1 Location:
 - .1 Work comprises dredging of following areas:
 - .1 Area of 165 m².
 - .2 Area measurements exclude side slopes.
 - .2 Navigation co-ordination:
 - .1 Plan and execute Work in manner that will not interfere with fishing operations, construction activities at wharf sites, or access to wharves by land or water.
 - .2 *Departmental Representative* will not be responsible for loss of time, equipment, material or any other cost related to interference with moored vessels in harbour or due to other Contractor's operations.
 - .3 Maintain a minimum 10 m clear width of channel for vessel traffic at all times. Provide and locate necessary buoys to indicate temporary channel for passage.
- 1.8 Site Conditions
- .1 Inspect work site and become thoroughly familiar with extent and nature of Work and conditions prior to tendering.
 - .2 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

-
- .3 Material to be dredged consists of Class "B" material.
 - .4 Results of most recent soundings are shown on drawings. Data is available for bidding purposes and may differ from present site conditions. Take this into consideration when submitting bid.
 - .5 Survey requirements:
 - .1 Provide, at own expense, survey vessel, equipment and crew to set up and maintain control for location of dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained. Areas are to be sounded to provide sounding printout display of at least 5 x 5m UTM grid to approval of *Departmental Representative*.
- 1.09 Dredging Sequence
- .1 Sequence of dredging will be in the following order:
 - .1 Dredge in the direction from upstream to downstream commencing at cut nearest to centreline of channel and completion at channel limit including side slope material.
 - .2 Supply *Departmental Representative* with plan of dredging sequence and stages.
- 1.10 Measurement Procedures
- .1 Mobilization and demobilization of dredging equipment will be considered incidental to the work.
 - .2 Dredging: [Class "B"] to be measured as per section 01 29 00.
 - .3 The follow shall be considered incidental to the work, costs for disposal of dredged material at location specified; maintenance of disposal site; site clean-up and mechanical sweeping of dredged areas.

- .4 Operations in connection with field positioning of dredging equipment, Contractor's survey vessel, equipment and crew or diving services will not be measured separately for payment but will be considered included in dredging item.
- .5 There will be no additional payment for delays caused by vessel traffic; downtime, or incurred during fishing seasons.
- .6 Removal of infilling material will not be measured for payment but will be considered included in dredging item.
- .7 Change in location of disposal site. Base contract unit price on location of disposal site as indicated within the on-site containment cell. Unit price will be adjusted up or down, subject to prior negotiation with *Departmental Representative* for significant change in location of disposal site.

PART 2 - PRODUCTS

- 2.1 Dredging Equipment
 - .1 Contractor to determine required equipment necessary to dredge material specified and to dispose of dredged material at locations specified.
 - .2 Upon request, prove to the satisfaction of the *Departmental Representative* that the dredging equipment and plant are adequate to finish the work to quality, time and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
 - .3 Contractor shall be responsible for ensuring that equipment can access and function at the disposal site.

PART 3 - EXECUTION

- 3.1 Examination
- .1 Verification of location:
 - .1 Work comprises dredging of areas as indicated and as specified herein.
 - .2 Surveys and acceptance of work:
 - .1 Post-dredge survey will be undertaken by *Departmental Representative* upon completion of dredging. Survey will confirm if dredging is completed as specified and whether area can be considered cleared area.
 - .2 Contractor to redredge as necessary to remove all material within dredge areas which is found to be above grade specified.
- 3.2 Layout of Work
- .1 Immediately upon entering site for purpose of beginning work on this project, locate reference points and take proper action necessary to prevent their disturbance.
 - .2 *Departmental Representative* will meet with Contractor and survey staff to identify established horizontal control consisting of a baseline and coordinate system with reference control monuments and vertical control consisting of benchmark to define dredge area.
 - .3 Maintain established horizontal and vertical control and lay out work from these established references. Be responsible for accuracy of work relative to established references. Provide and maintain electronic position fixing and distance measuring equipment as required for accurate dredging control. Provide at own expense, survey vessel, equipment and crew to set up and maintain control for location of dredge limits.
 - .4 Contractor's electronic positioning system must be made accessible to *Departmental Representative* or their representative upon request. It must provide a continuous

automatic update of position in all weather conditions. Minimum accuracy of positioning to be ± 1 metre. An on-line graphics display of position and hard copy capability is required. Positioning system is subject to *Departmental Representative's* approval.

- .5 Install and maintain tide boards in vicinity of worksite in order that proper depth of dredging can be determined. Locate tide boards so as to be clearly visible.
- .6 Lay out Work from bench marks and base lines established. Be responsible for accuracy of Work relative to established bench marks and baseline. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.

3.3 Dredging

- .1 Mark floating equipment with lights in accordance with Collision Regulations and maintain VHF (Channel 16) radio watch on board.
- .2 Place and maintain buoys, markers and lights required to define dredge areas.
- .3 Make arrangements with the Canadian Coast Guard - Aids to Navigation Program for the removal and reinstallation of the existing navigation aids, as required to carry out the dredging operations. Be responsible for damage to aids or other navigation markers caused by dredging operations. If such occurs, notify Canadian Coast Guard. Assume responsibility for replacement

Become familiar with fishery activities. Clearly mark dredging area, disposal areas and routes to and from dredging and disposal areas during periods when fishing gear is set in areas adjacent to dredging operations with "Cautionary Buoys" in

- accordance with Coast Guard Standard TP968. All buoys must be coloured cautionary yellow - CGSB # 505-108, and be equipped with radar reflectors.
- .2 Execute the work to ensure damage does not occur to fishing gear and interference to fishing operations is minimized by conducting operations within the areas so marked.
 - .3 Be responsible for damage to fishing gear outside marked areas, if as a result of dredging activities, and if damage occurs, assume responsibility for replacement or repair costs and cost of lost fishing opportunity.
 - .4 Areas to be dredged are to be referenced to vertical bench marks for each location of dredging as indicated.
 - .5 Establish and maintain tide boards] in order that proper depth of dredging can be determined. Locate tide boards so as to be clearly visible.
 - .6 Establish and maintain on-land targets for location and definition of designated dredge area limits. Targets to be suitable for control of dredging operations and locating soundings. Remove targets on completion of Work.
 - .7 Excavate areas to grade depths below Chart Datum where indicated on the drawings.
 - .8 Excavate side slopes to 1.5 horizontal to one vertical.
 - .9 Remove materials above specified grade depths, within limits indicated. Material removed from below subgrade depth or outside specified area or side slope is not part of Work. Do not over excavate. Average over dredging not to exceed 0.2 metres.
 - .10 Remove spillage that occurs as result of

Work at no expense to *Departmental Representative*.

- .11 Remove material cast-over on surrounding area and dispose of it as dredged material. Do not cast-over material unless authorized in writing by *Departmental Representative*.
- .12 Remove shoaling in dredge areas which occurs prior to acceptance by *Departmental Representative*.
- .13 Immediately notify *Departmental Representative* upon encountering object which might be classified as obstruction. By-pass object after clearly marking its location and continue Work.

3.4 Class 'A' Removal

- .1 Identify areas where Class "A" material and obstructions is encountered above specified dredge grade. Immediately delineate these areas with UTM coordinates, and provide information to *Departmental Representative*.
- .2 Complete removal of Class 'B' material and obstructions in area before removal of for Class 'A' material. Work toothed buckets over area to remove Class 'B' material until *Departmental Representative* is satisfied that further removal cannot be accomplished without additional measures such as blasting or hydraulic fracturing.

3.6 Disposal of Dredged Material

- .1 Dispose of dredged material by depositing in containment cell identified in Section 01 35 44 - Environmental Protection Procedures for Marine Work and in a manner as approved by the *Departmental Representative*. Limits of disposal to be verified on site prior to start of work. Restrict disposal activities to those areas indicated.
- .2 Do not permit dredged material to spill or flow into watercourses, wetlands or other ecologically sensitive areas during

disposal of dredged material activities.

- .3 Subject to the time of year and water content of the dredged material, leave the disposal site in good condition and to the satisfaction of the *Departmental Representative* prior to demobilizing from the site.
- .4 Maintain dyke roadways and transfer area in a clean manner throughout duration of contract. Repair damages caused by Contractor's operation at no additional cost. Restore surfaces to original condition upon completion of work.
- .5 Utilize a route to the dredge disposal containment cell that is approved by the *Departmental Representative* and will be responsible to maintain the access in good condition during the dredging period. Depending on the condition of the access road it may be necessary to haul in suitable material to maintain the road. The access road to the site is to be left in condition acceptable to *Departmental Representative* at the conclusion of the dredging operations.
- .6 All materials deposited on private or public roads or properties in vicinity of site or as a result of trucking material to dump site will be removed by the Contractor to satisfaction of owners involved at no additional cost to Department.
- .7 Clean truck boxes and wheels of dredge material before moving onto provincial roads. Vehicle wash down stations may be required at both the loading and offloading sites to ensure the above requirements are met.

3.7 Disposal of Debris

- .1 Do not dispose of debris in watercourses, wetlands or other environmentally sensitive areas.

- .2 Dispose of debris at approved land-based disposal site.
- 3.8 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 10 - 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 10 - Cleaning.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for construction of the containment cell consisting of component layers, including core stone, filter stone, armour stone, and to dimensions indicated.
- 1.2 Reference Standards .1 American Society for Testing and Materials International (ASTM):
.1 ASTM C 127-15 (or latest edition) Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
.2 American Association of State Highway and Transport Officials (AASHTO):
.1 AASHTO T85 (latest edition) Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
- 1.3 Related Work .1 Refer to other Specification Sections for related information.
- 1.4 Source Sampling .1 Inform *Departmental Representative* of proposed source of materials and provide access for sampling at least two (2) weeks prior to commencing work.
.2 Forward, prepaid, a sample rock to be used to a testing consultant to be determined by the *Departmental Representative* for approval. Sample to be between 5 and 10 kg, representative of quarry and submitted minimum two (2) weeks prior to starting work.
- 1.5 Existing Conditions and Haul Roads .1 The land surrounding the site is both privately owned and is also the property of His Majesty the King in the Right of Canada and the Contractor will exercise extreme care to prevent damage to the abutting lands.
.2 It is important that Contractors intending to bid on work visit the site and

ascertain what preparatory work will be required for the following:

- .1 Condition of existing access roads and structures over which material must be hauled.
- .2 Preparation, maintenance, and removal of temporary roadways to and on the site for the use of trucks, loaders, cranes, long-reach excavators, draglines, etc.
- .3 Preparation, maintenance and removal of all temporary causeways and/or fills as required for trucks, loaders, long-reach excavators, cranes, draglines, etc.
- .4 Contractor shall be solely responsible for construction and maintenance of haul roads which shall be considered incidental to the work. All temporary roads shall be removed at the completion of the project and the land restored to its original condition.

1.3 Measurement for
Payment

- .1 Core stone will be measured in accordance with Section 01 29 00.
- .2 Filter stone will be measured in accordance with Section 01 29 00.
- .3 Armour stone will be measured in accordance with Section 01 29 00.
- .4 Mobilization and demobilization will be measured in accordance with Section 01 29 00.
- .5 No payment will be made for material used to construct and/or maintain haul roads, causeways, fills or working roadways on top of filter and armour layers.
- .6 Clearing, grubbing and stripping of quarries to be incidental to the work.

- .7 Making good to the satisfaction of the *Departmental Representative*, any damage to the existing structures will be considered incidental to the work.
- .8 Do not mix different categories of material in the same truckload. Only one class of material will be weighed for payment at any given time. If rocks of markedly different sizes are present, *Departmental Representative* reserves the right to weigh such rocks separately for payment. There will be no additional payment for weighing individual stone units which do not meet the category of material listed for the truckload.

PART 2 - PRODUCTS

2.1 Materials

- .1 Rock Material:
 - .1 All rock materials to be tested and approved by the *Departmental Representative* prior to installation in the work.
 - .2 All field stone supplied by the Contractor must be accepted before it is used in the work.
 - .3 All rock materials to be free from cracks, seams and other defects which may impair durability.
- .2 Armour stone and Filter stone to meet the following requirements:
 - .1 Specific Gravity minimum 2.65 and absorption maximum 2.0%. Slate, sandstone, shale, and stone containing mica not acceptable for filter stone or armour stone.
 - .2 Quarried or field stone, rough and angular in shape.
 - .3 Greatest dimension of each stone not to exceed two times least dimension.

- .3 Armour stone:
 - .1 Armour stone will be hard, dense, durable, angular stone, free from cracks, or other structural defects.
 - .2 Minimum individual weight of armour stones will be 2 tonne, maximum weight will be 4 tonnes, based on a specific gravity of 2.65 tonnes per cubic metre.
 - .3 Fifty percent (50%) by weight of the armour stone will be individual stones greater than, or equal to 3 tonnes.

- .4 Filter stone for first and second underlayers:
 - .1 All filter stone will be hard, dense, durable, angular stone, free from cracks, or other structural defects.
 - .2 Underlayers:
 - .1 Filter stones to consist of stones weighing 200 to 400 kg.
 - .2 Fifty percent (50%) by weight of the filter stone shall be individual stones greater than, or equal 300 kg.

- .5 Core stone:
 - .1 Specific Gravity minimum 2.65.
 - .2 Actual Specific Gravity and absorption will be determined by testing selected samples of material being incorporated into the works. Materials with a specific gravity less than 2.65 or an absorption rate in excess of 2% will be rejected.
 - .3 To be pit run or quarried material rough and angular in shape requiring approval by the *Departmental Representative* prior to being used in the work.
 - .4 Material not to contain organic matter, frozen lumps, sod, roots, logs, stumps, excessive fines, or any other objectionable matter.

- .5 Core stone gradation shall be within the following limits:

IMPERIAL SIZE	METRIC SIZE	% PASSING BY MASS
10"	250 mm	100
6"	150 mm	20 - 35
4"	100mm	0 - 10

- .6 Material to be blended so that a homogeneous mix of smaller and larger sizes within the approved range is attained.

PART 3 - EXECUTION

- 3.1 Toe Protection .1 Provide toe as shown on the plans.
- 3.2 Construction Sequence .1 Refer to drawings for construction sequence.
- 3.3 Core Stone .1 Place core material in lifts and in sequence using suitable equipment to lines, grades and dimensions indicated on the plans.
- .2 Place material on harbour bottom to specified grades, and after the removal of kelp, debris, snow, ice, etc.
- .3 Execute work in such a manner to protect core material from storm wave action or tidal erosion damage. Replacement of material lost due to storm or erosion damage will be the responsibility of the Contractor.
- .4 Core stone material shall be placed by excavator. End dumping is not permissible. Contractor shall note that due to the side slopes of the breakwater that mechanical

placing of the core will be necessary to produce the slopes and shapes required.

- .5 Grades, lines, dimensions, slope, and quantity of core, to be reviewed and approved by the *Departmental Representative* before proceeding with overlaying filter layers.

3.4 Filter Stone

- .1 Two underlayers are to be placed over the core stone.
- .2 Place filter layer material to lines, grades and dimensions indicated on the plans.
- .3 Place each filter stone individually using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump filter units into place. Commence placement at toe of slope and proceed up the slope towards the crest. Place each filter stone so that it is stable, secure on slope and supported by units below. Control placement of filter stone so as to produce a uniform and continuous cover over the underlying layer.
- .4 Replace filter stone units broken or damaged during placement. Damaged units to be removed from the work and will not be paid for.
- .5 Grades, lines, dimensions, slopes, and quantity of filter stone to be reviewed and approved by *Departmental Representative* before proceeding with the overlying armour layer.

3.5 Armour Stone

- .1 Place armour stone layer as shown on the plan to the lines, grades and dimensions shown on the plan.
- .2 Place each armour stone individually using mechanical means to the lines, grades and dimensions shown on the plans. Do not dump

armour units into place. Commence placement at toe of slope and proceed up the slope towards the crest elevation. Place each unit so that it is stable and secure on slope and supported by units below. Control placement of armour units so as to produce a uniform and continuous cover.

- .3 Replace armour stone units broken or damaged during placement. Damaged units to be removed from the work and will not be paid for.
- 3.6 Existing Armour stone .1 Remove and salvage existing armour stone
Filter stone and Core stone Removal, Salvage and Installation
.2 Salvaged armour stone, filter stone and core stone to be incorporated into the new work as specified (where suitable).
- 3.7 Tolerances .1 Completed component layers to be within following tolerances of line and grades indicated:
 - .1 Core stone: +50 mm
 - .2 Filter stone +100 mm
 - .3 Armour stone: +150 mm
 - .4 Armour crest: Minimum design elevation
- 3.8 Cross Sections .1 During construction the Contractor shall submit cross-section sheets to the *Departmental Representative* showing the following:
 - .1 Cross-sections at stations every 10 metres along the breakwater slope.
 - .2 The design cross-section showing proposed core, filter, and armour stone in solid lines.
 - .3 Superimposed in dashed lines elevations taken at 2 metre intervals perpendicular to the centreline and at top and toe of slopes showing core, filter, and armour stone as constructed surfaces.

- .4 Cross-sections to be referenced to the plan view of the breakwater with stations shown for reference.
- .5 Cross-sections to be submitted as work at each station is completed for each class of stone. Next layer not to be placed until *Departmental Representative* has reviewed and approved the as-built elevations for underlying layer.
- .6 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 and two sets of prints. The following minimum requirements to be met:
 - .1 Elevations every 10 metres along the centreline of the breakwater and every 3 metres perpendicular to the centreline, on the end cone, and top and toe of slopes.

3.9 Protection

- .1 Take into account anticipated weather conditions and degree of exposure of site and tidal conditions in setting requirements for protection.
- .2 Schedule and carry out construction so that each phase of work is not left exposed longer than necessary.
- .3 Progress of placement of core and stone to be recorded daily by *Departmental Representative's* inspector with Contractor's concurrence. Replacement of material lost due to storm wave action or tidal erosion damage to be based on daily journal of work progress and to be considered incidental to the work.

3.10 Roadways

- .1 Construction, maintenance, and removal of working roadway layers to be the

responsibility of the Contractor and is to be considered incidental to the work.

3.11 Temporary
Navigational Buoys

- .1 Maintain temporary buoys to mark the position of the outer end of the breakwater toe as construction proceeds.
- .2 All buoys are to meet the requirements of Canadian Coast Guard Standard TP968 and Section 01 10 10.
- .3 Coordinate the buoy installation with the local Harbour Authority.
- .4 Pay all costs associated with the supply, installation, and removal of all temporary navigational buoys.

-----END of SECTION-----