

**SPECIFICATIONS FOR  
BREAKWATER REPAIRS  
LIONS HEAD, ON**



Department of Fisheries & Oceans  
Small Craft Harbours Branch  
Burlington, Ontario

**2018**

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## **01 11 05 – GENERAL INSTRUCTIONS**

### **Part 1      General**

#### **1.1            DESCRIPTION OF WORK**

- .1      The site of work is the Lions Head Marina in Lions Head, Ontario. Lions Head is located on the west shore of Georgian Bay approximately 50 km southeast of Tobermory.
- .2      The work under this contract covers:
  - .1      Salvaging and reinstating existing displaced armour rock adjacent to the breakwater.
  - .2      Supply and installation of new core stone and armour stone to build up the existing rubble mound breakwater and rock protection around the government wharf.
  - .3      Excavation and removal of existing infill material adjacent to existing breakwater.
  - .4      Supply and installation of a new concrete base for navigational aid, including reinstatement of existing navigational aid on new concrete base.
  - .5      Minor concrete repairs to the existing government wharf.
- .3      The work to be done by the Contractor under this Contract shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, insurance, and all things necessary for and incidental to the satisfactory performance and completion of all work as specified herein. All work to be done in accordance with details shown on the accompanying plans as specified herein.

#### **1.2            DEFINITIONS**

- .1      The word "provide" means "supply and install".
- .2      For purposes of this contract, "Departmental Representative", "Architect/Engineer" and "Engineer" shall have the same meaning.

#### **1.3            WORK SCHEDULE**

- .1      Provide, within 10 working days after Contract award, schedule(s) showing anticipated progress stages and final completion of work within time period required by contract documents.
- .2      Interim reviews of work progress based on work schedule will be conducted as decided by the Engineer and schedule updated by Contractor in conjunction with and to approval of the Engineer.
- .3      Work under this contract is to be performed in a timely manner. Commence planning and preparatory work immediately upon receipt of official notification of acceptance of Contract and schedule the work so that the project will be complete by dates shown in contract documents.
- .4      Work sequence:

- .1 Before work is undertaken, ensure that all materials and trades required are available to finish work in as short a period as possible.
- .2 No area to be renovated shall be placed out of service until it is confirmed that there shall be no need to stop the work waiting for receipt of materials, equipment or labour.

#### **1.4 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

#### **1.5 FEES, PERMITS AND CERTIFICATES**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and work permits required.
- .3 Furnish certificates and permits when requested.

#### **1.6 MEASUREMENT FOR PAYMENT**

- .1 Upon request, provide a breakdown of the sum lumps arrangement costs. Breakdown is to be provided within 10 working days of request.
- .2 Notify the Engineer sufficiently in advance of operations to permit required measurements for payment.
- .3 Submit to the Engineer, at least 7 days before Information for first application for payment, cost breakdown, Progress Payment in detail as directed by the Engineer, for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment. After approval by the Engineer, cost breakdown will be used as basis for progress payments.

#### **1.7 INTERPRETATION OF DOCUMENTS**

- .1 In the event of discrepancies or conflicts in interpreting the Plans (drawings) and Specifications, Specifications take precedence over drawings bound with specifications.
- .2 Drawings and specifications are complementary. When work is shown or mentioned on the drawings but is not indicated in the specifications, or when work is indicated in the specifications but is not shown or mentioned on the drawings, it shall nevertheless be included in the Contract.
- .3 The sub-division of the Specification into sections, identified by title and number, is for convenience only and does not modify the singularity of the document, nor does it operate to make or imply that the Engineer is an arbiter to establish the limits or extent of contract between Contractor and Subcontractors or to determine the limits or extents of work that may be decided by trade unions or contractors' organizations. Extras to the Contract will not be considered on the grounds of differences in interpretation of the Specification and/or Drawings as to which trade performs the work.
- .4 Do not scale off drawings.

## **1.8 CONTRACTOR'S USE OF SITE**

- .1 Co-ordinate use of premises under direction of the Engineer.
- .2 Do not unreasonably encumber the site with materials and equipment.
- .3 Assume full responsibility for protection and safekeeping of products under this Contract.
- .4 Move stored products or equipment which interfere with operations of the Engineer or other harbour users.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Engineer.
- .8 At completion of operations the condition of the existing work, including locations of the parking lot used for staging and/or storage, shall be equal to or better than that which existed before new work started.

## **1.9 EXISTING SERVICES**

- .1 Notify the Engineer and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give the Engineer 72 hours notice for necessary interruption of mechanical or electrical service throughout the course of work. Minimize duration of interruptions.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify the Engineer of findings.
- .4 Submit schedule to and obtain approval from the Engineer for any shut-down or closure of active service or facility including power and communications services. Adhere to the approved schedule and provide notice to affected parties.
- .5 Where unknown services are encountered, immediately advise the Engineer and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.

## **1.10 DOCUMENTS REQUIRED**

- .1 Maintain at the job site, one copy each document as follows:
  - .1 Contract Drawings.

- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 Change Orders.
- .6 Other Modifications to Contract.
- .7 Copy of Approved Work Schedule.
- .8 Health and Safety Plan and Other Safety Related Documents.
- .9 Other documents as specified.

**1.11 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 shall apply.
- .2 Work to meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

**1.12 PROJECT MEETINGS**

- .1 The Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

**1.13 SETTING OUT OF WORK**

- .1 Engineer will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give the Engineer reasonable notice of requirements for such control points and stakes.
- .2 Set grades and lay out work in detail from control points and grades established by the Engineer.
- .3 Provide devices needed to lay out and construct work.
- .4 Supply such devices needed to lay out and construct work.
- .5 Supply such devices as straight edges and templates required to facilitate the Engineer's inspection of work.
- .6 Supply stakes and other survey markers required for laying out work.

**1.14 ADDITIONAL DRAWINGS**

- .1 The Engineer may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in Contract documents.
- .2 When additional drawings and instructions are required by the Contractor, provide reasonable notice in writing to the Engineer in advance of the date they are required.

**1.15 EXAMINATION**

- .1 Before submitting your tender, examine the existing conditions and determine conditions affecting work.
- .2 Obtain all information which may be necessary for proper execution of the Contract.

**1.16 SITE INSPECTION**

- .1 The submission of a tender is deemed to be a confirmation of the fact that the Tenderer has inspected the site and is fully conversant with all the conditions under which the work is to be carried out.

**1.17 MATERIAL AND EQUIPMENT**

- .1 Use new products unless otherwise specified.

**1.18 SECURING WORK AREA**

- .1 Secure the work areas in each stage in an approved manner. This includes fencing or barricades to prevent public access to any areas where construction activities occur and construction materials are stored.

**1.19 VEHICLE AND PEDESTRIAN PROTECTION**

- .1 Provide snow fencing, wooden barriers, or other approved barriers to prevent vehicles and pedestrians from accessing the site during construction.

**1.20 DRAWINGS**

- .1 The following drawings are to be read in conjunction with this specification:
  - .1 MA-01- 03 Lions Head Breakwater Repairs
- .2 Elevations and soundings shown on Drawings are expressed in metres relative to chart datum.
- .3 Chart datum for Lake Huron is 176.0 metres I.G.L.D (1985).

**1.21 OVERLOADING**

- .1 No part of Work shall be loaded with load which will endanger its safety or will cause permanent deformation.
- .2 Repair to original condition any part of work damaged due to overloading at no cost to Engineer.

**1.22 TAXES**

- .1 Pay applicable Federal, Provincial and Municipal taxes.

**Part 2            Products**

**2.1                NOT USED**

.1                Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**



**01 35 29 – HEALTH AND SAFETY REQUIREMENTS**

**Part 1        General**

**1.1            MEASUREMENT FOR PAYMENT**

- .1        No measurement will be made under this Section.

**1.2            REFERENCES**

- .1        Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2        Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .3        Province of Ontario
  - .1        The Workers Compensation Act

**1.3            SUBMITTALS**

- .1        Submit site-specific Health and Safety Plan, to the Engineer, within 10 days of the Notice to Proceed and prior to commencement of Work.
- .2        Submit copies of incident and accident reports to the Engineer.
- .3        Submit WHMIS MSDS – Material Safety Data Sheets to Engineer.
- .4        The Engineer will review Contractor's site-specific Health and Safety Plan and provide comments to the Contractor, if any. Revise the plan as appropriate and resubmit plan to the Engineer within 5 days after receipt of comments from the Engineer.
- .5        The Engineer's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .6        On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

**1.4            FILING OF NOTICE**

- .1        File Notice of Project with Provincial authorities prior to beginning of Work.

**1.5            SAFETY ASSESSMENT**

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

**1.6            GENERAL REQUIREMENTS**

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

- .2 Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Worker's Compensation Board and municipal statutes and authorities.
- .3 In the event of a conflict between any provisions of above authorities having the most stringent provision will apply.

#### **1.7 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

#### **1.8 UNFORSEEN HAZARDS**

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

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

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

#### **1.10 POSTING OF DOCUMENTS**

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

#### **1.11 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or the Departmental Representative.
- .2 Provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**01 35 43 – ENVIRONMENTAL PROCEDURES**

**Part 1      General**

**1.1      MEASUREMENT FOR PAYMENT**

- .1      No separate measurement will be for work of this section. Work is incidental to the project cost.

**1.2      FIRES**

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

**1.3      DRAINAGE**

- .1      Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2      Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .3      Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

**1.4      WORK ADJACENT TO WATERWAYS**

- .1      Construction equipment may not enter the lake.
- .2      No construction debris from work activities will be allowed to enter the lake. The work site must be cleaned daily. Every effort will be made to minimize the introduction of sediment to the lake during work activities.
- .3      All materials and equipment used for the purpose of site preparation and project completion shall be operated, maintained, and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt etc.) from entering the water.
- .4      Construction equipment will enter and leave the project site at such a location and in such a manner that disturbance to the lakeshore is minimized.
- .5      Do not use waterway beds for borrow material.
- .6      Waterways to be free of excavated fill, waste material and debris.
- .7      Design and construct temporary crossings to minimize erosion to waterways.
- .8      Do not skid logs or construction materials across waterways.
- .9      Avoid damage to the shoreline.

- .10 Any impacts below the ordinary high water mark that are not shown on the site plan are not permitted without written approval from the Engineer. Up to 30 days may be required for approval.
- .11 Reclaim and restore disturbed areas to previous or better condition.
- .12 Areas used for stockpiling construction materials, including fill or other equipment storage will be well back from the edge of the water body and, if possible, in areas which have already been disturbed or are devoid of vegetation.
- .13 All required machinery should be supplied with appropriate spill containment kits as a precaution in the event of accidental fuel spills or hydraulic leaks. Additional kits should be available on site with the capacity to contain any spills of deleterious substances that may be reasonably expected to occur. Contractors should ensure that all personnel are familiar with the spill kits.
- .14 The Contractor shall report spills of fuels or other contaminants to the Engineer.
- .15 The Contractor shall not remove, destroy or disturb species pursuant to Provincial Threatened Endangered and Extirpated Species regulation, or species listed in the federal Species at Risk Act.
- .16 The Contractor shall not disturb migratory bird nests.

## **1.5 POLLUTION CONTROL**

- .1 Control emissions from equipment and plant to local authorities' emission requirements.
- .2 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. The Contractor shall not use chemical dust suppressant materials on roads within 100 metres of the construction site.
- .4 Locate temporary fuel storage 100 metres from shore and comply with Provincial Environmental Legislation.
- .5 Refueling, servicing, or cleaning of equipment on ice or within 100 metres of shore is prohibited. The Contractor to ensure all equipment operating on project is free of external fluid leaks, grease, oil, and mud.
- .6 The Contractor is to contain all oil leaks from equipment working adjacent to waterways.
- .7 No maintenance of vehicles or equipment in construction areas.
- .8 Use drip pans to catch leaking oil from compressors, pumps, etc.

## **1.6 DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site.

- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.
- .3 Hazardous wastes including fuels, oils and lubricants must be disposed of by a licensed hazardous waste carrier/handler in accordance with Provincial Environment Legislation.
- .4 Collect all rubbish and waste material and dispose of in accordance with applicable governing authorities.
- .5 The Contractor shall dispose of non-reusable construction debris and solid waste from construction at a waste disposal ground operating under the authority of a permit under Provincial regulation.
- .6 Do not allow debris of any type to enter waterway.

**1.7 PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties.
- .2 Avoid disturbance of topsoil and vegetation unless otherwise specified. The Contractor is responsible to restore all impacted areas to original state.
- .3 The Contractor shall revegetate soil in areas exposed by construction with vegetation species native to the area. These areas shall be revegetated as quickly as possible following construction to prevent soil erosion and establishment of noxious weeds.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**01 45 00 – QUALITY CONTROL**

**Part 1      General**

**1.1            MEASUREMENT FOR PAYMENT**

- .1      No measurement will be made under this Section.

**1.2            INSPECTION**

- .1      Allow the Engineer access to the Work. If part of the Work is in preparation at locations other than the Place of Work, allow access to such Work whenever it is in progress.
- .2      Give timely notice requesting inspection if the Work is designated for special tests, inspections or approvals by the Engineer.
- .3      The Engineer will order part of the Work to be examined if the Work is suspected to be not in accordance with the Contract Documents. If, upon examination such work is found not in accordance with the Contract Documents, correct such Work and pay cost of examination and correction.

**1.3            INDEPENDENT INSPECTION AGENCIES**

- .1      Independent Inspection/Testing Agencies may be engaged by the Engineer for purpose of inspecting and/or testing portions of the Work.
- .2      Provide equipment required for executing inspection and testing by appointed agencies.
- .3      Employment of inspection/testing agencies does not relax responsibility to perform the Work in accordance with the Contract Documents.
- .4      If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct the defect and irregularities as advised by the Engineer at no additional cost. Pay costs for retesting and reinspection.

**1.4            ACCESS TO WORK**

- .1      Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.
- .2      Co-operate to provide reasonable facilities for such access.

**1.5            PROCEDURES**

- .1      Notify the Engineer in advance of requirement for tests, in order that attendance arrangements can be made.
- .2      Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

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

#### **1.6 REJECTED WORK**

- .1 Remove defective Work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, which has been rejected by the Engineer as failing to conform to the Contract Documents. Replace or re-execute, in accordance with the Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Engineer it is not expedient to correct the defective Work or the Work is not performed in accordance with the Contract Documents, Owner will deduct from Contract Price the difference in value between the Work performed and that called for by the Contract Documents, the amount of which will be determined by the Engineer.

#### **1.7 TESTS AND MIX DESIGNS**

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

#### **1.8 MILL TESTS**

- .1 Submit mill test certificates as requested.

#### **Part 2 Products**

##### **2.1 NOT USED**

- .1 Not Used.

#### **Part 3 Execution**

##### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**01 77 00 – CLOSEOUT PROCEDURES**

**Part 1        General**

**1.1            MEASUREMENT FOR PAYMENT**

- .1        No measurement will be made under this Section.

**1.2            ADMINISTRATIVE REQUIREMENTS**

- .1        Acceptance of Work Procedures:
  - .1        Contractor's Inspection: the Contractor is to conduct an inspection of the Work, identify deficiencies and defects, and repair as required to conform to the Contract Documents.
  - .2        Final Inspection:
    - .1        When completion tasks are done, request final inspection of the Work by the Engineer.
    - .2        When the Work is incomplete, according to the Engineer, complete the outstanding items and request re-inspection.
  - .3        Final Payment:
    - .1        When Engineer considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .4        Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

**1.3            FINAL CLEANING**

- .1        Remove surplus materials, excess materials, rubbish, tools and equipment.

**Part 2        Products**

**2.1            NOT USED**

- .1        Not Used.

**Part 3        Execution**

**3.1            NOT USED**

- .1        Not Used.

**END OF SECTION**

## **35 31 23 – CONCRETE BASE**

### **Part 1      General**

#### **1.1            MEASUREMENT PROCEDURES**

- .1      Concrete base will be measured for payment as an individual unit including cost of supply, storage, delivery, installation, reinforcement and miscellaneous fittings (anchor bolts and lifting lugs). Removal of existing navigational aid and steel base plate from current location, without damage, and installation of existing navigational aid onto new concrete base is considered incidental to this item.

#### **1.2            REFERENCES**

- .1      Canadian Standards Association (CSA International)
  - .1      CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2      CSA-A23.3-04, Design of Concrete Structures.
  - .3      CSA-A23.4-05, Precast Concrete - Materials and Construction.
  - .4      CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1      CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .5      CAN/CSA-G30.18-M92 (R2002), Billet-Steel Bars for Concrete Reinforcement.
  - .6      CSA-W59-03, Welded Steel Construction (Metal Arc Welding) (Metric version).

#### **1.3            REQUIREMENTS**

- .1      Concrete base can be either in-situ or precast concrete.
- .2      Dimensions of concrete base may not be less than dimensions indicated by more than 50 mm.
- .3      Dimensions of concrete base may be greater than dimensions indicated to suit available precast elements or formwork.
- .4      Prior to pouring or ordering concrete base submit, for approval from the Departmental Representative, drawings or manufacturers specifications for base including:
  - .1      Type of concrete to be used (i.e. precast or in-situ).
  - .2      Dimensions of concrete base.
  - .3      Reinforcement size and placement.

### **PART 2      DELIVERY, STORAGE AND HANDLING**

- .1      Handle, store and protect concrete base in order to avoid damage to concrete.
- .2      Identify lifting points by inserting hooks during casting.

### **Part 3 Products**

#### **3.1 MATERIALS**

- .1 Concrete:
  - .1 Cement to CAN/CSA-A3001, Type GU.
  - .2 Compressive strength: 30 MPa at 28 days
  - .3 Exposure class: C-1 to CSA-A23.1/A23.2.
  - .4 Aggregate size: 20 mm;
  - .5 Air content: 6%
- .2 Water: to CSA-A23.1/A23.2.
- .3 Reinforcing steel: to CAN/CSA-G30.18, grade 350 or greater.
- .4 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .5 Anchors and supports: to CAN/CSA-G40.21 Type 300 W.
- .6 Bolts and anchor bolts: to ASTM A307.
- .7 Welding materials: to CSA W48.
- .8 Air entrainment admixtures: to ASTM C260.
- .9 Epoxy adhesive: 2 component, solvent free, high modulus moisture insensitive, high strength structural epoxy capable at a minimum embedment depth 255 mm to develop a tensile bond of 200 kN minimum for a 20M reinforcing rod.

#### **3.2 FINISHES**

- .1 Finish units to standard grade to CSA-A23.4.

### **Part 4 Execution**

#### **4.1 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated and in accordance with CSA-A23.1/A23.2.
- .2 Ensure cover to reinforcement is maintained during concrete pour.

#### **4.2 PRECAST WORK**

- .1 Do precast concrete work in accordance with CSA-A23.4 and CAN/CSA-A23.3.

**4.3 PLACEMENT**

- .1 Install concrete base as indicated on drawings.
- .2 Concrete base to be installed in a level position.

**4.4 HARDWARE**

- .1 As required, provide hardware suitable for handling elements.
- .2 Provide hardware suitable for installation of navigation aid on concrete base.

**END OF SECTION**

**35 31 24 – BREAKWATER**

**Part 1      General**

**1.1      MEASUREMENT PROCEDURES**

- .1      Armour stone will be measured in tonnes of material supplied and placed to the final dimensions indicated on the drawings and incorporated into the completed work and shall include all labour, equipment and materials necessary to complete the work.
- .2      Core stone will be measured in tonnes of material supplied and placed to the final dimensions indicated on the drawings and incorporated into the completed work and shall include all labour, equipment and materials necessary to complete the work.
- .3      Weigh all stone placed in the Work at the quarry on a scale approved and certified as correct by the Department of Consumer and Corporate Affairs Weights and Measures Inspection Branch. Prior to use, have weigh scale certified as meeting requirements of Statutes of Canada, Chapter 36, Weights and Measures Act 1971 and subsequent amendments. Provide the Departmental Representative with a copy of the certificate and display certificate in prominent location. Costs for maintenance and operation of scale shall be considered incidental to the work.
- .4      Provide the Departmental Representative with weigh tickets at time of delivery to site.
- .5      All labour, equipment and material necessary to complete the following will be considered part of the sum lump arrangement:
  - .1      Removal, transporting and disposal off site of existing navigational aid base;
  - .2      Salvaging, retaining and placement of existing displaced armour stone;
  - .3      Excavating, stockpiling and backfilling of native material as required to install new core and armour stone to limits shown;
  - .4      Excavating, transporting and disposal off site of surplus and/or unsuitable native material from within  $\pm 9.45$  m of the centerline of the breakwater, as indicated. Excavation, transporting and disposal of infill material from Area A (Option 2) will be measured separately;
  - .5      Grinding of concrete on government wharf, to the limits and dimensions specified on the drawings; and
  - .6      Temporary relocation and reinstatement of anchor blocks and associated chains.
- .6      Excavating, transporting and disposal of infill material from Area A (beyond toe of repaired breakwater) will be measured in cubic metres, truck box measurement, determined from capacity of filled truck. Only material excavated within the areas indicated on the drawings (Area A) or as directed by the Departmental Representative, will be measured. Payment will include disposal of excavated material off site, and will include all machinery required to load the truck at the Lions Head Harbour and removal of material at the disposal location.
- .7      Construction, maintenance and removal of haul roads are to be considered incidental to this work.

## **1.2 SOURCE SAMPLING**

- .1 Inform Engineer of proposed source of materials and provide access for sampling at least 2 weeks prior to commencing work.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Rock materials:
  - .1 Contractor to provide all materials.
  - .2 Armour stone:
    - .1 The largest dimension of each stone is not to exceed two times the smallest dimension.
    - .2 Armour stone: Type A – 0.75 to 2 tonnes each by weight.
    - .3 Armour stone: Type B – 2 to 4 tonnes each by weight.
    - .4 Stones are to be fractured and angular. Field stone is not acceptable.
    - .5 The Armour stone is to be free from cracks, seams and other defects which may impair durability. The Los Angeles abrasion loss determined using ASTM procedures shall not exceed 35%. The armour rock shall be durable, blasted limestone or granite. Slate and shale are not acceptable.
  - .3 Core stone:
    - .1 The largest dimension of each stone is not to exceed three times the smallest dimension.
    - .2 Quarry Run Core Stone: 25kg to 180kg each by weight, shovel run material for core, with 60 percent of the total volume to be at the midpoint of the specified size range, and not more than a maximum 5 percent content less than 25mm.
    - .3 Stones are to be fractured and angular. Field stone is not acceptable.
    - .4 Material is to be free of roots and other deleterious material.

## **Part 3 Execution**

### **3.1 EXCAVATING**

- .1 Excavate and stockpile native material that is suitable for reuse as core material in repaired breakwater. Unsuitable and/or surplus material is to be disposed of off-site.
- .2 Suitable native fill material is to be free of roots and other deleterious material.
- .3 Reinstall rock materials as indicated on drawings.
- .4 Excavating for Area A (Option 2):
  - .1 Area A consists of infilled sand and pebbles from the nearshore area.

- .2 Limits of excavation area to be verified on site prior to start of work. Restrict excavation and disposal activities to those area indicated.
- .3 Sweep Area A in one continuous operation on completion of excavating to confirm that grade depth has been achieved.

### **3.2 DISPOSAL OF DEBRIS**

- .1 Do not dispose of debris in harbour.
- .2 Dispose of debris in containment facility at an approved land disposal site.

### **3.3 PLACEMENT OF CORE STONE**

- .1 Place core stone to lines, grades and dimensions as indicated on the drawings.
- .2 Place core stone in thickness courses to total layer thickness, as shown on the drawing.
- .3 Place core stone on a slope of 1.5 horizontal to 1 vertical
- .4 No allowance made for material placed outside specified limits

### **3.4 PLACEMENT OF ARMOUR STONE**

- .1 Place armour stone to lines, grades and dimensions as indicated on the drawings.
- .2 Place each armour stone in stable position.
- .3 Place armour stone in thickness courses to total layer thickness, as shown on the drawing.
- .4 Sort, fit and tightly key each rock to ensure stability of faces.
- .5 Placement not deemed acceptable must be removed and replaced

### **3.5 TOLERANCES**

- .1 Completed component layers to be within following tolerances of lines and grades as indicated:
  - .1 Armour: plus or minus 300 mm.
  - .2 Core: plus or minus 150 mm.

### **3.6 FLOATING DOCK**

- .1 Co-ordinate relocation of Dock A with the Municipality of Northern Bruce. Notify the Municipality prior the start of work to determine storage locations.
- .2 Temporarily relocate anchor blocks and associated chains during duration of work.
- .3 Reinstate anchor blocks, or secure Dock A to final rubble mound breakwater, as approved by the Engineer.

**3.7 HAUL ROADS**

- .1 Be solely responsible for construction and maintenance of haul roads. Remove haul roads from site upon completion of project. No separate payment to be made for construction, maintenance and removal of haul roads.
- .2 The Contractor is to be responsible for obtaining approval from applicable agencies for using access roads to site.
- .3 The Contractor to repair any damage caused to roads or property as a result of hauling operations.

**END OF SECTION**