



**Fisheries and Oceans  
Canada**



**Small Craft Harbours**

## **Ile d'Entrée – Magdalen Islands Region**

---

### **Slipway Construction and Breakwater repair**

**Project n° 722790**



**Specifications for bid**

**November 2019**

## TABLE OF CONTENTS

### Pages

### **DIVISION 1**      **GENERAL REQUIREMENTS**

Section 01 11 11 – Description of Work .....	7
Section 01 11 55 – Weigh Scales.....	2
Section 01 14 00 – Work Restrictions .....	3
Section 01 29 83 – Payment Procedures: Testing Laboratory Services .....	2
Section 01 31 19 – Meeting .....	2
Section 01 32 16 – Construction Progress Schedules - Bar (Gantt) Charts .....	4
Section 01 33 00 – Submittal Procedures .....	5
Section 01 35 29 – Health and Safety Requirements .....	8
Section 01 35 43 – Environmental Procedures .....	7
Section 01 41 00 – Regulatory Requirements.....	2
Section 01 45 00 – Quality Control .....	3
Section 01 45 01 – Quality Insurance .....	4
Section 01 51 00 – Temporary Utilities .....	2
Section 01 52 00 – Construction Facilities .....	5
Section 01 56 00 – Temporary Barriers and Enclosures.....	2
Section 01 61 00 – Common Product Requirements .....	4
Section 01 71 00 – Examination and Preparation .....	3
Section 01 73 00 – Work execution .....	2
Section 01 74 11 – Cleaning .....	2
Section 01 74 21 – Construction /Demolition Waste Management .....	4
Section 01 77 00 – Closeout Procedures .....	2

### **DIVISION 2**      **EXISTING CONDITIONS**

Section 02 41 16 – Structure Demolition .....	7
Section 02 81 01 – Hazardous Materials .....	4

### **DIVISION 3**      **CONCRETE**

Section 03 10 00 – Concrete Forming and Accessories .....	4
Section 03 20 00 – Concrete Reinforcing .....	4
Section 03 30 00 – Cast-in-Place Concrete .....	8
Section 03 41 00 – Precast Structural Concrete .....	4

### **DIVISION 6**      **WOOD, PLASTIC AND COMPOSITE**

Section 06 03 01 – Composite embankment.....	6
Section 06 15 00 – Decking.....	3
Section 06 40 00 – Sheathing.....	2

### **DIVISION 31**      **EARTHWORKS**

Section 31 05 16 – Aggregates .....	4
-------------------------------------	---

Section 31 23 33 – Excavating, trenching and backfilling .....	9
Section 31 32 19 – Geotextile .....	3

### **DIVISION 32**      **EXTERIOR IMPROVEMENTS**

Section 32 11 23 – Granular Sub-base.....	5
---	---

### **DIVISION 35**      **WATERWAYS AND MARINE CONSTRUCTION**

Section 35 20 23 – Dredging and excavation .....	9
Section 35 31 23 - Rubble Mound Breakwaters.....	9
Section 35 51 23 – Floating Docks .....	3

### **DRAWINGS**

<u>SHEET</u>	<u>FILENAME</u>	<u>TITLE</u>
00/12	PPB19-3609-M01-00	PRESENTATION PAGE, DRAWING LIST
01/12	PPB19-3609-M01-01	GENERAL LAYOUT (EXISTING)
02/12	PPB19-3609-M01-02	GENERAL LAYOUT (NEW)
03/12	PPB19-3609-M01-03	EXISTING BREAKWATER
04/12	PPB19-3609-M01-03	BREAKWATER REPAIR WORKS
05/12	PPB19-3609-M01-05	SLAB OF THE SLIPWAY AS PROVIDED BY D.F.O
06/12	PPB19-3609-M01-05	SLAB OF THE SLIPWAY AS PROVIDED BY D.F.O
07/12	PPB19-3609-M01-07	EXISTING SLIPWAY LAYOUT
08/12	PPB19-3609-M01-07	EXISTING SLIPWAY LAYOUT
09/12	PPB19-3609-M01-07	EXISTING SLIPWAY LAYOUT
10/12	PPB19-3609-M01-10	CONCRETE ANCHOR BLOCK - GANGWAY ABUTMENT
11/12	PPB19-3609-M01-11	EXISTING FLOATING DOCKS
12/12	PPB19-3609-E01-12	ELECTRICITY EXISTING - GENERAL LAYOUT

## **Part 1            General**

### **1.1            RELATED SECTIONS**

- .1      Section 01 14 00 - Work Restrictions.
- .2      Section 01 32 16 - Construction Progress Schedules - Bar (Gantt) Charts.

### **1.2            WORK COVERED BY CONTRACT DOCUMENTS**

- .1      This list of works is not necessarily complete and does not relieve the Contractor of its responsibility to perform any other work, change or modification required, to complete the work under this project to the satisfaction of the Departmental Representative.
- .2      The Slipway Construction and Breakwater repair at the fishing harbour of l'Ile d'Entrée in the Magdalen Islands region includes, without limitation, the following work:
  - .1      The complete demolition of existing hauling slip and disposal of demolition material (treated wood, bolt products, etc...)
  - .2      Partial demolition of breakwater and recovery of granular materials and existing stone to be reintroduced into new structures.
  - .3      Supply and installation of imported stone, recovery and placement of existing stone and dolosse from partial demolition and placement of dolosse provided by DFO to repair existing breakwater.
  - .4      Dolosse supplied by DFO are stored closed to the spur breakwater.
  - .5      The supply and placement of geotextile and granular materials for the construction of the granular foundation of the slipway.
  - .6      The installation of precast concrete slabs provided by DFO for the construction of the slipway.
  - .7      The relocation of the floating dock line with chains recovery, manufacture and installation of anchor blocks for its eastward displacement of approximately 12 meters.
  - .8      Dredging inside harbour in the new area of the floating docks system
  - .9      Length modification of the existing aluminum gangway

### **1.3            WORK EXTENT**

- .1      Work included in this project comprises the supply of all materials, labour, tools, equipment, and also protection and transport necessary to execute and finish work accordingly to specifications, in such a manner that the whole property shows uniformity.
- .2      Co-ordination and allocation of work among subcontractors is the sole responsibility of the General Contractor, and no reference to subcontractors in these documents shall be construed as binding Canada with respect to any such allocation.

### **1.4            OWNER OCCUPANCY**

- .1      Site may be used with certain restrictions until substantial completion of work. The work shall be carried out in coordination with the Harbour Authority in order to coordinate the use of the launching ramp for boat winterisation.

- .2 The use of the premises is limited to the areas necessary to the execution of the work, for purpose of storage and access to allow:
  - .1 Occupancy of the premises by users for the use of wharves, floating docks and continuity of services for ferry operations and fishing activities for 2020 season.**
- .3 Co-ordinate use of premises under direction of Departmental Representative.
- .4 Work with Departmental Representative and the Harbour Authority in scheduling operations to minimize conflict and to facilitate the use of the premises by all users.
- .5 Contractor shall consider while planning works, that activities in Harbour take place from March to October. Harbour access and wharf shall be available and safe at any time.
- .6 Find additional storage areas necessary to work performance under the terms of this contract and pay the cost.
- .7 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .8 Repair or replace, as directed by the Departmental Representative, for connection to the existing structure or an adjacent structure or for alignment with them, the parts of the existing structure that have been modified during construction.
- .9 Once the work is completed, existing structures must be in the same or better condition than before the work began.

## **1.5 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING**

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

## **1.6 EXISTING SERVICES**

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .3 Provide alternative routes for personnel, pedestrian and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary utilities according to Departmental Representative indications.
- .7 When unlisted utilities lines are discovered, immediately inform Departmental Representative, and record it in writing.

- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .9 Record the location of utilities lines that are maintained, displaced or abandoned.
- .10 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

## **1.7 WORK SEQUENCE**

- .1 Work shall be completed no later than September 30<sup>th</sup>, 2020**
- .2 Construct Work in stages, and if possible, as directed by Departmental Representative.
- .3 Coordinate Progress Schedule with Departmental Representative.
- .4 Work shall observe the following schedule:
  - .1 Upon receipt of the notice of acceptance of the offer, the contractor may perform the following work:
    - .1 Acquisition of construction material
    - .2 Manufacture of concrete blocks, etc....
  - .2 Upon receipt by the contracting authority and to its satisfaction of the valid certificate of insurance, the Contractor may perform on site work.**
  - .3 The Contractor is free to complete all work by March 31<sup>st</sup>, 2020. However, the following work shall be completed by March 31<sup>st</sup>, 2020:**
    - .1 Demolition of the hauling slip and disposal of demolition material
  - .4 The following Works shall be completed no later than July 16<sup>th</sup>, 2020:**
    - .1 Breakwater repair
    - .2 Dredging
  - .5 The following Work shall be performed between September 1<sup>st</sup> and September 30<sup>th</sup>, 2020:**
    - .1 Displacement of floating docks line
  - .6 All Works shall be completed on September 30<sup>th</sup>, 2020.**
  - .7 For more information on deadlines, refer to section 01 32 16 – Construction progress schedule - Bar (Gantt) charts
- .5 Sequence activities to limit exposure of partially constructed work to waves, ice and snow storms. Damages to new structures, partially constructed or approved, prior to substantial completion, due to Contractor or subcontractor operations, shall be repaired by Contractor at no additional cost for Departmental Representative.

## **1.8 CONTINUITY OF SERVICES**

- .1 Fishing activities normally start in mid-March and ends in mid-October.

## **1.9 DOCUMENTS**

- .1 Maintain at work site, one copy of each document mentioned above:
  - .1 Contract drawings
  - .2 Specifications

- .3 Addenda
- .4 Reviewed shop drawings
- .5 List of outstanding shop drawings
- .6 Change orders
- .7 Other modifications to Contract
- .8 Field test reports
- .9 Copy of approved work schedule
- .10 Health and safety plan and other safety related documents
- .11 Other documents as specified

#### **1.10 MEASUREMENT METHOD**

- .1 Provision of materials, labour, tools, equipment, protection, transport, administration fees, profits, financing, etc., required to perform the work in this undertaking are included in each item described below, unless otherwise indicated.
- .2 Measuring method for items will be:
  - .1 Item n°.1 Site organization
    - .1 Item will be measured as a lump sum price and includes all items listed in division 1, also items that cannot be assigned to another measurement item.
    - .2 This item shall include all the necessary work and the means to ensure continuity of services for fishers.
    - .3 This item also includes all works indicated on Drawing and Specs and that that there are not included in other item.
    - .4 Site organization during work will be paid proportionately with monthly progress payments.
  - .2 Item n°.2 –Demolition
    - .1 The item is divided as follows:
      - .1 Hauling slip
      - .2 Breakwater
      - .3 Excavation
      - .4 Contaminated material Disposal
      - .5 Floating docks displacement
    - .1 Item .1 Hauling slip will be measured as a lumps sum price and includes, but is not limited to, all demolition work necessary for construction of new structures. This includes demolition remaining old wood and concrete components (treated or not) of existing hauling slip, partial demolition and rebuilding of stone protection.
    - .2 The Item also include the installation of a boom to retain floating debris.
    - .3 Item .2 Breakwater will be measured as a lumps sum price and includes, but is not limited to, all the partial

- demolition and recovery of stone for the repair of the breakwater and others. It includes the demolition of the existing breakwater as indicated on drawings, the recovery and reuse of the stone. It also includes the recovery of existing dolosse and reuse in partial demolition of the breakwater
- .4 This item also includes removal and precautions when handling dolosse for reuse in breakwater repair.
- .5 Item .3 Excavation will be measured as a lumps sum price and includes, but is not limited to, all demolition work necessary for construction of new structures. This includes excavation and recovery of granular material under hauling slip, natural ground excavation to shape new slipway basement.
- .6 The item also includes costs related to reuse of granular material from demolition work (natural ground, granular material, stone and crushed concrete) that can be incorporated in new structures, as indicated on drawings and specifications.
- .7 This item also includes the costs of loading, transportation and unloading of demolition materials that cannot be reintroduced in new structures and become contractor's property.
- .8 Item .4 Disposal of Contaminated material will be measured in m.t. and includes the costs of loading, transportation and disposal of contaminated material (treated wood, natural land) in an authorised site.
- .9 Item .5 Floating docks displacement will be measured as a lumps sum price and includes, but not limited to, all work necessary to relocate the floating docks.
- .10 This item includes the dismantling of floating docks, recovery of anchor blocks, Japanese anchors and chains and the reinstallation of recovered components with new anchor blocks, as indicated on the drawings.
- .11 This item includes the modification of the existing gangway.
- .12 This item includes all work and material required for the construction of the crib used as gangway base.
- .13 **Departmental Representative provides 203mm x 203mm x 3 600mm and 103mm x 152mm x 3 600mm recycled plastic beam for cribwork.**
- .14 The item includes labour, tools, equipment, hardware, geotextile, concrete bag placed in a jut pocket and installation of 150-25mm stone for foundation, 200 @ 300 mm ballast stone and all materials required for the construction of cribs in accordance with Specs and Drawing.



- .15 Installation of anchor blocks is part of Item 4.3.
- .16 This item also includes the reinstallation of the floating docks and any required adjustments
- .3 Item n°.3 - Dredging
  - .1 The Item will be measured at theoretical m<sup>3</sup>pm.
  - .2 The item is divided as follows:
    - .1 Sediment Deposit
    - .2 Rock
  - .3 **The Item includes Dredging of the identified zone to a depth of -1.5 meter and sea deposit.**
  - .4 **For information, the top of superficial deposit is composed of a sand and gravel. Rock is a red friable sandstone or conglomerate.**
  - .5 Removal of obstructions, authorized by Departmental Representative will be measured in hours actually used in removal.
  - .6 Operations in connection with field positioning of dredging equipment will not be measured separately for payment.
  - .7 Removal of infilling material will not be measured for payment.
  - .8 No separate payment will be made for sweeping.
  - .9 Surveys will be conducted jointly following the complete demolition of structures.
- .4 Item n°.4 - Concrete
  - .1 The item is divided as follows:
    - .1 Dolosse
    - .2 Slab
    - .3 Anchor block
  - .2 Item will be measured as a lumps sum price and includes, but is not limited to, installation concrete components (dolosse and Slab) supplied by DFO in stored on site and manufacture and installation of anchor block for floating dock line relocation.
  - .3 **DFO supplies 200 dolosse for breakwater repair and the precast slabs for slipway construction. Dolosse will be stored next to the spur breakwater and precast slab will be located on site**
- .5 Item n°.5 - Stone and aggregates
  - .1 This item is divided as follows:
    - .1 1 @ 2 mt
    - .2 300 @ 500 kg
    - .3 150-25mm
    - .4 20-0 mm
    - .5 20mm
    - .6 Quarry-run
  - .2 The items will be measured in metric tons. The unit price includes loading, weighing, transporting and installation.

- .3 The unit price includes monitoring and spot-check surveys required to complete the structure as specified. All as described in this section and in Section 01 45 01 – Quality Assurance.
- .4 Measure the materials in metric tons of materials installed, according to the exact dimensions indicated on the plans.
- .5 The payment amount shall be determined by the weigh tickets from certified scales, less all deductions for stone that is refused or beyond tolerance limits.
- .6 Under the provisions of article 10.2.3 of the CCDG, all expenses related to the installation, maintenance, material, weigher required at the weigh station and scale are included in the unit price of materials incorporated into the structure.
- .6 Item n ° 6 - Geotextile
  - .1 This item will be measured as a lump sum price. It includes the supply of materials, labor, hardware and equipment to install the geotextile at the locations indicated on the drawings
- .2 The global lump sum that contractor had to furnish at item SA-03 of bid forms shall be detailed and furnished to Departmental Representative within 2 weeks after notice of acceptance of offer.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Partie 1      General information**

**1.1            DESCRIPTION**

- .1      This section specifies requirements for truck weigh scales, unless otherwise specified, for weighing of materials where measurement for payment is based on mass.

**1.2            REQUIREMENTS OF REGULATORY AGENCIES**

- .1      Prior to use weigh scales, obtain certification meeting requirements of Weights and Measures Act. Display certificate in a prominent position.

**Partie 2      Products**

**2.1            MATERIAL**

- .1      Weigh scales: supply a scale of sufficient capacity to weigh loaded vehicles in a single operation and with on automatic printer.
- .2      Cabin:
  - .1      Provide a cabin with a mass indicator and in which Contractor's representative can perform work and maintain records.
  - .2      The cabin will 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 facing scale platform. The lighting and heating systems must be approved by Departmental Representative.
- .3      The Contractor shall provide weight tickets.

**Partie 3      Execution**

**3.1            INSTALLATION**

- .1      Provide, install and maintain scale and scale house convenient to project site, at location approved by Departmental Representative. However the contractor is still responsible to verify that the loaded vehicles do not exceed the limits allowed on the roads he intends to use.
- .2      Remove scale and scale house when no longer required by Departmental Representative, level approach and exit ramps.

**3.2            WEIGHING**

- .1      Contractor's representatives at scales will weigh monitor weighing of materials.

**3.3            MAINTENANCE**

- .1      Maintain scale platform and scale mechanism clean and free from gravel, asphalt, snow, ice and debris.
- .2      Maintain approach and exit ramps in good condition free from sags and ruts.

- .3 Have scales recertified if requested by Departmental Representative at no cost for Departmental Representative.

### **3.4 OPERATION**

- .1 Include costs of certification, installation, maintenance and removal of scale and cabin in items of work to be measured by mass.
- .2 The wages for the Contractor's representative at the scale are to be paid by the Contractor with no cost for Departmental Representative.

### **3.5 ACCEPTATION OF MATERIALS**

- .1 The acceptance of materials shall be made on the work site.
- .2 The contractor is responsible for the materials to comply with the specifications.

**END OF SECTION**

## **1 General**

### **1.1 RELATED SECTIONS**

- .1 Section 01 32 16 - Construction Progress Schedules - Bar (Gantt) Charts
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 01 56 00 – Temporary Barriers and Enclosures

### **1.2 ACCESS AND EGRESS**

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

### **1.3 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. For more information on harbour activities, contact:
- .2 To obtain information on the activities of the Harbour, the port Administration resource people are:
  - .1 M. Stephen Clarke 418-937-9487
- .3 Maintain the existing utilities services and provide personnel and vehicles with access to the work site.
- .4 Where security is reduced by work provide temporary means to maintain security.

### **1.4 MODIFICATIONS, REPAIRS OR ADDITIONS TO EXISTING STRUCTURES**

- .1 Perform works by disrupting the less users, and normal use of the premises. In this regard, make arrangements with the Department's representative to facilitate the implementation of the prescribed work.

### **1.5 EXISTING SERVICES**

- .1 Inform the representative of the Department and public carriers of the scheduled interruption of services and obtain permissions.
- .2 Whether to perform pressure on existing networks or connections to those networks, notify the representative of Ministry 48 hours before the scheduled time of interruption of the electrical or mechanical systems services. Ensure that the duration of interruptions is as short as possible. Make breaks after normal hours of work of the occupants, preferably weekend.
- .3 Ensure the movement of pedestrians, vehicles and personnel.
- .4 Build temporary barriers of protection in accordance with the 01 56 00 - works for access and protection section.
- .5 Preserve safe navigation close to the entrance and in the Harbour

## **1.6 SPECIAL REQUIREMENTS**

- .1 All Work shall be completed no later than September 30<sup>th</sup>, 2020.**
- .2 Dredging work with sea disposal and repair of breakwater shall not take place between July 16<sup>th</sup> and August 10<sup>th</sup>, 2020.**
- .3 Displacement of floating docks shall take place between September 1<sup>st</sup> and September 30<sup>th</sup>, 2020.**
- .4 The work shall at no time affect access to the harbor and interfere with ferry activities. The Contractor shall take into account the schedule of the Société des Traversiers du Québec ferry in planning and execute Work.**
- .5 Noisy work shall be performed Monday through Friday between 7 am and 18 pm.
- .6 Develop and submit construction progress schedule in accordance with Section 01 32 16 – Construction Progress Schedules – Bar (Gantt) Charts.
- .7 Contractor shall comply with environmental limitation mentioned in Section 01 35 43 – Environmental Procedures.
- .8 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .9 Keep within limits of work, and avenues of ingress and egress free of obstacles.
- .10 In his construction schedule, the Contractor shall ensure the continuity of operations by other users during the work period.
- .11 The Contractor is responsible for obtaining, from harbour authority officials, all relevant information concerning activities in the fishing harbour. Plan and carry out the work so as not to hamper fishing activities or impede access to port facilities.

## **1.7 SAFETY**

- .1 Provide temporary means to maintain security if it has been reduced because of the work covered by this contract.

## **1.8 NAVIGATION INTERFERENCE**

- .1 It is of Contractor's responsibility to get from harbour authorities all information necessary to perform his activities in the harbour. Contractor shall plan and execute work in such manner that it will not interfere with usual operations, or limit access to wharf, by land or water.
- .2 Contractor is responsible for loss of time, equipment, material or any other cost related to interference with moored vessels, displacements of ships in harbour or other impacts Caused by Contractor's operations.

## **2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**3 Execution**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            APPOINTMENT AND PAYMENT**

- .1    Departmental Representative will appoint and pay for services of testing laboratory except follows:
  - .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       Mill tests and certificates of compliance.
  - .4       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, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

**1.2            CONTRACTOR'S RESPONSIBILITIES**

- .1    Provide labour, equipment and facilities to:
  - .1       Provide access to Work for inspection and testing.
  - .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 personnel 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.

**Part 2            Products**

**2.1            NOT USED**

- .1    Not Used.



**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                ADMINISTRATIVE**

- .1        Schedule project meetings throughout the course of the work and at the request of the Departmental Representative, and manage them.
- .2        Provide physical space and make arrangements for meetings.

**1.2                PRECONSTRUCTION MEETING**

- .1        Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .2        Points on the agenda of the day
  - .1        *Designation of official representatives* of the participants in the work.
  - .2        Schedule of work, according to section 01 32 16 – Construction progress schedule - bar (GANTT) charts.
  - .3        Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
  - .4        Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section according to the 01 52 00 – Construction facilities.
  - .5        Delivery of materials and materials prescribed schedule.
  - .6        Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .7        Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .8        Owner provided products.
  - .9        Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .10      Monthly progress claims, administrative procedures, photographs, hold backs.
  - .11      Appointment of inspection and testing agencies or firms.
  - .12      Insurances, transcript of policies.

**1.3                PROGRESS MEETINGS**

- .1        Schedule meetings that will be held during the course of the work.
- .2        Contractor, major subcontractors involved in work and Departmental Representative are to be in attendance.
- .3        Agenda to include the following:
  - .1        Review, approval of minutes of previous meeting.
  - .2        Review of Work progress since previous meeting.
  - .3        Field observations, problems, conflicts.
  - .4        Problems which impede construction schedule.
  - .5        Review of off-site fabrication delivery schedules.

- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Maintenance of quality standards.
- .11 Review proposed changes for effect on construction schedule and on completion date.
- .12 Other

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

## 1.1 DÉFINITIONS

- .1 Activity: determined work carried out as part of a project. An activity normally has an expected duration and expected cost in resources-related needs. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide 5 day-work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision-making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

## 1.2 REQUIREMENTS

- .1 **All work shall be completed no later than September 30<sup>th</sup>, 2020, when Substantial Performance Certificate to be delivered as defined times of completion.**
- .2 **Repair of breakwater shall be completed on July 16<sup>th</sup>, 2020**
- .3 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .4 The overall plan must provide for the realization of the work according to the prescribed milestones, within the agreed time.
- .5 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .6 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of substantial performance and Final Certificate as defined times of completion are of essence of this contract.

### **1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Notice of acceptance of the offer, the Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.
- .4 The Contractor shall be responsible for the information required to set up the work schedule. The Contractor shall submit to the Departmental Representative information concerning the work operations and sequence, the breakdown of the work into activities and the duration of these activities.
- .5 Work schedules are submitted subject to approval by the Departmental Representative. The Departmental Representative may require additional schedules or reports to demonstrate timely progress in the work or any other project deadline or indication of unrealistic performance.
- .6 Approval of work schedules by the Departmental Representative does not release the Contractor from its obligation to complete the work in accordance with the contract documents. Approval of the submitted schedules by the Departmental Representative shall not make the latter liable for time or cost overruns resulting from delays in the schedule.
- .7 The work schedule and monthly schedule updates shall be provided to the Departmental Representative for review with each request for payment as a condition of processing the payment request.
- .8 The Departmental Representative and the Contractor shall revise the updated work schedule at each progress meeting. The Contractor shall revise the schedule to incorporate changes made during the progress meetings.
- .9 When the deadlines or the completion date are not met, the Contractor shall, at no additional cost to the Departmental Representative, undertake one or more of the following: increase labour, increase working hours or take other actions to eliminate work delays.

### **1.4 PROJECT MILESTONES**

- .1 Milestones of the project are the interim targets set out in the schedule.
- .2 Works consist to:
  - .1 Demolition of the hauling slip made of concrete and treated wood
  - .2 Work to build the granular base of the new slipway
  - .3 Partial demolition of existing breakwater and recovery of stone
  - .4 Recovery of dolosse from existing structure to integrate into the repair of the breakwater
  - .5 Recovery of granular materials
  - .6 Disposal of demolition materials
  - .7 Installation of DFO Dolosse for breakwater repairs

- .8 Installation of DFO precast slabs for the construction of the slipway
- .9 Supply and placement of stone and granular materials
- .10 Dismantling of the floating docks, recovery of the anchoring components and relocation of the floating docks line

## **1.5 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar (GANTT) Chart.
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.
- .5 Contractor shall be responsible for information required to develop the construction schedule. Contractor shall provide Departmental Representative with information regarding work operations, sequence of work, breakdown of the work into activities, and time estimates for the activities.

## **1.6 PROJECT SCHEDULE**

- .1 Develop a timetable for execution detailed from the master plan.
- .2 The time frame detailed must at least understand the steps for the following activities.
  - .1 Award
  - .2 Shop drawings, samples
  - .3 Permits
  - .4 Mobilization
  - .5 Construction material delivery
  - .6 Demolition of existing structures and excavation
  - .7 Installation of granular base of slipway
  - .8 Installation of precast slabs
  - .9 Breakwater repair with DFO dolosse, existing dolosse and stone from demolition
  - .10 Displacement of floating docks line
  - .11 Demobilization

## **1.7 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.
- .3 The approval of Project Schedule by the Departmental Representative does not relieve the Contractor of his obligation to achieve works according to specifications. The acceptance

of submitted Project Schedule by Departmental Representative will not make him responsible for goings of time or costs resulting from delays.

- .4 Both Departmental Representative and Contractor will have to update the Project Schedule at each site meeting. The Contractor will have to modify the Project Schedule in order to include the modifications that are done.
- .5 When the limit date or work achievement date will not be respected, the Contractor will, and this without additional fees for Departmental Representative, have to take one or more

## **1.8 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       Section 01 45 00 - Quality control

**1.2               ADMINISTRATIVE**

- .1       Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2       Do not proceed with Work affected by submittal until review is complete.
- .3       Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4       Where items or information is not produced in SI Metric units converted values are acceptable.
- .5       Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6       Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7       Verify field measurements and affected adjacent Work are co-ordinated.
- .8       Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9       Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10      Keep one reviewed copy of each submission on site.

**1.3               SHOP DRAWINGS AND PRODUCT DATA**

- .1       The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2       Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Province of Québec, Canada.
- .3       Coordinate the submission of necessary documents or samples in accordance with work and contract document requirements. Documents or samples submitted individually will not be verified until all related information is available.
- .4       Identify potential stakeholders in the project, such as the Contractor, subcontractors and suppliers, as well as all sections of the specifications, shop drawings and details relating thereto.



- .5 Leave a space on the documents for the "Document Verification" stamp by the Contractor and Departmental Representative.
- .6 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .7 Allow 5 days for Departmental Representative's review of each submission.
- .8 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .9 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .10 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
  - .5 Other pertinent data
- .11 Submissions include:
  - .1 Date and revision dates
  - .2 Project title and number
  - .3 Name and address of:
    - .1 Subcontractor
    - .2 Supplier
    - .3 Manufacturer
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.

- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .12 After Departmental Representative's review, distribute copies.
- .13 Submit 3 copies of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .14 Submit 3 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .15 Submit 3 copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .16 Submit three (3) copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .17 Soumettre trois (3) copies des instructions du fabricant prescrites dans les sections techniques du devis et exigées par le Représentant du Ministère.
  - .1 Documents préimprimés décrivant la méthode d'installation des produits, matériels et systèmes, y compris des notices particulières et des fiches signalétiques indiquant les impédances, les risques ainsi que les mesures de sécurité à mettre en place.
- .18 Submit 3 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Departmental Representative.
- .19 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .20 Submit 3 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Departmental Representative.
- .21 Delete information not applicable to project.
- .22 Supplement standard information to provide details applicable to project.
- .23 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .24 Review of shop drawings is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

#### **1.4 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's site office.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

#### **1.5 MOCK-UPS**

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control

#### **1.6 PHOTOGRAPHS SHOWING WORK PROGRESS**

- .1 Submit a copy of colour digital photography in .jpg format, standard resolution as directed by the Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Frequency of photographic documentation: as directed by the Departmental Representative.
  - .1 Upon completion of excavation, foundation, framing and services facilities works, before concealment

#### **1.7 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 The Contractor shall:

- .1 When specified in individual Specification Sections, submit certification by manufacturer to Departmental Representative, in quantities required.
- .2 Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- .3 Certificates may be recent or previous test results on material or Product, but must be acceptable to Departmental Representative.

**1.8 PRODUCT DATA**

- .1 1 The Contractor shall:
  - .1 Submit the number of copies that the Contractor requires, plus two copies to be retained by Departmental Representative.
  - .2 Mark each copy to identify applicable products model, option, and other data. Supplement manufacturers' standard data to provide information unique to the Project.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **Part 1 General**

### **1.1 REFERENCES**

- .1 Canada Labour Code - Part II, Canadian Occupational Safety and Health Regulations.
- .2 Province of Québec
  - .1 Act Respecting Occupational Health and Safety, R.S.Q. Chapter S-2.1.
  - .2 Construction Safety Code, S-2.1, r.6.
- .3 Canadian Standards Association (CSA)
- .4 Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 Canada Shipping Act and Navigable Waters Protection Act

### **1.2 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative, the CNESST and the Association paritaire en santé et sécurité du secteur de la construction (ASP Construction) the site-specific safety program, as outlined in 1.8 at least 10 days prior to start of work. The Contractor must review his program during the course of the project if any change occurs in work methods or site conditions. The Departmental Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site and activities. The Contractor must make the required changes before work begins.
- .3 Submit to Departmental Representative the site inspection sheet, duly completed, at the intervals indicated in 1.12.1.
- .4 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.
- .5 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.
- .6 Submit to Departmental Representative all safety data sheets for hazardous material to be used at the site at least three days before they are to be used.
- .7 Submit to Departmental Representative copies of all training certificates required to apply the safety program, in particular:
  - .1 General construction site safety and health courses;
  - .2 Safety officer attestations;
  - .3 First aid in the workplace and cardiopulmonary resuscitation;
  - .4 Wearing and fitting of individual protective gear;
  - .5 Forklift truck;
  - .6 Positioning platform;
  - .7 Any other requirement of Regulations or the safety program.

- .8 Medical examinations: Wherever legislation, regulations, directives, specification or a safety program require medical examinations, Contractor must:
  - .1 Prior to start-up, submit to Departmental Representative certificates of medical examination for all concerned supervisory staff and employees who will be on duty when the site opens.
  - .2 Thereafter, submit without delay certificates of medical examination for any newly hired concerned personnel as and when they start work at the site.
- .9 Emergency plan: The emergency plan, as defined in 1.8.3, shall be submitted to Departmental Representative at the same time as the site-specific safety program.
- .10 Notice of site opening: Notice of site opening shall be submitted to the Commission *de la santé et de la sécurité du travail* before work begins . A copy of such notice shall be submitted to Departmental Representative at the same time and another posted in full view at the site. During demobilization, a notice of site closing shall be submitted to the CNESST, with copy to Departmental Representative.
- .11 Engineer's plans and certificates of compliance : Submit to the CNESST and to Departmental Representative a copy signed and sealed by engineer of all plans and certificates of compliance required pursuant to the Construction Safety Code (S-2.1, r. 6), or by any other legislation or regulation or by any other clause in the specifications or in this contract. Copies of these documents must be on hand at the site at all times.
- .12 Certificate of compliance delivered by the CNESST: The certificate of compliance is a document delivered by the CNESST confirming that the contractor is in rule with the CSST, i.e. that he had pay out all the benefits concerning this contract. This document must be delivered to Departmental Representative at the end of the work.

### **1.3 FILING OF NOTICE**

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall be responsible and assume the Principal Contractor role for each work zone location and not the entire complex. Contractor shall provide a written acknowledgement of this responsibility with 3 weeks of contract award. Contractor to submit written acknowledgement to CNESST along with Ouverture de Chantier Notice.
- .3 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

### **1.4 HAZARDS ASSESSMENT**

- .1 The contractor must identify all hazards inherent in each task to be carried out at the site.
- .2 The contractor must plan and organize work so as to eliminate hazards at source or promote mutual protection so that reliance on individual protective gear can be kept to a minimum. Where individual protection against falling is required, workers shall use safety harness that meets standard Can - CSA- Z-259.10 - 06. Safety belts shall not be used as protection against falling.
- .3 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.

- .4 All mechanical equipment shall be inspected before delivery to the site. Before using any mechanical equipment, submit to Departmental Representative a certificate of compliance signed by a qualified mechanic. Whenever he suspects a defect or accident risk, Departmental Representative may at any time order the immediate shut-down of equipment and require a new inspection by a specialist of his own choosing.

## **1.5 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Contractor decisional representative must attend any meetings at which site safety and health issues are to be discussed
- .3 Set up a site safety committee, and convene meetings in accordance with the Construction Safety Code.

## **1.6 LEGAL AND REGULATORY REQUIREMENTS**

- .1 Perform Work in accordance to Section 01 41 00 – Regulatory Requirements
- .2 Comply with all legislation, regulations and standards applicable to the site and its related activities.
- .3 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.
- .4 Regardless of the publication date shown in the construction safety code, always use the most recent version.

## **1.7 SITE-SPECIFIC CONDITIONS**

- .1 In his work planning, Contractor shall not disturb Harbour activities
- .2 Workers to be exposed to the following conditions:
  - .1 Work near watercourse.
  - .2 Work involving risk of drowning.
  - .3 Marine work with difference of tide of around 1,0 metres and water depth near 4 metres under chart datum.
  - .4 Works with treated wood handling**
- .3 The weather conditions may be difficult (wind, cold, etc...). Harbour may be exposed to heavy agitation caused by waves and also moving ice floes.
- .4 Until final acceptance, the protection of work for work stability and workers' security during work progress remains under Contractor's responsibility.

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

- .3 Acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.6).
- .4 Develop a site-specific safety program based on the hazards identified and apply it from the start of project work until close-out is completed. The safety program must take account of all information appearing in 1.7 and must be submitted to all parties concerned, in accordance with the provisions set forth in 1.2. At a minimum, the site-specific safety program must include:
  - .1 Company safety and health policy.
  - .2 A description of the work, total costs, schedule and projected workforce curve.
  - .3 Flow chart of safety and health responsibility.
  - .4 The physical and material layout of the site.
  - .5 First-aid and first-line treatment standards.
  - .6 Identification of site-specific hazards.
  - .7 Risk assessment for the tasks to be carried out, including preventive measures and the procedures to apply them.
  - .8 Training requirements.
  - .9 Procedures in case of accident/injury
  - .10 Written commitment from all parties to comply with the prevention program.
  - .11 A site inspection schedule based on the preventive measures.
- .5 The contractor must draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, pursuant to the provisions of 1.2. The emergency plan must include:
  - .1 Evacuation procedure;
  - .2 Identification of resources (police, firefighters, ambulance services, etc.);
  - .3 Identification of persons in charge at the site;
  - .4 Identification of those with first-aid training;
  - .5 Training required for those responsible for applying the plan;
  - .6 Any other information needed, in the light of the site characteristics.
- .6 For all work involving risk of drowning, conform to following requirements:
  - .1 Comply with the Safety Code for the Construction Industry, paragraph 2.10.13.
  - .2 Ensure that required life vests are conforming to:
    - .1 CAN/GGSB-65.7-2007, Life Jackets, Inherently Buoyant published by the Canadian General Standards Board (CGSB).
    - .2 Or exceptions to be approved by Transport Canada.
  - .3 Obtain and submit to Departmental Representative a letter of compliance issued by Transport Canada for approval of any craft (transportation, rescue, inspection or other) prior to commencement of work
  - .4 Ensure that a rescue craft is moored, in the water and available for every shift. When craft is accessible by land, it can be used by several work locations provided that distance between each work location and craft is less than 100 metres.



- .5 Ensure that craft is equipped with a motor powerful enough to travel upstream.
- .6 Ensure that craft has required characteristics to carry individuals likely to participate in a rescue operation.
- .7 Ensure that craft is available for personnel at all times in case of emergency.
- .8 Ensure that a qualified individual is available to operate rescue equipment. Individual must be qualified to operate recreational craft, depending on length of craft used.
- .9 Establish written rescue procedures containing the information below and ensure that all personnel concerned by these procedures have received the necessary training and information to apply them.
  - .1 Complete descriptions of the procedures, including responsibilities of individuals permitted access to place of work.
  - .2 Location of rescue equipment.
- .10 When place of work is a landing wharf, dock, jetty, pier or other similar structure, install a ladder with at least two rungs below surface of water on front of structure every 60 metres. This measure also applies to construction projects. In this case, a temporary (or portable) ladder can be used and removed at end of work if Owner does not have basic facilities. But we have to notify the owner that site is not in accordance with the Canada Labour Code, Part 2.
- .7 For diving work, conform to the following requirements:
  - .1 Professional divers must apply the Standards of the CAN/CSA Z275 related to diving work:
    - .1 Z275.2 - Occupational safety code for diving operations
    - .2 Z275.4 - Competency standard for diving, hyperbaric chamber, and remotely operated vehicle operations
    - .3 Z275.5 - Occupational diver training
  - .2 The Contractor must ensure that the diver company has a minimum of three (3) persons including:
    - .1 An active diver who will be connected to the surface;
    - .2 A stand-by diver ready to intervene;
    - .3 Tender.
  - .3 Meet the qualifications of divers under Article 312.8 of the regulation on health and safety (CNESST) - Training of members of the diving team:
    - .1 Within 12 months following June 10th, 2010, each member of the diving team must, depending of diving method and to function it performs: receive a professional diving training according to Occupational diver training standard, CSA -Z275.5-05 and hold a certificate issued by an eligible educational institution by Ministère de l'Éducation, du Loisir et du Sport that provide such training or by an educational institution recognized by a professional diving to CNESST or hold a recognition of competences according to CAN/CSA Z275.4 Occupational safety code for diving operations issued by such institution or organization;

## **1.9 RESPONSIBILITIES**

- .1 Assume responsibility of health and safety of those present on the site, as well as the protection of property located on the site; assume also, in contiguous areas to the construction site, the protection of people and the environment insofar as they are affected by the work.
- .2 Respect, and ensure respect by employees, security requirements set out in the contract Documents, orders, laws and local regulations, territorial, provincial and federal law applicable, as well as the health and safety plan for the site.
- .3 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the contract documents, applicable federal and provincial regulations and standards as well as the site-specific safety program, complying without delay with any order or correction notice issued by the Commission de la santé et de la sécurité du travail.
- .4 No matter the size of the construction site or how many workers are present at the workplace, designate a competent person to supervise and take responsibility for health and safety
- .5 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the contract documents, applicable federal and provincial regulations and standards as well as the site-specific safety program, complying without delay with any order or correction notice issued by the Commission de la santé et de la sécurité du travail.
- .6 Take all necessary measures to keep the site clean and in good order throughout the course of the work

## **1.10 COMMUNICATIONS AND POSTING**

- .1 Make all necessary arrangements to ensure effective communication of safety and health information at the site. As they arrive on site, all workers must be informed of their rights and obligations pertaining to the site specific safety program. The Contractor must insist on their right to refuse to perform work which they feel may threaten their own health, safety or physical integrity or that of other persons at the site. The Contractor must keep and update a written record of all information transmitted with signatures of all affected workers.
- .2 The following information and documents must be posted in a location readily accessible to all workers:
  - .1 Notice of site opening;
  - .2 Identification of Principal Contractor;
  - .3 Company OSH policy;
  - .4 Site-specific safety program;
  - .5 Emergency plan;
  - .6 Data sheets for all hazardous material used at the site;
  - .7 Minutes of site committee meetings;
  - .8 Names of site committee representatives;
  - .9 Names of those with first-aid training;

- .10 Action reports and correction notices issued by the CNESST.

#### **1.11 CONFORMITY REQUIREMENTS**

- .1 Comply with the labour act : Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1, et au Code de sécurité pour les travaux de construction, c. S-2.1, r. 4.
- .2 Comply with the Regulations on health and safety at work made under the Canada Labour Code

#### **1.12 UNFORESEEN CIRCUMSTANCES**

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary site inspection arises as a result of or in the course of the work, immediately suspend work, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must modify or update the site specific safety program in order to resume work in safe conditions.

#### **1.13 DOCUMENTS DISPLAYING**

Ensure that documents, articles, orders, and relevant notices are displayed prominently on the site, in accordance with the laws and to the province and in consultation with the Departmental Representative.

#### **1.14 NON-COMPLIANCES FIXING**

- .1 When a specified in the quote and no identifiable source of danger during the preliminary inspection of the site appears by the fact or during the execution of the work, the contractor must immediately stop work, implement temporary protection measures for workers and the public, and prevent the departmental representative orally and in writing. Subsequently, the contractor shall make the necessary changes to the prevention program so that the work can resume safely.
- .2 Immediately take the necessary steps to correct situations deemed non-compliant, in terms of health and safety, by the competent authority or by the departmental representative.
- .3 Provide to the departmental representative a written report measures taken to correct the situation in the event of non-compliance in health and security. The representative of the Department may order the stop work if the contractor does not have the necessary corrections with regard to the non-compliant health and safety conditions considered.

#### **1.15 INSPECTION OF SITE AND CORRECTION OF HAZARDOUS SITUATIONS**

- .1 Inspect the work site and complete the site inspection sheet at least once a week.
- .2 Immediately take all necessary measures to correct any lapses from legislative or regulatory requirements and any hazards identified by a government inspector, by the Departmental Representative, by the site safety and health coordinator or during routine inspections.
- .3 Submit to Departmental Representative written confirmation of all measures taken to correct lapses and hazardous situations.

- .4 Give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order interruption and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 Without limiting the scope of sections 1.8 and 1.9, Departmental Representative may order cessation of work if, in his/her view, there is any hazard or threat to the safety or health of site personnel or the public or to the environment.

**1.16 BLASTING**

- .1 s/o

**1.17 CARTOUCHES DEVICES**

- .1 s/o

**1.18 WORK STOPS**

- .1 Priority to the health and safety of the public as well as the site personnel, and the protection of the environment, on issues related to the cost and timing of the work.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            SUBMITTALS**

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

**1.2            DEFINITIONS**

- .1        Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2        Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

**1.3            DOCUMENTS/ÉCHANTILLONS À SOUMETTRE POUR APPROBATION/INFORMATION**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets.
  - 2.            Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements.

**1.4            FIRE**

- .1        Fire and waste material burning are prohibited.

**1.5            DISPOSAL OF WASTES**

- .1        Do not bury rubbish and waste materials on site unless approved by Departmental Representative.
- .2        Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .3        Grade and classify all reusable demolition materials from wharf to manage their future utilisation or disposal in compliance with all applicable environmental regulations.
- .4        All necessary installations for the use of grading and classification of reusable or disposal materials must be plan out of work site and in a safe and predetermined area.
- .5        Reusable or recyclable materials from demolition are as follows:
  - .1            Granular material
  - .2            Treated wood
  - .3            Concrete with steel reinforcement
- .6        Information on managing demolition material is found in Section 01 74 21 – Construction/Demolition Waste Management

- .7 Contractor shall gradually dispose of non-reusable material from demolition off work site to an authorized site.
- .8 Waste materials from demolition and not reusable in the new structure shall be recycle if possible, and if not, the site of disposal shall be approved by the Quebec Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). Upon request, the department may provide information on the sites in operation. This includes any dry material, waste or rubbish from demolition or construction.
- .9 Contractor shall submit a copy of official authorization and permits prior to seek Departmental Representative's authorization to remove waste materials from work site.
- .10 Dispose of contaminated waste and soils according to Québec's regulation and with Québec's Soil Protection and Rehabilitation of Contaminated Sites Policy.

## **1.6 WORK ADJACENT TO WATERWAYS**

- .1 Waterways shall be kept free of excavated fill, waste material and debris.
- .2 Do not use banks or waterway beds material for borrow.
- .3 Do not dump construction material, waste or debris in waterways.
- .4 Cleaning of equipment in the water is prohibited.
- .5 Service and refuel vehicles at least 30 m from bank.
- .6 Do not store petroleum products or any other hazardous materials less than 30 m from bank.
- .7 If for some reasons certain equipment or hazardous products, implying hazardous material handling, should stay beneath 30 m from waterways, Contractor shall submit a contingency plan to the Departmental Representative and get it approved prior to beginning of work. The plan will provide, without being limited to, details as follows:
  - .1 Designated inner limits of work area for the use of operations;
  - .2 Handled or stored hazardous products (ex. diesel, waste oils, etc.);
  - .3 Containment methods used in order to limit contamination during maintenance and refuelling of equipment and vehicles (in case of oil leakage);
  - .4 The presence of emergency equipment in case of spill near supplying zone and maintenance area.
  - .5 The procedure for hazardous spill.
  - .6 A list of contacts in case of hazardous spill.
  - .7 If generators must be used, make sure that the fuel tank of each generator is with double walls and that it is installed on an impermeable floor with raised kerb to avoid any discharge.
- .8 Before work begins and after it is completed, the Contractor shall provide, at its own expense, a characterization of the chemical quality of soil on the site used for refuelling, maintenance and storage of machinery, heavy equipment and storage of demolition and construction materials.

- .9 Soil characterization shall be performed by a recognized firm in accordance with the procedures specified by the MDDELCC and CCME. The sampling plan and protocol shall be approved by the Departmental Representative.
- .10 In the event of soil contamination in the targeted areas as a result of project-related activities, the site shall be restored to comply with its intended use, and the contaminated soil shall be disposed of at an MDDELCC-authorized site.

## **1.7 POLLUTION CONTROL**

- .1 Maintain temporary facilities to prevent erosion and pollution, and implemented under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent fine materials and other extraneous materials from contaminating air and water beyond work site.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Indications of Departmental Representative, water the dry materials.
- .5 Control dust on temporary roads.
- .6 Materials used shall be inert and exempt from contaminants.
- .7 Use machinery in good operating condition to avoid grease, oil or fuel leaks. Submerged equipment parts shall be clean and free of leaks.
- .8 Perform service and verifications on all machineries (excavator, crane, etc) by a qualified technician before arrival at site. Ensure there are no fuel, oil or grease leaks, and silencer must be in good condition. Repair non-compliant equipment as rapidly as possible (noise or leaks).
- .9 Immediately recover any contaminant spill in the environment and dispose of it in accordance with applicable legislation.
- .10 Maintain absorbent materials on site at all times for rapid intervention in case of hazardous spill. Know how to use emergency equipment in case of accidental spill. Report any oil spill or other environmental incident to Departmental Representative and authorities having jurisdiction. Recover hydrocarbons and contaminated soil and dispose of in conformance with applicable legislation.
- .11 L'Entrepreneur devra fournir un plan d'urgence relatif à un déversement environnemental, avec liste des intervenants incluant leur numéro de téléphone.
- .12 Keep on site suitable emergency equipment in case of an accidental spill and ensure the appropriate use of it.
- .13 Keep on site, near the work area and near the supplying zone established, an emergency spill response kit. The emergency spill response kit shall contain absorbent material in adequate quantities to remove petroleum from site.
- .14 In the event of a hydrocarbons spill or other hazardous material, the Contractor must advise Departmental Representative and authorities having jurisdiction mentioned in the emergency plan. Report immediately the situation to Environment Canada Emergency services (1-866-283-2333), Environment Emergency of Québec (1-866-694-5454) for an on land spills and to Canadian Coast Guard- Marine Accidental Spill Incidents (1-800-363-4735).

- .15 Wasted oils and other contaminated wastes shall be managed in compliance with effective regulation. This included storage at site, transportation and elimination.
- .16 Do not dispose of volatile materials such as mineral oils and oil or paint thinner in rivers, storm-water or sewers.
- .17 Any hazardous waste generated on the work site will have to be conveyed to a well-authorized disposition site by MDDELCC.
- .18 Hazardous waste storage and transport will have to be done in accordance with the regulation in force in order not to contaminate the environment.
- .19 Prior to conveying hazardous waste from work site, the Contractor shall obtain Departmental Representative authorization by showing a copy of all licenses obtained from the owners or hazardous waste disposal site authorities

## **1.8 TRANSPORT OF MATERIALS**

- .1 Materials may be transported on public roads to construction site from Monday to Saturday unless notified otherwise by the authorities having jurisdiction. Transport is prohibited on Sundays and public holidays.
- .2 Materials may be transported through the city between 7:00 a.m. and 5:00 p.m. (17h00) Transport outside these hours is prohibited.
- .3 Ensure proper operation of trucks used. Any trucks or other means of transport creating sound levels that Departmental Representative deems to exceed standards shall cease transporting materials or be repaired or modified to be made acceptable.
- .4 Contractor shall use adequate signalization and co-operate with municipality, Departmental Representative and other authorities having jurisdiction to minimize the impact of transportation on the daily lives of residents in area adjacent to truck route and construction site.
- .5 Use a sheet to cover granular material during transportation.
- .6 Limit traffic for the transportation of material to roads and areas identified in the specifications.
- .7 Maintain the roads used in good condition at all times and take the necessary measures to ensure they can be safely used and crossed by other users.
- .8 Upon work completion, promptly restore the roads to a condition that is at least equal to their original state.

## **1.9 PROTECTION OF THE AQUATIC ENVIRONMENT IN THE WORK AREA**

- .1 The work area should be clearly defined.
- .2 Ensure workers are informed of environmental and safety measures.
- .3 Do not store stone or debris from demolition on bank.
- .4 A boom shall be deployed during the demolition of the hauling slip to prevent the drifting of floating debris that may be released during demolition.**
- .5 As work progresses, completely clean bank to recover all debris (wood) from demolition works.



- .6 The Contractor shall minimize the work in aquatic environment and on bank. At anytime the heavy equipment will be allowed the move outside the work area.
- .7 For underwater works required, the Contractor must assure that all equipment pieces involved are free of contamination and of any oil leakage.
- .8 Land-based equipment storage shall be made in anytime above high tides level and as conditions described in section 1.6 – Work adjacent to waterways.
- .9 Employ a method for removing rocks that involves minimal contact between the sediments and machinery to avoid creating suspended matter. Notably, these rocks must be raised slowly and hoisted directly to the surface, taking care not to drag them on the seabed.
- .10 Carefully dispose of the materials on the bottom, especially for the furthest parts, in order to minimize the resuspension of suspended solids (SS); deposit rather than drop the rocks on the seabed.
- .11 Work shall be performed when the wave height is equal to or less than 1.5 m in order to minimize the resuspension of SS, as stable manoeuvring would become more difficult with bigger waves.
- .12 Keep navigation near the area to a minimum in order to minimize the ripple effect caused by passing boats on the sediment.
- .13 When conditions are right, carry out the riprap work or install the crib structures in a dry environment, or at low tide, which significantly mitigates the impacts on surface water quality by limiting SS and noise propagation.
- .14 When weather conditions deteriorate, work must be avoided to prevent the dispersion of material resuspended by the work;

#### **1.10 TREATED WOOD AND CONTAMINATED MATERIALS**

- .1 Treated wood and contaminated materials shall be temporarily stored in leak-proof containers or under waterproof tarps prior to shipping the wood for sorting, removal of metals or other preparations so that the wood and any other contaminated materials can be contained from the soil and protected from the rain and so that runoff does not reach the soil or waterways. For example, wood piles can be placed on a waterproof tarp and covered with another waterproof tarp. Absorbents must be scattered around the piles to capture contaminants.
- .2 During the work, take all necessary measures to avoid spreading debris into the aquatic environment:
  - .1 Store waste and debris at a site distant from the aquatic environment, in agreement with Departmental Representative.
  - .2 Quickly retrieve debris or objects released into the aquatic environment.
  - .3 The Contractor shall provide a log of activities related to the management and disposal of demolition materials.
- .3 Treated wood and any other contaminated materials shall be sent to a site authorized by the MDDELCC and intended for this purpose.
- .4 The Contractor shall provide the Departmental Representative with a copy of authorizations obtained from the owners or managers of disposal sites for creosote-

treated wood and other contaminated materials and, if necessary, for soil contaminated by firefighting activities.

#### **1.11 NOISY WORKS**

- .1 Noisy works are prohibited at night, unless absolutely necessary.

#### **1.12 NOTICE TO SHIPPING**

- .1 Issue a Notice to Shipping regarding date and duration of work, in accordance with the Navigation Protection Act.
- .2 Set up and meet requirements of license emitted under the terms of the Navigation Protection Act

#### **1.13 WORK MONITORING**

- .1 Mitigation measures from the assessment report, and those mentioned in the present section will be subject to constant monitoring on work site by a Departmental Representative.
- .2 The Department Representative will complete an environmental control data record of work site. This control data record will be given to Contractor on a weekly basis.

#### **1.14 NON-COMPLIANCE NOTICE**

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
  - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

### **Part 2 Product**

#### **2.1 NOT USED**

- .1 Not used.

### **Part 3 Execution**

#### **3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.

- .2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .5 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**FIN DE LA SECTION**

## **Part 1           General**

### **1.1           REFERENCES AND CODES**

- .1 All work shall meet or exceed the requirements of the latest edition of the standards of the Canadian Government Specifications Board (CGSB), the Canadian Standards Association (CSA), the National Building Code of Canada (NBC), the American Society for Testing and Materials (ASTM), the Canadian Standard Association (CSA), the American Concrete Institute (ACI), Cahier des charges et Devis généraux (CCDG) from Ministère des Transports du Québec and the other standards and codes referred to herein, including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Where conflict arises in the course of work, the strictest standards shall apply.
- .3 At any time when the specifications refer to standards, standard to be applied shall be the latest edition available, regardless of the edition designated in specification.
- .4 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

### **1.2           LAWS, REGULATIONS AND DECREES**

- .1 Contractor shall conform to all rights and privileges of others, and to all federal, provincial and municipal laws, regulations and decrees; he must also make sure that his employees, in law or in fact, and his subcontractors conform to same.
- .2 The applicable permits and approvals will have to be obtained by the Contractor before the beginning of work.

### **1.3           PERMITS, FEES AND TAXES**

- .1 Contractor shall give all notices, obtain and pay all fees and construction permits for the demolition and for construction, and for all other services, as required by the authorities having jurisdiction.
- .2 Contractor shall be responsible for all damage and costs resulting from default to obtain these fees and permits.

## **Part 2           Products**

### **2.1           NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       Section 01 33 00 – Submittal procedures
- .2       Section 01 77 00 – Closeout procedures

**1.2               INSPECTION**

- .1       Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2       Give timely notice requesting inspection if Work is designated for inspections, approvals or special tests required by Departmental Representative or by law of Place of Work.
- .3       If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4       Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

**1.3               INDEPENDENT INSPECTION AGENCIES**

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

**1.4               ACCESS TO WORK**

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

**1.5               PROCEDURES**

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

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

## **1.6 REJECTED WORK**

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

## **1.7 REPORTS**

- .1 Submit 2 copies of inspection and test reports to Departmental Representative
- .2 Provide copies to manufacturer or fabricator of material being inspected or tested.

## **1.8 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative.

## **1.9 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct mock-ups in locations approved by the Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.
- .6 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.
- .7 Mock-ups may remain as part of Work.
- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

**1.10 MILL TESTS**

- .1 Submit mill test certificates as required of specification Sections.

**1.11 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical Products

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**Partie 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 45 00 - Quality Control.
- .2        Section 02 41 16 – Structure Demolition

**1.2                QUALITY CONTROL**

- .1        Contractor obligations:
  - .1        The Contractor is responsible for quality control and shall establish and maintain an effective quality control program. This includes the personnel, procedures and organization required to produce a final product that meets contract requirements. Quality control must cover all construction operations, both on the work site and elsewhere, and must be adapted to the proposed construction sequence.
  - .2        The Contractor shall monitor quality control for suppliers, manufacturers, products, services, work site conditions and work activities to produce the specified quality of work.
  - .3        The Contractor shall comply with manufacturers' instructions for each step of the construction sequence.
  - .4        If manufacturers' instructions conflict with contract documents, the Contractor shall request clarification from the Departmental Representative before proceeding.
  - .5        The Contractor shall comply with the specified standards for the minimum quality of work unless there are tolerances for codes or prescribed requirements that require stricter standards or more detailed work.
  - .6        The Contractor shall perform the work with qualified personnel to produce work of the prescribed quality.

**1.3                TOLERANCES**

- .1        The Contractor shall monitor the control of tolerances to produce acceptable work. The Contractor shall not allow tolerances to accumulate.
- .2        The Contractor shall comply with manufacturer and specification tolerances. If manufacturer tolerances conflict with contract documents, the Contractor shall request clarification from the Departmental Representative before proceeding.

**1.4                REFERENCES**

- .1        For products or work prescribed by an association, a construction trade or other recognized standards, the Contractor shall comply with the standards unless more stringent requirements are prescribed or required by applicable codes.
- .2        The Contractor shall comply with the reference standards in effect at the time of receipt of bids, except where a specific date is set by the code.

- .3 The Contractor shall obtain copies of the standards if required by the specification sections.
- .4 Neither contractual relationships nor the duties and responsibilities of the contract parties or those of the Departmental Representative can change with respect to the contract documents by mention or suggestion of any reference document.

## **Partie 2 Products**

### **2.1 NOT USED**

- .1 Not used.

## **Partie 3 Execution**

### **3.1 QUALITY CONTROL PHASES**

- .1 Quality control is a means by which the Contractor can ensure that the construction, including for subcontractors and suppliers, fulfills contract requirements. Quality control must cover all construction operations, both on the work site and elsewhere, and correspond to the proposed construction sequence. It must include at least three control phases to be carried out by the Contractor's quality control system manager for all definable portions of the work, as follows:
  - .1 **Preparatory phase:** This phase must be completed before work begins for each definable portion of work and must include:
    - .1 A review of each paragraph of the applicable specifications.
    - .2 A review of the contract plans.
    - .3 A review to ensure all materials and/or equipment have been tested, submitted and approved.
    - .4 A review to ensure the required control inspection and testing have been planned.
    - .5 A review of the work area to ensure that all required preliminary work has been performed and is consistent with the contract.
    - .6 A physical examination of materials, equipment and work samples required to ensure they are available, in accordance with the approved shop drawings or on the required bid submission date, and are properly stored.
    - .7 A discussion on construction work procedures, including necessary changes to resolve recurring problems.
    - .8 Construction tolerances in documents and work standards for this work phase.
    - .9 A review to ensure the Departmental Representative has approved the portion of the quality control plan for the work to be done.

- .2 **Initial phase:** This phase must be carried out at the beginning of a definable portion of work. The following must be done:
  - .1 A review of the completed work to ensure it complies with contract requirements.
  - .2 Review of overall compliance with the contract: Verify inspection and testing required by quality control.
  - .3 Establish the level of qualification for the work to be carried out and make sure it meets the minimum acceptable standards for the work. Compare with test sections and approved sample panels, where applicable.
  - .4 Correct any differences.
  - .5 The initial phase should be repeated for each new team to work on the site or whenever the prescribed minimum acceptable standards are not met.
- .3 **Monitoring phase:** Daily checks must be performed to ensure continued compliance with contract requirements, including control testing, until the specific portion of the work is completed. Reviews must be recorded in the Contractor's quality control documents and submitted to the Departmental Representative. Final monitoring reviews must be performed and all problems must be corrected before the start of a new portion of work that could be affected by the defective work. The Contractor shall not build on or conceal non-compliant work.

### 3.2 STONE MATERIAL CONTROLPLAN

- .1 The Contractor is responsible for establishing and maintaining a quality control plan for quarry materials to ensure that all quarry materials incorporated into the structure comply with specifications.

### 3.3 SURVEY CONTROL, PROJECT LAYOUT AND STONE PLACEMENT SURVEYS

- .1 The Contractor is responsible for establishing and maintaining all land survey controls required to perform the work as described in Section 01 71 00 – Examination and Preparation.
- .2 The Contractor is responsible for the project location, including establishing and maintaining the survey control line, and for construction surveys necessary to perform the work required by the contract documents.
- .3 The Contractor is responsible for conducting spot-check surveys for all work performed on-site to ensure compliance with requirements. Spot-check surveys will be used to determine payment amounts and must be performed in the presence of the Departmental Representative, unless the latter determines otherwise.

### 3.4 COMPLETION INSPECTION

- .1 Once all the work is completed, the Contractor's quality control manager and the Departmental Representative shall inspect the work and list the elements that are inconsistent with the plans and specifications. The Contractor shall provide an estimated

date on which the Contractor's quality control manager and personnel will conduct a second inspection to ensure all defects have been corrected and shall notify the Departmental Representative of the date.

### **3.5 DOCUMENTATION**

- .1 The Contractor shall maintain records of operations, activities and quality control tests conducted, including work carried out by subcontractors and suppliers. These records must be in an acceptable format and must include factual evidence that the required activities and/or quality control testing have been carried out, including, but not limited to, the following:
  - .1 The Contractor/subcontractor and their area of responsibility
  - .2 Testing and/or control activities conducted with results and references to plan and/or specification requirements
  - .3 Identification of elements submitted and reviewed with contract reference
  - .4 Conflicts with plans and/or specifications
  - .5 Contract plans as created, including full set of contract plans marked in red to indicate all conditions differing from original plans
  - .6 Shop drawings having received final approval

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 – Submittal Procedures
- .2        Section 01 52 00 – Construction facilities
- .3        Section 01 56 00 – Temporary barriers and enclosures

**1.2                SUBMITTAL PROCEDURES**

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

**1.3                INSTALLATION AND REMOVAL**

- .1        Provide temporary utilities controls in order to execute work expeditiously.
- .2        Remove from site all such work after use.

**1.4                TEMPORARY POWER AND LIGHT**

- .1        Provide and pay for temporary power during construction for temporary lighting and operating of power tools.
- .2        Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .3        Temporary power for electric equipment requiring of above is provided by Departmental Representative.
- .4        Provide and maintain temporary lighting throughout project. Ensure level of illumination on work site is not less than required by Departmental Representative.

**1.5                TEMPORARY COMMUNICATION FACILITIES**

- .1        Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Departmental Representative.
- .2        Ensure the connection of these installations with major networks and the costs of these services.

**1.6                FIRE PROTECTION**

- .1        Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2        Burning rubbish and construction waste materials is not permitted on site.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                TEMPORARY EROSION AND SEDIMENTATION CONTROL**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 51 00 - Temporary Utilities
- .2        Section 01 56 00 - Temporary Barriers and Enclosures
- .3        Section 01 74 11 – Cleaning

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3                INSTALLATION AND REMOVAL**

- .1        Provide construction facilities in order to execute work expeditiously.
- .2        Remove from site all such work after use.

**1.4                SCAFFOLDING**

- .1        Scaffolding in accordance with CAN/CSA-S269.2.

**1.5                HOISTING**

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

**1.6                SITE STORAGE/LOADING**

- .1        Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products and materials.
- .2        Do not load or permit to load any part of Work with weight or force that will endanger Work.
- .3        Before storing equipment or materials on-site, the Contractor shall obtain written authorization from Harbour Authority.

**1.7                ON-SITE PARKING**

- .1        Parking will be permitted on site if it does not disrupt performance of Work. The storage area planned for the Contractor can be used for this purpose.
- .2        If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and repair damages resulting from Contractors' use of roads
- .3        Provide and maintain adequate access to project site.
- .4        Clean runways where used by Contractor's equipment.

## **1.8 OFFICES**

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Departmental Representative's Site office.
  - .1 Provide temporary office for Departmental Representative.
  - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4 - 50% opening windows and one lockable door.
  - .3 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
  - .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
  - .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
  - .6 Equip office with 1 x 2 m table, 4 chairs, one 3-drawer filing cabinet, drawing rack, coat rack and shelf.
  - .7 The Contractor shall arrange and pay for the installation of 2 telephone lines, with separate numbers, and High speed Internet service. One telephone line shall have a speaker telephone and answering machine, and the other shall have an auto-answering telephone/facsimile machine.
  - .8 Electricity, telephone calls and faxes and Internet connection shall be paid for by Contractor. Long distance calls are paid by Departmental Representative.
  - .9 Contractor shall keep water cooler, toilet, electrical supply, telephone, fax, Internet connection, HVAC and lighting systems in good running order, and shall maintain office in clean condition, throughout the duration of the Work.
  - .10 The Contractor shall maintain the road leading to the office throughout duration of Works.
  - .11 The site offices shall be located within reserved area as shown on the plans. The Contractor shall provide a suitable safety barrier around the site offices to protect the buildings and personal from his operations, and shall maintain safe access to the offices throughout duration of Works.
  - .12 If Contractor wants to use other lots adjacent to the work site, he shall come to an agreement with the owners concerned and submit to Departmental Representative and to contracting authority a copy of this agreement. The Contractor shall also obtain Departmental Representative's approval regarding location of the Departmental Representative's office with respect to the work site and access.
  - .13 Site offices shall be established on site prior to works.
  - .14 Maintain worksite clean.



## **1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE**

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

## **1.10 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Keep premises and areas clean.

## **1.11 CONSTRUCTION SIGNAGE**

- .1 Provide and erect project sign, within three (3) weeks of notice of acceptance of order, in a location designated by Departmental Representative.
- .2 Construction sign 1.2 m x 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.
- .3 Indicate on sign, name of Owner, Contractor and Subcontractor (if applicable), of design style established by Departmental Representative.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.
- .5 Provide project identification site sign comprising foundation, framing, and one 1200 x 2400 mm signboard as detailed and as described below.
  - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
  - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
  - .3 Signboard: Medium Density Overlaid Douglas fir Plywood to CSA O121.
  - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
  - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
- .6 Locate project identification sign as directed by Departmental Representative and construct as follows:
  - .1 Build concrete foundation, erect framework, and attach signboard to framing.
  - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
  - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .7 Direct requests for approval to erect Contractor signboard to Departmental Representative. For consideration general appearance of signboard must conform to project identification site sign. Wording in both official languages.

- .8 Signs and notices for safety and instruction in both official languages. Graphic symbols to CAN/CSA-Z321.
- .9 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

#### **1.12 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

#### **1.13 ELECTRICAL SERVICES**

- .1 Supply necessary electrical services on work site.
- .2 Assume the cost of these electrical services, whether for lighting, heating or other uses.
- .3 Assume the cost of installation and removal of these electrical services
- .4 The installation of electrical services shall be abide by applicable laws and regulations

#### **1.14 TEMPORARY AIDS TO NAVIGATION AND MARKER BUOYS**

- .1 Provide temporary aids to navigation and marker buoys to delineate work areas acceptable to Canadian Coast Guard and Harbour Authority.
- .2 Coordinate with the Local Authorities to provide Notices to Mariners regarding navigation requirements throughout the duration of Work

**1.15            CLEANING**

- .1      Remove construction debris, waste materials, packaging material from work site daily.
- .2      Clean dirt or mud tracked onto paved or surfaced roadways.
- .3      Store materials resulting from demolition activities that are salvageable.
- .4      Stack stored new or salvaged material not in construction facilities.
- .5      Clean work area progressively.
- .6      Once Works is completed, remove machinery/tools and evacuate waste to leave the place in order.

**Part 2           Products**

**2.1            NOT USED**

- .1      Not Used.

**Part 3           Execution**

**3.1            TEMPORARY EROSION AND SEDIMENTATION CONTROL**

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

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       Section 01 14 00 – Work Restrictions
- .2       Section 01 51 00 – Temporary Utilities
- .3       Section 01 52 00 – Construction Facilities

**1.2               REFERENCE STANDARDS**

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

**1.3               INSTALLATION AND REMOVAL**

- .1       Provide temporary controls in order to execute Work expeditiously.
- .2       Remove from site all such work after use.

**1.4               GUARD RAILS AND BARRICADES**

- .1       Provide secure, rigid guard rails and barricades around deep excavations.
- .2       Provide items as required by governing authorities.

**1.5               ACCESS TO SITE**

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

**1.6               FIRE ROUTES**

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

**1.7               PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1       Protect surrounding private and public property from damage during performance of Work.
- .2       Be responsible for damage incurred.

**1.8               PROTECTION OF WORK FINISHES**

- .1       Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2       Provide necessary screens, covers, and hoardings.

- .3 Be responsible for damage incurred due to lack of or improper protection.

## **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal procedures

**1.2            REFERENCES**

- .1        Within text of each specifications section, reference may be made to reference standards.
- .2        Conform to reference standards, in whole or in part as specifically requested in specifications.
- .3        If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4        Cost for such testing will be born Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.3            QUALITY**

- .1        Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2        Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4        Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5        Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6        Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.4            AVAILABILITY**

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

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

## **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet or panel materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over nameplates.

## **1.6 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Departmental Representative will be paid for by Departmental Representative. Unload, handle and store such products.

## **1.7 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

## **1.8 QUALITY OF WORK**

- .1 Ensure Quality of Work is of best quality, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site of workers deemed incompetent or careless.
- .3 Decisions as to standard, fitness or quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

## **1.9 CO-ORDINATION**

- .1 Ensure co-operation of subcontractors in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

## **1.10 CONCEALMENT**

- .1 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

## **1.11 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

## **1.12 LOCATION OF FIXTURES**

- .1 Consider location of mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

## **1.13 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.



**1.14 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.15 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of structures. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

**1.16 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work and local users.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1       Section 01 32 16 – Construction Progress Schedules - Bar (Gantt) Charts

**1.2               REFERENCES**

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

**1.3               QUALIFICATIONS OF SURVEYOR**

- .1       Qualified registered technician, licensed to practice in Place of Work.

**1.4               SURVEY REFERENCE POINTS**

- .1       Existing base horizontal and vertical control points are designated on drawings.
- .2       The benchmark can be described as follows:
  - .1       Convex Medallion from CHS, marked "M01L9063" (61.717017 ° West 47.27803 ° North) and vertically anchored to a concrete slab located in front of the winch building near the hauling slip. The benchmark is located 0.80 m from the north-west corner of the building, 6.20 m east of a lightning and 12.25 m west of another lightning. It is at elevation 4.992 meters above chart datum.
- .3       Detailed descriptions of reference marks are available at following Internet site:  
<http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/twl-mne/maps-cartes/benchmarks-reperes-fra.asp#divGoogleMaps>
- .4       All elevation indicated on plans refer to chart datum.
- .5       Tide range is generally 0.6 meter and higher high water of level tide reaches approximately + 1.2m, but the Contractors should consult tide tables published by the Department of Fisheries and Oceans in order to ascertain the effect of tides on the work. Also consider waves and wind that raise water level near structures.
- .6       Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .7       Make no changes or relocations without prior written notice to Departmental Representative.
- .8       Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .9       Require surveyor to replace control points in accordance with original survey control.

**1.5               SURVEY REQUIREMENTS**

- .1       Establish permanent benchmarks on site, referenced to established benchmarks by survey control points. Record locations, with horizontal and vertical data, in Project Record Documents.
- .2       Establish lines and levels, locate and lay out, by instrumentation.
- .3       Mark site prior to Works.

- .4 The Contractor shall take on the entire responsibility for the marking out of the work and the complete execution in accordance with the location, the lines and the levels indicated.
- .5 Provide the necessary material for the marking out and the implantation.
- .6 Provide the required material such as rules and gauges to ease the work of the Departmental Representative concerning the inspection of the works.

#### **1.6 EXISTING SERVICES**

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

#### **1.7 LOCATION OF EQUIPMENT AND FIXTURES**

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

#### **1.8 RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

#### **1.9 SUBMITTALS**

- .1 Submit signed certificate certifying and noting elevations and locations of completed Work that conform and do not conform with Contract Documents.

#### **1.10 SUBSURFACE CONDITIONS**

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

**Part 2            Products**

**2.1                NOT USED**

.1            Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1        Section 01 32 16 – Construction Progress Schedules - Bar (Gantt) Charts.

**1.2               ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Submit written request in advance of cutting or alteration which affects:
  - .1        Structural integrity of elements of project.

**1.3               MATERIALS**

- .1        Required for original installation.
- .2        Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

**1.4               PREPARATION**

- .1        Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2        After uncovering, inspect conditions affecting performance of Work.
- .3        Beginning of cutting or patching means acceptance of existing conditions.
- .4        Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5        Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

**1.5               WORKS EXECUTION**

- .1        Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2        Fit several parts together, to integrate with other Work.
- .3        Uncover Work to install ill-timed Work.
- .4        Remove and replace defective and non-conforming Work.
- .5        Restore work with new products in accordance with requirements of Contract Documents.
- .6        Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

**1.6               WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 74 21 - Construction/demolition Waste Management
- .2        Section 01 77 00 - Closeout Procedures

**1.2                WORK SITE CLEANLINESS**

- .1        Maintain work site in tidy condition, free from accumulation of waste products and debris.
- .2        Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative
- .3        Do not burn waste materials on site, unless approved by Departmental Representative.
- .4        Keep work site access road free of ice and snow. Place snow only at indicated areas or evacuate out of work site as indicated.
- .5        Make arrangements to obtain all necessary licences from authorities for waste disposal.
- .6        Provide on-site containers for collection of waste materials and debris.
- .7        Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .8        Dispose of waste materials and debris off-site.
- .9        Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .10       Store volatile waste in covered metal containers, and remove from premises at end of each working day.

**1.3                NETTOYAGE FINAL**

- .1        When work is substantially performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining work.
- .2        Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3        Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4        Remove waste products and debris including that caused by Owner or other Contractors.
- .5        Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6        Make arrangements to obtain all necessary licences from authorities for waste disposal.
- .7        Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



## **Part 1            General**

### **1.1            RELATED SECTIONS**

- .1      Section 01 33 00 – Submittal Procedures
- .2      Section 01 35 43 – Environmental Procedures
- .3      Section 01 74 11 – Cleaning
- .4      Section 02 41 16 – Structure Demolition
- .5      Section 02 81 01 – Hazardous materials

### **1.2            DEFINITIONS**

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

### **1.3            SUBMITTALS**

- .1      Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Prepare and submit the following once every two (2) weeks, throughout the project or at intervals defined by the Departmental Representative:
  - .1          Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled or disposed of.

- .2 Monthly written summary report , which details the cumulative amounts of waste recycled / reused, recycled and landfilled, and a summary status of activities relating to the management of ongoing waste.

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

- .1 Execute work with minimal disruption to the normal use of premises.
- .2 Maintain existing security measures established for the installation. Implement temporary security measures approved by the Departmental Representative.

#### **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property. Contractor is responsible for disposing of these materials and choosing authorized landfill site.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of structures is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Provide waybills for separated materials.
- .10 Store treated wood on site in a temporary containment area set up for this purpose to prevent streaming water from reaching aquatic environment.
- .11 Transport materials whose level of contamination would be equal or higher than the generic C criterion of the MDDELCC Soil Protection and Rehabilitation of Contaminated Sites Policy, either in a closed means of containment or in a dump vehicle equipped with a waterproof tarpaulin completely covering the top of the body and the load. (Art. 18, *Transportation of dangerous substances Regulation*).

#### **1.6 SITE WASTE TREATMENT**

- .1 Contractor is responsible for finding the waste-material resources and service providers. Recovered waste materials shall be transported to recycling facilities approved and / or authorized, or at recyclers equipment.

## **1.7 DISPOSAL OF WASTES**

- .1 Recover, sort and separate waste generated by demolition into categories in preparation for transfer to various licensed sites. Contractor shall recover (reuse and/or recycle) non contaminated materials before disposal:
  - .1 Rock, stone and other granular materials to be removed from existing structures or form excavation will be recovered and reused for the construction of new structures, if they meet the specification requirements.
  - .2 Metals must be removed from wood recovered from demolition, and wood residues from construction must be managed according to the best practices and standards in effect. Leachate waters from temporarily stored wood that has been treated or is being treated must be recovered and disposed of at an authorized site.
- .2 Manage construction or demolition debris and waste that cannot be reclaimed on land in conformance with requirements of the Quebec Department of Sustainable Development, the Environment and Parks (according to the "Soil Protection and Rehabilitation of Contaminated Sites Policy" or "Dry Materials Management"). Do not incorporate any demolition materials into work other than those accepted. Contractor is responsible for disposing of these materials and choosing authorized landfill site.
- .3 Do not bury rubbish or waste materials.
- .4 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.
- .5 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .6 Evacuate waste materials out of site along with work progress.
- .7 Prepare project summary to verify destination and quantities on a material-by-material basis as identified.
- .8 Remove materials on-site as Work progresses.

## **1.8 SCHEDULING**

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

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 APPLICATION**

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

- .2 Soils characterization of work site will be done prior and after works. Contamination caused by Contractor operations shall be rectified, without expense to Departmental Representative.

### **3.2 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling/reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  - .2 Source separate materials to be reused/recycled into specified sort areas.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1            Section 01 33 00 – Submittal Procedures

**1.2            ADMINISTRATIVE REQUIREMENTS**

- .1            Acceptance of Work Procedures:
  - .1            Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1            Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2            Request for Departmental Representative inspection.
  - .2            Departmental Representative Inspection:
    - .1            Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2            Contractor to correct Work as directed.
  - .3            Completion Tasks: submit written certificates that tasks have been performed as follows:
    - .1            Work: completed and inspected for compliance with Contract Documents.
    - .2            Defects: corrected and deficiencies completed.
    - .3            Equipment and systems: tested, [adjusted] [balanced] and fully operational.
    - .4            Certificates required by Utility companies: submitted.
    - .5            Operation of systems: demonstrated to Owner's personnel.
    - .6            Commissioning of mechanical systems: completed in accordance with Departmental Representative.
    - .7            Work: complete and ready for final inspection.
  - .4            Final Inspection:
    - .1            When completion tasks are done, request final inspection of Work by Departmental Representative, and contractor
    - .2            When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
  - .5            Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
  - .6            Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement

for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

- .7 Final Payment:
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

### **1.3 FINAL CLEANING**

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

### **Part 2 Products**

#### **2.1 NOT USED**

- .1 Not Used.

### **Part 3 Execution**

#### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 01 11 11 – Description of work
- .2    Section 01 33 00 - Submittal Procedures
- .3    Section 01 35 29 – Health and safety requirements
- .4    Section 01 35 43 – Environmental procedures
- .5    Section 01 56 00 - Temporary Barriers and Enclosures
- .6    Section 01 74 21 - Construction/Demolition Waste Management and Disposal

**1.2            REFERENCES**

- .1    Canadian Environmental Protection Act (CEPA)
  - .1    CCME PN 1327, Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products
- .2    Canadian Standards Association (CSA International).
  - .1    CSA S350-M, Code of Practice for Safety in Demolition of Structures.
- .3    Department of Justice Canada (Jus).
  - .1    Canadian Environmental Assessment Act (CEAA).
  - .2    Canadian Environmental Protection Act (CEPA).
    - .1    SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
    - .2    SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
    - .3    Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .4    Underwriters' Laboratories of Canada (ULC)
  - .1    CAN/ULC-S660, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.
  - .2    ULC/ORD-C58.15, Overfill Protection Devices for Flammable Liquid Storage Tanks.
  - .3    ULC/ORD-C58.19, Spill Containment Devices for Underground Flammable Liquid Storage Tanks.
- .5    U.S. Environmental Protection Agency (EPA).
  - .1    EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
  - .2    EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
  - .3    EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

### **1.3 DEFINITIONS**

- .1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Site Meetings.
  - .1 Convene pre-demolition meeting 1 (one) week prior to beginning work in accordance with Section 01 31 19 Project meeting to:
    - .1 Verify project requirements.
    - .2 Review installation and site conditions.
  - .2 Ensure key personnel attend.
  - .3 Departmental Representative will provide notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .2 Scheduling:
  - .1 Meet project time lines without compromising specified minimum rates of material diversion. In event of unforeseen delay notify in writing Departmental 24 hours prior to meeting.

### **1.5 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures and Section 01 74 21 – Construction/Demolition Waste Management.
- .2 Shop Drawings
  - .1 When required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
  - .2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Quebec, Canada.
- .3 The Contractor is responsible for fulfilment of reporting requirements.
- .4 Submit if requested by Departmental Representative, copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and reuse and recycling facilities for material removed from site.
  - .1 Written authorization from Departmental Representative is required to deviate from receiving organizations.

### **1.6 QUALITY ASSURANCE**

- .1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial and Municipal regulations.



## **1.7 ENVIRONMENTAL PROTECTION**

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.
- .4 No demolition or waste material should be buried on site
- .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
  - .1 Ensure proper disposal procedures are maintained throughout project.
- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.
- .8 During work, erect temporary protective enclosures to prevent substances or foreign materials contaminate air outside the site.
- .9 Cover or wet down dry materials and waste to prevent blowing dust and debris. If required by Departmental Representative, control dust on all temporary roads.

## **1.8 EXISTING CONDITIONS**

- .1 The Contractor shall take the necessary steps to become thoroughly familiar with all aspects of the work site environment.
- .2 The results of the most recent bathymetric survey are included in drawings. The information is provided for tender only. Information could differ from site conditions during Work.
- .3 Should material resembling hazardous substance be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.
- .4 If the demolition works require the installation of temporary supporting structures to protect the existing hauling ramp, the workshop drawings must carry the seal and signature of a recognized qualified engineer or holding a license enabling him to exert in Canada, in the Province de Québec.
- .5 Structures to be demolished to be based on their condition on date that tender is accepted.
  - .1 Remove, protect and store salvaged items as directed by Departmental Representative.

- .6 The Contractor shall conduct research on historical temperature, wave and ice conditions and assess possible difficulties. There shall be no additional payment for lost time as a result of weather conditions.
- .7 Weather conditions can be difficult (wind, cold, etc.). The work site may be subject to significant agitation due to waves.

## **1.9 SCHEDULING**

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
  - .1 In event of unforeseen delay notify Departmental Representative in writing.

## **Part 2 Products**

### **2.1 EQUIPMENT**

- .1 Equipment and heavy machinery to:
  - .1 On-road vehicles to meet applicable emission requirements as prescribed in CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
- .2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:
  - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
  - .2 Prevent movement, settlement or damage of adjacent services, structures, parts of existing structures to remain.
    - .1 Provide bracing, shoring and underpinning as required.
    - .2 Repair damage caused by demolition as directed by Departmental Representative.

- .3 Support affected structures and, if safety of structure being demolished adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
- .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .3 Surface Preparation:
  - .1 Disconnect and re-route electrical and telephone service lines entering buildings to be demolished.
    - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
  - .2 Disconnect and cap designated mechanical services.
    - .1 Sewer and water lines: remove as directed by Departmental Representative.
    - .2 Other underground services: remove and dispose of as directed by Departmental.
  - .3 Do not disrupt active or energized utilities traversing premises.

### **3.2 DEMOLITION AND EXCAVATION**

- .1 Perform demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .3 No compensation will be approved for demolition work outside boundaries of demolition indicated on plans or determined by Departmental Representative.
- .4 Information concerning the existing structures is drawn from « As-built » plans as well as from statements carried out on the le site. The tender must reflect these conditions. In the 48 hours following the discovery of a divergence at the time of the realization of work, Contractor shall inform the Departmental Representative of the situation.
- .5 Remove demolition material or excavate at elevations on plan.
- .6 Execute demolition work to permit construction.
- .7 Excavate sediments, overburden and rock in place to create the foundation for new wharves. Reuse the excavated material as stone, run material for new breakwater.
- .8 When demolition and excavation works are done, ask Departmental Representative for verification of rises and dimensions.
- .9 Do not allow pieces of wood to drift or release demolition material in the water. The Contractor shall immediately recover any debris released into water, at his own expense, and will be held responsible for any damage caused by floating or released material.
- .10 Identify sources for recycling granular material.

- .1 To get more information about recycling, communicate with provincial/local granular material supplier.
- .11 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .12 At the end of each day work, leave Work in safe and stable condition.
- .13 Carry out demolition work as so to minimize dusting. Keep materials wet as directed by Departmental Representative.
- .14 Only dispose of waste material within the specified alternative disposal option as directed by Departmental Representative.
  - .1 Additional disposal options for waste diversion to be provided on-site by Departmental Representative prior to disposal.
- .15 Do not dispose materials in landfill or waste stream destined for landfill.
- .16 Unless otherwise specified, remove and dispose of demolition materials in accordance with competent authority requirements.
- .17 Use natural lighting to do work where possible. Shut off lighting at the end of each day, except for those required for security purposes.
- .18 Take account of tides during demolition and construction work, in particular, in the sector of the dolosse protection.
- .19 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .20 Remove following materials and equipment and store in location designated by Departmental Representative
- .21 At end of each day's work, leave Work in safe and stable condition.
  - .1 Protect interiors of parts not to be demolished from exterior elements at all times.

### **3.3 POST-DEMOLITION SURVEY**

- .1 After demolishing structures and before installing the new structures, the Contractor shall conduct a bathymetric and/or land survey to map the natural ground profile within the limits of the new structures.
- .2 The Contractor shall not begin construction of new structures until the Departmental Representative has reviewed the survey and given permission.

### **3.4 MATERIALS**

- .1 All materials from demolition that cannot be reused or those who will not be returned to Departmental Representative will become the property of the Contractor and shall be removed promptly according to Work progress.

- .2 Do all sorting of materials directly on site. Unless specified, no other method will be accepted.
- .3 The Contractor shall refer to Section 01 74 21 – Construction/Demolition Waste Management for the procedures for handling and storing demolition materials on-site.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Waste Management: separate waste materials for recycling, reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 01 74 21 – Construction/Demolition Waste Management and Disposal

**1.2            REFERENCES**

- .1        Canadian Environmental Protection Act, (CEPA)
  - .1            Export and Import of Hazardous Waste Regulations
- .2        Department of Justice Canada (Jus)
  - .1            Transportation of Dangerous Goods Act, (TDG Act), (c. 34).
  - .2            Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .3        Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1            Material Safety Data Sheets (MSDS).
- .4        National Research Council Canada Institute for Research in Construction (NRC-IRC)
  - .1            National Fire Code of Canada

**1.3            DEFINITIONS**

- .1        Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2        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 environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3        Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4        Workplace Hazardous Materials Information System (WHMIS): a Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

**1.4            SUBMITTALS**

- .1        Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

## **1.5 TRANSPORT, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
  - .1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.
- .4 Storage and Handling Requirements:
  - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
  - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
  - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
  - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
    - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
    - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
  - .5 Transfer of flammable and combustible liquids is prohibited within buildings.
  - .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
  - .7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
  - .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
  - .1 Store hazardous materials and wastes in closed and sealed containers.
  - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
  - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
  - .4 Segregate incompatible materials and wastes.
  - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
  - .6 Store hazardous materials and wastes in secure storage area with controlled access.
  - .7 Maintain clear egress from storage area.
  - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
  - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
  - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .12 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.
- .13 Respect following requirements when hazardous waste is generated on site:
  - .1 Co-ordinate transportation and disposal with Departmental Representative.
  - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
  - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
  - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
  - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
  - .6 Only trained personnel handle, offer for transport or transport dangerous goods.
  - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.



- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Description
  - .1 Only bring on site quantity of hazardous materials required to perform work.
  - .2 Maintain MSDSs in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

## **Part 3 Execution**

### **3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
  - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
  - .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
  - .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
  - .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
  - .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
  - .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
  - .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

- .1 Hazardous wastes recycled in manner constituting disposal.
- .2 Hazardous waste burned for energy recovery.
- .3 Lead-acid battery recycling.
- .4 Hazardous wastes with economically recoverable precious metals.

**END OF SECTION**

**Part 1            General**

**1.1            EXIGENCES CONNEXES**

- .1      Section 03 20 00 – Concrete reinforcing
- .2      Section 03 30 00 – Cast-in-place concrete
- .3      Section 03 41 00 – Precast structural concrete

**1.2            REFERENCE STANDARDS**

- .1      Canadian Standards Association (CSA International)
  - .1      CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2      CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
  - .3      CSA O121, Douglas Fir Plywood.
  - .4      CSA O151, Canadian Softwood Plywood.
  - .5      CSA O153, Poplar Plywood.
  - .6      CSA O437 Series, Standards for OSB and Waferboard.
  - .7      CSA S269.1, Falsework for Construction Purposes.
  - .8      CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada
- .2      Underwriters' Laboratories of Canada (ULC)
  - .1      CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Submit shop drawings for formwork and falsework.
  - .1      Submit drawings stamped and signed by professional engineer registered or licensed in the province of Quebec in Canada.
- .3      Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .4      Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings Comply with CAN/CSA-S269.3 for formwork drawings .
- .5      Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .6      Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

- .7 When slip forming or lying forms are used, submit details of equipment and procedures for review by Departmental Representative.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials in accordance with 01 47 21 - Construction/Demolition Waste Management and Disposal .
  - .2 Place materials defined as hazardous or toxic in designated containers.
  - .3 Divert wood materials from landfill to a reuse / recycling or composting facility as approved by Departmental Representative
  - .4 Divert plastic materials from landfill to a reuse / recycling or composting facility as approved by Departmental Representative.
  - .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

#### **1.5 MATERIALS**

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA O437 Series, CSA-O121, CAN/CSA-O86, CSA-O153.
  - .2 The formwork must be in conformity with standard CAN3-A23.1-M77. Respect the maximum tolerances for the finished concrete works as mentioned in standard 347 of ACI « Recommended Practice for Concrete Formwork ».
- .2 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .3 Form liner:
  - .1 Plywood: Canadian Softwood Plywood to CSA O151, Poplar to CSA O153 or Douglas Fir to CSA O121
  - .2 Waferboard: to CAN3-0188.0
- .4 Form release agent: biodegradable, low VOC, non-toxic .
- .5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with a viscosity between 70 and 110s in Saybolt Universal with viscosity between 15 to 24 mm<sup>2</sup>/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .6 Falsework materials: to CSA-S269.1.
- .7 Sealant: use appropriate material.

**Part 2            Execution**

**2.1                FABRICATION AND ERECTION**

- .1      Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2      Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.
- .3      Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4      Fabricate and erect falsework in accordance with CSA S269.1.
- .5      Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6      Do not place shores and mud sills on frozen ground.
- .7      Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8      Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .9      Align form joints and make watertight.
  - .1      Keep form joints to minimum.
- .10     Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .11     Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .12     Construct forms for architectural concrete, and place ties as directed as indicated.
  - .1      Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .13     Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1      Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .14     Line forms for following surfaces:
  - .1      Outer face of beams and vertical edge of bridge sidewalk slab..
  - .2      Soffit of girders and underside of bridge decks if exposed.
  - .3      Exposed faces of abutments, wingwalls, piers and pylons: do not stagger joints of form lining material and align joints to obtain uniform pattern.
  - .4      Secure lining taut to formwork to prevent folds.
  - .5      Pull down lining over edges of formwork panels.
  - .6      Ensure lining is new and not reused material.
  - .7      Ensure lining is dry and free of oil when concrete is poured.

- .8 Application of form release agents on formwork surface is prohibited where drainage lining is used.
- .9 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.
- .10 Cost of textile lining is included in price of concrete for corresponding portion of Work.
- .15 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.
- .16 When slip forming or flying forms are used, submit details as indicated in PART 1 - SUBMITTALS.

## **2.2 REMOVAL AND RESHORING**

- .1 Remove formwork when concrete has reached 3 days or sufficient capacity
- .2 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Space reshoring in each principal direction at not more than 3000 mm apart.
- .4 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 03 10 00 – Concrete forming and accessories
- .2    Section 03 30 00 - Cast-in-Place Concrete
- .3    Section 03 41 00 – Precast Structural Concrete

**1.2            REFERENCES**

- .1    American Concrete Institute (ACI)
  - .1    ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure
- .2    American National Standards Institute/American Concrete Institute (ANSI/ACI)
  - .1    ANSI/ACI 315, Details and Detailing of Concrete Reinforcement
- .3    American Society for Testing and Materials (ASTM)
  - .1    ASTM A 775/A 775M, Specification for Epoxy-Coated Reinforcing Steel Bars
- .4    Canadian Standards Association (CSA)
  - .1    CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction
  - .2    CAN3-A23.3, Design of Concrete Structures for Buildings
  - .3    CAN/CSA-G30.18-M, Billet-Steel Bars for Concrete Reinforcement
  - .4    CAN/CSA-G40.20/G40.21, Structural Quality Steels
  - .5    CAN/CSA-G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles
  - .6    CAN/CSA-S6, Canadian Highway Bridge Design Code
  - .7    CAN/CSA W186-M, Welding of Reinforcing Bars in Reinforced Concrete Construction
- .5    Reinforcing Steel Institute of Canada (RSIC)
  - .1    RSIC-Reinforcing Steel, Manual of Standard Practice.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit shop drawings, including placing of reinforcement in accordance with Section 01 33 00 – Submittal Procedures.
- .2    Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3    Shop Drawings:
  - .1    Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec.
    - .1    Indicate placing of reinforcement and:
      - .1    Bar bending details.
      - .2    Lists.
      - .3    Quantities of reinforcement.

- .4 Sizes, spacing, locations 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, spacing and locations of chairs, spacers and hangers.
- .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
  - .1 Provide tension lap splices unless otherwise indicated.
- .4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

#### **1.4 QUALITY ASSURANCE**

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
  - .1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
  - .2 Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in a clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.
- .6 Welded steel wire fabric: to ASTM A185/A185M.



- .1 Provide in flat sheets only.
- .7 Welded deformed steel wire fabric: to STM A82/A82M.
  - .1 Provide in flat sheets only.
- .8 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.
- .9 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m<sup>2</sup>.
  - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
  - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
    - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
  - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
    - .1 In this case, no restriction applies to temperature of solution.
  - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
    - .1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .10 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .11 Mechanical splices: subject to approval of Departmental Representative.
- .12 Plain round bars: to CSA-G40.20/G40.21.

## **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada SP-66 CSA-A23.1/A23.2.
  - .1 SP-66 unless otherwise indicated.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
  - .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

## **2.3 SOURCE QUALITY CONTROL**

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request, advise the Departmental Representative of the proposed source of materials to be supplied.

**Part 3            Execution**

**3.1            FIELD BENDING**

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

**3.2            PLACING REINFORCEMENT**

- .1      Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2      Use plain round bars as slip dowels in concrete.
  - .1          Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
  - .2          When paint is dry, apply thick even film of mineral lubricating grease.
- .3      Concrete cover requirement of reinforcement is 75 mm, otherwise indicated. Maintain concrete cover of 75 mm during concrete pouring.
- .4      24 hours prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .5      Metal pieces susceptible of rusting shall not touch the surface of concrete parts exposed to bad weather.

**3.3            FIELD TOUCH-UP**

- .1      Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

**3.4            CLEANING**

- .1      Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1          Leave Work area clean at end of each day.
- .2      Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3      Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 03 10 00 - Concrete Forming and Accessories
- .2        Section 03 20 00 - Concrete Reinforcing
- .3        Section 03 41 00 – Precast Structural Concrete
- .4        Section 31 05 16 - Aggregates

**1.2                PRICE AND PAYMENT PROCEDURES**

- .1        Measurement and Payment:
  - 1.        No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.
  - 2.        No deductions will be made for volume of concrete less than 0.1 m<sup>2</sup> displaced by individual drainage openings.

**1.3                REFERENCE STANDARDS**

- .1        ASTM International
  - 1.        ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
  - 2.        ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 3.        ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - 4.        ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - 5.        ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - 6.        ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
  - 7.        ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
  - 8.        ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2        Canadian General Standards Board (CGSB)
  - 1.        CAN/CGSB-37.2, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Damp proofing and Waterproofing and for Roof Coatings.
  - 2.        CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

- .3 CSA International
  - 1. CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - 2. CSA A283, Qualification Code for Concrete Testing Laboratories.
  - 3. CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

#### **1.4 ABBREVIATIONS AND ACRONYMS**

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
  - 1. Type GU, GUb and GUL - General use cement.
  - 2. Type MS and MSb - Moderate sulphate-resistant cement.
  - 3. Type MH, MHb and MHL - Moderate heat of hydration cement.
  - 4. Type HE, HEb and HEL - High early-strength cement.
  - 5. Type LH, LHb and LHL - Low heat of hydration cement.
  - 6. Type HS and HSb - High sulphate-resistant cement.
- .2 Fly ash:
  - 1. Type F - with CaO content less than 15%.
  - 2. Type CI - with CaO content ranging from 15 to 20%.
  - 3. Type CH - with CaO greater than 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

#### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Minimum four (4) week 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
    - .1 Supplementary cementing materials
    - .2 Grout
    - .3 Admixtures
    - .4 Aggregates
    - .5 Water
    - .6 Waterstops
    - .7 Waterstop joints
    - .8 Joint filler
- .3 Provide results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

- .4 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .5 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.
- .6 Submit two (2) copies of MSDSs required under WHMIS, in accordance with Section 01 35 43 – Environmental Procedures and 01 35 29 - Health and Safety Requirements.

## **1.6 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
  - 1. Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .3 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for Departmental Representative's approval for following items:
  - 1. Falsework erection.
  - 2. Hot weather concrete.
  - 3. Cold weather concrete
  - 4. Curing
  - 5. Finishes
  - 6. Formwork removal
  - 7. Joints
- .4 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - 1. Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by Departmental Representative.
  - 2. Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

## **Part 2            Products**

### **2.1                DESIGN CRITERIA**

- .1        Alternative 1 - Performance: to [CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

### **2.2                PERFORMANCE CRITERIA**

- .1        Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in article 1.4 of PART 1 - QUALITY ASSURANCE.

### **2.3                MATERIALS**

- .1        Portland cement, for general purposes, GU, to CAN/CSA-A3001.
- .2        Cementitious hydraulic slag: to CAN/CSA-A23.1/A23.2.
- .3        Water: to CAN/CSA-A23.1/A23.2.
- .4        Aggregates: to CAN/CSA-A23.1/A23.2. Coarse aggregates to be normal density.
- .5        Chemical admixtures
  - 1.        Air entraining admixture: to ASTM C260.
  - 2.        Chemical admixtures: to ASTM C494. Departmental Representative shall approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6        Shrinkage compensating grout: to CSA A23.1/A23.2.
  - 1.        Compressive strength: 35 MPa at 28days.
- .7        Curing compound: to CSA A23.1/A23.2, white, Type I-D with fugitive dye.
- .8        Premoulded joint fillers:
  - 1.        Bituminous impregnated fibre board: to ASTM D1751.
  - 2.        Sponge rubber: to ASTM D1752, Type I.
  - 3.        Cork: to ASTM D1752.
- .9        Weep hole tubes: galvanized steel or plastic.
- .10       Elastomer cement for joints: cement made of polyurethane, Sikaflex 1c from Sika or equivalent.
- .11       Steel, Anchors: to CAN/CSA-G40.20/G40.21 Grade 350W or as indicated.

### **2.4                MIXES**

- .1        Proportion concrete in accordance with CAN/CSA-A23.1/A23.2. Mix proportions as specified below.
- .2        Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.
  - 1.        Co-ordinate construction methods to suit Departmental Representative concrete mix proportions and parameters.

2. Identify and report immediately to Departmental Representative when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.
  3. Departmental Representative to proportion concrete mix for normal including:
  4. Concrete:
    - .1 GU-b SF Portland cement.
    - .2 Minimal compressive strength at 28 days: 35 Mpa.
    - .3 Class of exposure: C-1.
    - .4 20 mm nominal size coarse aggregate.
    - .5 Slump at time and point of discharge: 80 mm to 125 mm.
    - .6 Air content 5% to 8 %.
    - .7 Chemical admixtures: water reducing strength increasing, set retarding, accelerating, strength increasing, air entraining, super plasticizers, following admixtures in accordance with ASTM C 494.
    - .8 Dry weight per cubic meter: 2 400 kg/m<sup>3</sup> minimum.
    - .9 Water/Cement content: lower than 0.40.
    - .10 Minimum cement content: 375 kg/m<sup>3</sup> of concrete.
  5. Ensure materials to be used in concrete mix have been submitted for testing.
  6. Co-ordinate construction methods with Departmental Representative to suit concrete mix proportions and parameters.
  7. Identify and report immediately to Departmental Representative when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.
- .3 Not with standing specification CAN/CSA\_A23.1 and CAN/CSA-A23.4, the Contractor will provide the Departmental Representative with a mixing formula for the concrete. This formula is only a guide prepared according the aggregates supplied by the Contractor and submitted to the designated laboratory for all processes such as grading, washing, etc. It is the Contractor's responsibility to use similar aggregates and to handle them so as to obtain good results. It is also Contractor's responsibility to set the mixing guide formula depending on possible variations of aggregates or other concrete components.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 Obtain Departmental Representative's written approval before placing concrete.
  1. Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  1. Development of cold joints not allowed.

2. Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete will be permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

### 3.2 CONSTRUCTION

- .1 Does cast-in-place concrete work in accordance with CAN/CSA-A23.1/A23.2.
- .2 Sleeves and inserts:
  1. Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
  2. Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
  3. Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
  4. Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
  5. Confirm locations and sizes of sleeves and openings shown on drawings.
  6. Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts
  1. Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
  2. Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
    - .1 Formed holes: 100 mm minimum diameter.
    - .2 Drilled holes: diameter to manufacturers' recommendations.
  3. Protect anchor bolt holes from water accumulations, snow and ice build-ups.
  4. Set bolts and fill holes with epoxy grout.
  5. Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.



.4 Finishing

1. Finish concrete in accordance with CAN/CSA-A23.1/A23.2.
2. Use procedures noted in CAN/CSA-A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
3. Use curing compounds compatible with applied finish on concrete surfaces.
4. For concrete slab, execute a broom or brush groovy finish.

.5 Water stops:

1. Install water stops to provide continuous water seal.
2. Do not distort or pierce water stop in way as to hamper performance.
3. Do not displace reinforcement when installing water stops.
4. Use equipment to manufacturer's requirements to field splice water stops.
5. Ties water stops rigidly in place.
6. Use only straight heat sealed butt joints in field.
7. Use factory welded corners and intersections unless otherwise approved by Departmental Representative.

.6 Joint fillers:

1. Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
2. When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
3. Locate and form construction expansion joints as indicated.
4. Install joint filler.
5. Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to finished slab surface unless indicated otherwise.

**3.3 TOLERANCE**

- .1 Concrete finishing tolerance in accordance with CAN/CSA-A23.1/A23.2

**3.4 FIELD QUALITY CONTROL**

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Agencies designated by Departmental Representative in accordance with CAN/CSA-A23.1/A23.2 and Section 01 45 00 - Quality Control.
- .2 Departmental Representative will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures: Testing Laboratory Services.
- .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 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.1/A23.2.

- .5 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.
- .6 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing agency and Departmental Representative.

### **3.5 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - 1. Divert unused concrete materials from landfill to local quarry or facility after receipt of written approval from Departmental Representative.
  - 2. Provide appropriate area on job site where concrete trucks and be safely washed.
  - 3. Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.
  - 4. Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
  - 5. Prevent admixtures and additive materials from entering drinking water supplies or streams.
  - 6. Using appropriate safety precautions collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
  - 7. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 03 30 00 - Cast-in-Place Concrete.

**1.2            REFERENCE STANDARDS**

- .1        American Society for Testing and Materials International (ASTM)
  - .1        ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .2        ASTM A775/A775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
  - .3        ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .4        ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
  - .5        ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.40, Anticorrosive Structural Steel Alkyd Primer.
  - .2        CAN/CGSB-1.181, Ready Mixed Organic Zinc-Rich Coating.
- .3        Canadian Standards Association (CSA International)
  - .1        CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2        CSA-A23.3, Design of Concrete Structures.
  - .3        CAN/CSA-A3000, Cementitious Materials Compendium.
    - .1        CSA-A3001, Cementitious Materials for Use in Concrete.
  - .4        CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.
  - .5        CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .6        CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .7        CAN/CSA-S6, Canadian Highway Bridge Design Code.
  - .8        CSA-W47.1, Certification of Companies for Fusion Welding for Steel.
  - .9        CAN/CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .10       CSA-W59, Welded Steel Construction (Metal Arc Welding) (Metric version).
  - .11       CSA-W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4        The Master Painters Institute (MPI) - Architectural Painting Specification Manual (ASM)
  - .1        MPI # 18, Organic Zinc Rich Primer.
  - .2        MPI # 23, Oil Alkyd Primer.
- .5        Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design precast elements to CSA-A23.3 to carry handling stresses.
- .2 Design precast elements to carry loads as indicated.
- .3 Provide detailed calculations and design drawings for typical precast elements and connections as described in PART 1 - SUBMITTALS.

### **1.4 PERFORMANCE REQUIREMENTS**

- .1 Tolerance of precast elements to CAN/CSA-A23.1/A23.2.

### **1.5 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Submit shop drawings in accordance with CSA-A23.3 and include following items:
  - .1 Details of prestressed and non-prestressed members, reinforcement and their connections.
  - .2 Camber.
  - .3 Finishing schedules.
  - .4 Methods of handling and erection.
  - .5 Openings, sleeves, inserts and related reinforcement.
- .4 Submit copies of detailed calculations and design drawings for typical precast elements and connections for review by Departmental Representative 2 weeks prior to manufacture.
- .5 Shop Drawings: submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Québec.
- .6 Submit samples in accordance with Section 01 33 00 - Submittal Procedures. Submit sample number of each finish to be used on project to Departmental Representative.

### **1.6 QUALITY ASSURANCE**

- .1 Quality Control Plan: submit written report, as described in PART 3 - VERIFICATION, to Departmental Representative verifying compliance that concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

### **1.7 QUALIFICATIONS**

- .1 Precast concrete elements to be fabricated in accordance with CSA-A23.1/A23.2.
- .2 Welding companies certified to CSA-W47.1.

## **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Store and manage hazardous materials in accordance with Section 02 81 01 – Hazardous Materials.
- .2 Deliver, handle and store precast/prestressed units according to manufacturer's instructions.
- .3 Protect unit corners from contacting earth to prevent from staining.
- .4 Waste Management and Disposal:
  - .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Product**

### **2.1 MATERIALS**

- .1 Cement, aggregates, water, admixtures: to CAN/CSA A23.1 and CAN3 A23.4.
- .2 Reinforcing steel: to CAN/CSA-G30.18.
- .3 Hardware and miscellaneous materials: to CAN/CSA-A23.1.
- .4 Forms: to CAN3-A23.4.
- .5 Anchors and supports: to CAN/CSA G40.21 Type 350 W, galvanized.
- .6 Welding materials: to CSA-W48.1.
- .7 Welding electrodes: to CSA-W48.1 and certified by Canadian Welding Bureau.
- .8 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m<sup>2</sup> to CAN/CSA-G164.

### **2.2 MIXES**

- .1 Concrete.
  - .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, to give physical properties following Section 03 30 00 – Cast-in-Place Concrete.

### **2.3 MANUFACTURED UNITS**

- .1 Manufacture units in accordance with CAN/CSA-A23.1/A23.2.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.
- .3 Provide hardware suitable for handling elements.

### **2.4 FINISHES**

- .1 Finish units to CSA-A23.1.

### **2.5 SOURCE QUALITY CONTROL**

- .1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA A23.1/A23.2.

- .2 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.
- .3 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .4 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

### **Part 3 Execution**

#### **3.1 ERECTION**

- .1 Do precast concrete work in accordance with CSA-A23.3 and CAN/CSA-S6.
- .2 Do welding in accordance with CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement.
- .3 Erect precast elements within allowable tolerances as specified.
- .4 Non-cumulative erection tolerances in accordance with CAN3-A23-1.
- .5 Uniformly tighten bolted connections with torque indicated.
- .6 Clean field welds with wire brush and touch-up galvanized finish with zinc-rich primer.

#### **3.2 VERIFICATION**

- .1 Ensure concrete supplier meets performance criteria of concrete as established in Part 2 B Products, by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

#### **3.3 CLEANING**

- .1 Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       Section 01 33 00 - Submittal Procedures
- .2       Section 01 61 00 – Common product requirements
- .3       Section 01 74 21 - Construction/Demolition Waste Management and Disposal

**1.2               REFERENCES**

- .1       American Society for Testing and Materials International, (ASTM)
  - .1       ASTM A6/A6M, Standard Specification for general Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
  - .2       ASTM A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .3       ASTM A 36/A36M, Specification for Structural Steel.
  - .4       ASTM A123/123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Production
  - .5       ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - .6       ASTM A 325M, Specification for High-Strength Bolts for Structural Steel Joints (Metric).
  - .7       ASTM A563, Standard Specification for Carbon and Alloy Steel Nuts
  - .8       ASTM A 780, repainting of damaged galvanized coating.
- .2       American National Standards Institute, (ANSI)
  - .1       AWS D3.6M, Specification for underwater welding.
- .3       Canadian Standards Association (CSA International)
  - .1       CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2       CAN/CSA-G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3       CAN/CSA-S16-S1, Limit States Design of Steel Structures.
  - .4       CSA-S136.S1, Limit States Design of Steel Structures (Specification for the Design of Cold-Formed Steel Structural Members).
  - .5       CSA-S136.1, Commentary on CSA Standard S136.
  - .6       CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
  - .7       CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .8       CSA W59, Welded Steel Construction (Metal Arc Welding) [Metric].
- .4       Canadian Institute of Steel Construction
  - .1       Handbook of steel construction
- .5       The Master Painters Institute (MPI)

### **1.3 SUBMITTALS PROCEDURES**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing and bolts and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit one copy of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
    - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec.
  - .2 Indicate materials, core thicknesses, finishes, connections, joint, methods of anchorage, number of anchors, supports, reinforcement, details, and accessories.
  - .3 Submit shop drawings, including materials processing and assembly, and the list of equipment and materials in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
    - .1 Description of methods.
    - .2 Sequence of erection.
    - .3 Type of equipment used in erection.
    - .4 Temporary walers.
- .4 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Quebec, Canada.

### **1.4 QUALITY ASSURANCE**

- .1 Submit 2 copies of mill test reports 4 weeks prior to fabrication of structural steel.
  - .1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
  - .2 Provide mill test reports certified by metallurgists qualified to practice in province of Quebec, Canada.
- .2 Provide structural steel Fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and section 01 61 00 - Common Product Requirements.



- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location, off ground indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

## **1.6 WASTE MANAGEMENT**

- .1 Sort and remove for reuse waste in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade 350W or as indicated.
- .2 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Anchor bolts: to ASTM A307 or A325, as indicated on drawings.
- .5 Nuts and washers: following asked bolts, to develop full strength. Lubricated in accordance with ASTM A563.
- .6 Hot dip galvanizing: galvanize steel, where indicated, in accordance with ASTM A123/123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Production and to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

### **2.2 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16, CAN/CSA-S136 and in accordance with reviewed shop drawings.
- .2 Bolts Tightening: use tightening torque in accordance with CISC
- .3 Continuously seal members by continuous welds where indicated. Grind smooth.
- .4 Exposed welds should be continuous throughout the length of the joint; they must be filed down or ground to present a smooth, even surface.
- .5 Where possible, fit and shop assemble work, ready for erection.

### **2.3 METAL FABRICATION - GENERAL**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.

- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

## **2.4 SHOP PAINTING**

- .1 All steel components to be hot-dip galvanized, not painted, in accordance to CAN/CSA-G164.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 GENERAL**

- .1 Structural steel work: in accordance with CAN/CSA-S16 and CAN/CSA-S136.
- .2 Provide a letter of validation of the steel manufacturer and welders as evidence of certification by the Canadian Welding Bureau, Division 2.1.
- .3 Welding: in accordance with CSA W59.
- .4 Companies to be certified under Division 2 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

### **3.3 INSTALLATION**

- .1 Surface welding: welding work must be done in conformity with the requirements of the standards indicated to article 1.3 of this section, and with the dimensional tolerances specified in the standards of this article. The welders must be qualified according to Canadian Welding Bureau for the type of welding corresponding to work carried out.
- .2 Finish: Carefully finish the various parts of work. Cutting, carving, boring and machining shall be done with care and precision. Finished components must meet prescribed alignment requirements and be free from torsion, curves, open joints, sharp corners and ridges.
- .3 On-site additional splices: obtain Departmental Representative's approval before making on-site additional splices (to facilitate transport and assembly of elements). No additional cost for expenses incurred by the additional splices done on-site.
- .4 All the adjacent welding with galvanized parts will receive a coat of rich zinc protective paint.

### 3.4 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16, CAN/CSA-S136 and in accordance with reviewed erection drawings.
- .2 Does welding work in accordance with CSA W59 unless specified otherwise.
- .3 Field cutting or altering structural members, to approval of Departmental Representative.
- .4 Erect steel accurately, level, plumb straight, line up and adjusted with precision, joints and crossing well fixed.
- .5 Provide and install suitable anchors approved by Departmental Representative such as studs, tie-rods, anchor bolts, expansion bolts, etc.
- .6 Visible fastening to be compatible with crossed or fixed to material.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Clean with mechanical brush and touch up coat protection to bolts, rivets, welds or burned or scratched surfaces at completion of erection.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- .10 Continuously seal members by continuous welds where indicated. Grind smooth.
- .11 Allowable tolerances for bolt holes:
  - .1 Matching holes for bolts to register so that a gauge 2 mm less than diameter than hole will pass freely through assembled members at right angles to such members.
  - .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.
  - .3 Centre-to-centre distance between 2 holes of a group of holes to vary but not more than 1 mm from dimensioned distance between such holes..
  - .4 Centre-to-centre distance between any group of holes to vary not more than following:

Centre-to-centre (m)	Difference (±) (mm)
Less than 10	1
10 to 20	2
20 to 30	3

### 3.5 CLEANING

- .1 .Cleaning up work: perform cleanup in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work site clean at the end of each workday.
- .2 Final Cleaning: upon completion remove materials / surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

- .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

### **3.6 PROTECTION**

- .1 Protect installed products and components against damage during construction.
- .2 Repair damage to adjacent materials and equipment from installation of steel components.

**END OF SECTION**

**Partie 1      General information**

**1.1            SECTION CONTENT**

- .1      This section includes specifications for the construction of wood embankments to be built.

**1.2            WASTE MANAGEMENT AND DISPOSAL**

- .1      Sort and recycle waste in compliance with section 01 74 21 – Construction/demolition waste management and disposal.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Shop Drawings:
  - .1      Submit drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2      Before ballasting cribs, submit to Departmental Representative for approval, the proposed installation method of materials

**1.4            QUALITY ASSURANCE**

- .1      Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2      Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

**1.5            WASTE MANAGEMENT**

- .1      Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2      Place materials defined as hazardous or toxic in designated containers.
- .3      Ensure emptied containers are sealed and stored safely.
- .4      Do not dispose of composite or plastic products through incineration.
- .5      Evacuate composite and plastic parts as well as tip sections, waste and sawdust to an approved landfill.

**1.6            DELIVERY, STORAGE AND HANDLING**

- .1      Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2      Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
  - .4 Beams:
    - .1 Handle with tongs or ropes. Do not use chains.
    - .2 Avoid dragging and marring of surface.
  - .5 Protect beam elements from damage during handling.

## **Partie 2 Products**

### **2.1 MATERIALS**

- .1 203 x 203 x 3 660 mm and 103 x 152 x3 660 mm recycled plastic beams are provided by the Departmental Representative.**
- .2 Steel
  - .1 All mechanical bolts, lag screw, drift bolt and nails will be of medium construction steel, in compliance with standard ASTM-A307.
  - .2 All steel parts must be galvanized in compliance with standards ASTM A123/123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Production.
    - .1 Galvanize the various parts in accordance with the following rates:
      - .1 Bolts and nuts: 460 g/m2;
      - .2 Section, plates and rods: 705 g/m2
  - .3 Threads will meet the specifications of standard ANS/B1-1, class 2A.
  - .4 Washers will be made of grey cast iron or steel.
  - .5 Mechanical bolts, lag screw and drift bolt will have forged heads.
  - .6 The length of bolts specified does not include the head; the length of the bolt's threads is 100 mm.
  - .7 The spiral galvanized nails will be 250 mm long.
  - .8 All drift bolts will be properly worked down and will have 9 mm countersunk heads, larger than the diameter used.
  - .9 All drift bolts holes will be drilled to a diameter of 2 mm smaller than the diameter of the bolts used and 75 mm shorter than their length;
  - .10 The lag screw will be threaded and have hexagonal heads;
  - .11 The lag bolt holes must conform to the following:
    - .1 The pilot hole for the bolt core must be the same diameter as the bolt core and the same height as the bolt core length without the thread.
    - .2 The diameter of the pilot hole for the threaded portion must be 60 to 75 percent of the diameter of the bolt core for the length equal to the threaded portion of the bolt.

- .3 The threaded portion of the screw must be inserted into the pilot hole by turning the screw with a wrench and not by using a hammer.
- .4 Soap or any other lubricant that is not petroleum based may be used on the screw or in the pilot hole in order to facilitate insertion and prevent damage to the screw.
- .12 In structure, each mechanical bolt will be equipped with two (2) flat washers with a diameter equal to four (4) times the bolt diameter. The heads and nuts of the bolts will also lie evenly over the washers. They will be inserted flush with the plastic pieces on all outside faces of the crib structures and wherever this procedure is specified or required, as directed by the Departmental Representative. The mechanical bolt holes will be drilled to the same diameter as the bolts used.
- .13 Generally speaking, the length of the nuts and bolts in the structure is determined as follows, except where otherwise specified:
  - .1 Drift bolt and lag screw: total width of parts to secure less 50 mm.
  - .2 Mechanical bolt with two (2) non-countersunk washers: total width of parts to secure less 100 mm.
  - .3 Mechanical bolt with two (2) washers, only one of which is countersunk: total width of parts to secure plus 50 mm.
  - .4 Mechanical bolt with two (2) countersunk washers: total width of parts to secure.
  - .5 Common nails and spiral nails: width of thinner part to be secured multiplied by two and a half (2.5).
- .3 Ballast stone
  - .1 Stone measuring 200 to 300 mm in diameter.
  - .2 The smallest size stones must not be less than 150 mm.
  - .3 The stone used must be quarried from hard and durable stone. The use of shale or slate and round stones will not be accepted in any part of the structure. The stones used must be free of planes of weakness such as stratification, bedding, cracks and argillite beds.
  - .4 The stone must have a minimum density of 2,650 kg per cubic meter, show an absorption rate of less than 0.5% (ASTM-C127) and provide less than 1.5% loss in magnesium sulfate durability tests after 5 cycles (ASTM-C88). Same criteria apply to 150-25 mm stone.
  - .5 The ballast stone must be evenly distributed between the minimum and maximum values.
  - .6 It is the sole responsibility of the Contractor to ensure the availability of usable sources of supply and the quantity and sizes of stone that can be obtained.
- .4 Recycled plastic Sheathing
  - .1 The product must be made from 100% recycled thermoplastic (# 2 HDPE, # 3 PVC, # 4 LDPE, etc.).
  - .2 Bending Force (to ASTM D6109) = 2810 psi
  - .3 Modulus of elasticity (to ASTM D6109) = 139 500 psi
  - .4 Density (to ASTM D6111) = 0.035 lbs / cu inch

.5 Water Absorption (to ASTM D1037) = <0.01%

### **Partie 3 Execution**

#### **3.1 PREPARATION**

- .1 Dredge area of crib base to elevation indicated.
- .2 Place concrete bags and 150-25mm stone and level crushed stone mattress.
- .3 Before construction, stockpile sufficient ballast to completely fill cribs.
- .4 Take closely spaced accurate soundings, precisely located by template, to surface of mattress, to determine actual configuration of base area of crib.
  - .1 Construct crib bottom to match base configuration.

#### **3.2 COMPOSITE EMBANKMENT**

- .1 Build embankment with 203 mm x 203 mm recycled plastic beams, as specified on the drawings.
- .2 These embankments will be built on site so that faces, stringers, bolsters etc, are installed horizontally. They will be built in compliance with the drawings and will have the specified dimensions.
- .3 These embankments will be entirely filled up to the internal face of the joists with ballast stone.
- .4 If, after immersion, cages are unaligned, the Contractor will have to remove ballast stone, at his own expense until the cages float and will have to replace them at the proper locations.
- .5 The Contractor will have to notify Department Representative, five (5) days before the probable immersion date of the embankment and these will not be immersed before Department Representative written approval.
- .6 Preparation of foundation:
  - .1 Prior to embankment installation, the Contractor will have to conduct a survey of the zone where the embankment will be placed.
  - .2 The Contractor will have to add concrete bags (above chart datum) and 150-25 mm crushed stone in order to respect the levels required.
  - .3 If massive rock is encountered at the embankment site, it will be cleaned and bottom parts of the embankments will be adjusted to the bedrock. This same method will be used if a section of the sea floor were to be of an inferior level due to erosion during cribwork.
- .7 Bottom pieces:
  - .1 The bottom parts include the lower layers of the embankment. They will have 203 mm and be placed fore and aft or crosswise, as required.



- .2 Crosswise bottom parts will be of one length.
- .3 They will be secured to each piece they cross, as specified in drawings.
- .4 The bottom parts will be secured to each vertical pole they cross using a mechanical bolt, 25 mm in diameter of the appropriate length. Bottom parts will be placed horizontally.
- .5 Bottom parts placed fore and aft will be butt jointed at mid-distance between the crosswise bottom parts on a 1 200 mm long block placed above or below and anchored with mechanical bolts 25 mm in diameter and of appropriate lengths.
- .8 Ballast platform:
  - .1 The ballast platform will be made up of 150 to 200 mm diameter untreated logs or 203 x 203 mm recycled plastic beams, and placed head to foot to bottom parts. They will be of required length and their joint will be done on a bottom part, as specified in the plans.
  - .2 The logs or beams will be placed on the second layer of the bottom parts. Each log extremity will be anchored to bottom parts using 25 mm diameter drift bolt of appropriate length.
- .9 Stringers and cross-tie
  - .1 Stringers and cross-tie will be made up of 203 mm pieces.
  - .2 Cross-tie will be placed on one horizontal length.
  - .3 These pieces will be secured to each crossing with a bolster or a facing timber using a 25 mm diameter drift bolt of appropriate length. They will also be secured to each crossing with a vertical pole using a machine bolt 25 mm in diameter of the appropriate length.
- .10 Vertical poles
  - .1 Vertical poles will be made up of 254 mm beam, situated as specified on the drawings. They will be of one length going from below the bottom parts up to the upper face of joists.
  - .2 Poles will be secured to each intersection with a bottom part, cross-tie, ledger, wall, crown, using 25 mm diameter machine bolts of the appropriate length.
- .11 Stringers
  - .1 203 mm stringers will be installed on the embankment.
  - .2 Stringers will be placed as specified on drawings. They will be secured to each cross-tie using a 25 mm diameter drift bolt of the appropriate length.

### **3.3 BALLAST**

- .1 Place ballast to avoid damage to timber cribwork.
- .2 Place ballast so that differential height of fill between adjacent cells, at any time, will be less than 1m.

### **3.4 WHEEL-GUARDS**

- .1 A 203 mm x 203 mm recycled plastic wheel guard will be constructed in compliance with drawings.
- .2 The wheel guard will be secured to blocks and concrete slabs using 25 mm diameter mechanical bolt of appropriate length.
- .3 The top of wheel guards will be leveled at the proper elevation.
- .4 The wheel guard will rest on two (2) 50 mm x 203 mm x 600 mm long blocks placed at every 1 500 mm on center.

### **3.5 FLOORS**

- .1 **A 103 x 154 mm recycled plastic beams floor will be installed on embankment.**
- .2 Each piece will be secured to stringers using 19 Ø x 150 mm galvanized lag screw at each stringer intersection.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1      Section 01 33 00 – Submittals procedures.
- .2      Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .3      Section 06 03 01 – Composite Embankment.

**1.2            REFERENCE STANDARDS**

- .1      ASTM International
  - .1          ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2      CSA International
  - .1          CSA B111, Wire Nails, Spikes and Staples.
- .3      Green Seal Environmental Standards (GS)
  - .1          GS-36, Commercial Adhesives.
- .4      Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1          Material Safety Data Sheets (MSDS).

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Product Data:
  - .1          Submit manufacturer's instructions, printed product literature and data sheets for decking and include product characteristics, performance criteria, physical size, finish and limitations.
- .3      Shop Drawings:
  - .1          Submit drawings stamped and signed by professional engineer registered or licensed in the province of Quebec, Canada.
- .4      Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

**1.4            QUALITY ASSURANCE**

- .1      In accordance with Section 01 45 01 – Quality Insurance

**1.5            DELIVERY, STORAGE AND HANDLING**

- .1      Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2      Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3      Storage and Handling Requirements:

- .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect wood decking from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel
  - .1 All lag screw shall be of medium structural steel and galvanized, in accordance to ASTM-A307.
  - .2 All steel parts to be galvanized to ASTM A123 / 123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Production.
    - .1 Galvanize the various parts respecting the following rates:
      - .1 Lag screws and washers: 460 g / m<sup>2</sup>;
  - .3 Threads will meet the specifications of standard ANS/B1-1, class 2A.
  - .4 Washers will be made of grey cast iron or steel.
  - .5 The lag screw will be threaded and have hexagonal heads;
  - .6 The lag screw holes must conform to the following:
    - .1 The pilot hole for the lag screw body shall be the same diameter as the lag screw body, and the same height as the length of the lag screw body without thread.
    - .2 The pilot hole for the threaded portion shall have a diameter equal to 60 to 75 percent of the diameter of the lag screw body for the length equal to the threaded portion of the lag screw.
    - .3 The threaded portion of the lag screw must be inserted into the pilot hole by turning the lag screw with a wrench and not with a hammer.
    - .4 Soap or any other lubricant that is not petroleum-based, may be used on the lag screw or in the pilot hole, to facilitate the introduction and avoid damage to the lag screw.
- .2 In Work, each lag screw shall be provided with one (1) ordinary washer with a diameter of not less than three (3) times the diameter of the lag screw. They will be drowned touching parts.
- .3 In general, in work, the length of the bolting is determined in the following manner, except where otherwise specified:
  - .1 Total width of parts to secure less 50 mm.
- .4 Recycled plastic decking
  - .1 The product shall be made from 100 recycled thermoplastics (HDPE # 2, PVC # 3, LDPE # 4, etc.).
  - .2 Flexural strength (as per ASTM D6109) = 2 810 psi
  - .3 Modulus of elasticity (according to ASTM D6109) = 139 500 psi
  - .4 Density (as per ASTM D6111) = 0.035 lb/cu-in

- .5 Water absorption (according to ASTM D1037) = <0.01%

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of structure/support previously installed under other Sections or Contracts are acceptable for decking installation in accordance with manufacturer's written instructions.
- .1 Visually inspect support in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 INSTALLATION**

- .1 Supply minimum of 1 bearing support for each plank except extend cantilevers over two supports. Install sloping deck with tongues up. Join butt ends with splines to assure tight square fit.
- .2 Stagger end joints in adjacent planks minimum of 0.5 m.
- .1 Separate joints in same area by at least 2 intervening courses.
- .2 Avoid joints in first fifth of end spans.
- .3 Minimize joints in middle third of span.

#### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

#### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by wood decking installation.

**END OF SECTION**

**Part 1            General information**

**1.1               RELATED SECTIONS**

- .1       Section 01 33 00 – Submittal Procedures
- .2       Section 01 74 21 – Construction/demolition waste management and disposal.

**1.2               REFERENCES**

- .1       American Society for Testing and Materials International, (ASTM)
  - .1       ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

**1.3               SHOP DRAWINGS**

- .1       Submit required shop drawings in compliance with section 01 33 00 - Documents and samples to be submitted.
- .2       Drawings must show the construction and assembly details, profiles, attachments and other related details.
- .3       Drawings must specify the materials, finishes, thicknesses and hardware parts.

**1.4               DELIVERY, STORAGE AND HANDLING**

- .1       Transport, store and handle material and materials in compliance with section 01 61 00 – Common product requirements.
- .2       Protect materials against humidity and damages during and after delivery.

**1.5               WASTE MANAGEMENT AND DISPOSAL**

- .1       Sort and recycle waste in compliance with section 01 74 21 – Construction/demolition waste management and disposal.

**Part 2            Products**

**2.1               MATERIALS**

- .1       Recycled plastic decking
  - .1       The product shall be made from 100 recycled thermoplastics (HDPE # 2, PVC # 3, LDPE # 4, etc.).
  - .2       Flexural strength (as per ASTM D6109) = 2 810 psi
  - .3       Modulus of elasticity (according to ASTM D6109) = 139 500 psi
  - .4       Density (as per ASTM D6111) = 0.035 lb/cu-in

- .5 Water absorption (according to ASTM D1037) = <0.01%
- .2 Lag screw: made of galvanized steel, type and size appropriate for the application, in compliance with standard ASTM A-307.

### **Part 3 Execution**

#### **3.1 IMPLEMENTATION**

- .1 Install sheathing, level and in alignment, at all locations specified in drawings.
- .2 Solidly affix and anchor sheathing as specified on the plans.
- .3 Each piece will be secured to longitudinal using 19 Ø x 150 mm galvanized lag screw at each intersection.
- .4 Work must be done with precision and be level, true and in alignment, at all locations specified in drawings.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures
- .2        Section 32 11 23 – Aggregate Base Courses

**1.2                REFERENCES**

- .1        Government of Quebec, Department of Transports
  - .1            Cahier des charges et devis généraux (CCDG)
- .2        American Society for Testing and Materials (ASTM)
  - .1            ASTM D4791-05, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
- .3        ASTM International
  - .1            ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

**1.3                SUBMITTALS**

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

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and section 01 61 00 - Common Product Requirements.
- .2        Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3        Storage: store washed materials or materials excavated from underwater minimum 24 hours to allow free water to drain and for materials to attain uniform water content.

**Part 2            Product**

**2.1                MATERIALS**

- .1        Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2        Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1            Greatest dimension to exceed five (5) times least dimension.



- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1 Natural sand.
  - .2 Manufactured sand.
  - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel [and crushed gravel] composed of naturally formed particles of stone.
  - .3 Light weight aggregate, including slag and expanded shale.
  - .4 Reclaimed asphalt pavement.
  - .5 Reclaimed concrete material.

## **2.2 SOURCE QUALITY CONTROL**

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

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Aggregate source preparation
  - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
  - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
  - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
  - .4 When excavation is completed, dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
  - .5 Trim off and dress slopes of waste material piles and leave site in neat condition.

- .2 Processing
  - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
  - .2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
    - .1 Use methods and equipment approved in writing by Departmental Representative.
- .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
  - .1 Use only equipment approved in writing by Departmental Representative.
- .5 Stockpiling
  - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
  - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
  - .3 Stockpiling sites to be levelled, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
  - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
  - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.
  - .7 Stockpile materials in uniform layers of thickness as follows:
    - .1 Maximum 1.5 m for coarse aggregate and base course materials.
    - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
    - .3 Maximum 1.5 m for other materials.
  - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
  - .9 Do not cone piles or spill material over edges of piles.
  - .10 Do not use conveying stackers.
  - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

### **3.2 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials in accordance with 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .7 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

**END OF SECTION**

## **Part 1            General**

### **1.1            RELATED SECTIONS**

- .1    Section 01 33 00 - Submittal Procedures
- .2    Section 01 35 29 - Health and Safety Requirements
- .3    Section 01 35 43 - Environmental Procedures
- .4    Section 01 56 00 - Temporary Barriers and Enclosures
- .5    Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .6    Section 31 32 19 - Geotextiles

### **1.2            REFERENCES**

- .1    American Society for Testing and Materials International (ASTM)
  - .1    ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2    ASTM C 127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
  - .3    ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4    ASTM C 535, Standard Test Method for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .5    ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
  - .6    ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> ; ) (600 kN-m/m<sup>3</sup> ; ).
  - .7    ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> ) (2,700 kN-m/m<sup>3</sup> ).
  - .8    ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2    U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1    EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .3    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-8.2-M, Sieves, Testing, Woven Wire, Metric.
- .4    Canadian Standards Association (CSA International)
  - .1    CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1    CSA-A3001, Cementitious Materials for Use in Concrete.

- .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

### 1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
- .1 Rock: solid material in excess of 1.00 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material not classified as rock.
- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
- .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
- .1 Weak, chemically unstable, and compressible materials.
- .2 Frost susceptible materials:
- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136 : Sieve sizes to CAN/CGSB-8.2.
- .2 Table:
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 2.00 mm           | 100       |
| 0.10 mm           | 45 - 100  |
| 0.02 mm           | 10 - 80   |
| 0.005 mm          | 0 - 45    |
- .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
  - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
  - .2 Submit for review by Departmental Representative proposed heave prevention dewatering methods as described in PART 3 of this Section.
  - .3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
  - .4 Submit to Departmental Representative written notice when bottom of excavation is reached.
  - .5 Submit to Departmental Representative testing, inspection results and report as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
  - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .4 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

## **1.5 QUALITY ASSURANCE**

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .1 Do not use soil material until written report of soil test results are approved by Departmental Representative.
- .2 Engage services of qualified professional Engineer who is registered or licensed in the province of Québec, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
- .3 Health and Safety Requirements:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert excess materials from landfill to local quarry for reuse as directed by Departmental Representative.

## **1.7 EXISTING CONDITIONS**

- .1 Buried services:
  - .1 Before commencing work establish location of buried services on and adjacent to site.
  - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

- .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
- .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .5 Prior to beginning excavation Work, notify applicable authorities having jurisdiction and Departmental Representative establish location and state of use of buried utilities and structures. Departmental Representative and authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
- .6 Confirm locations of buried utilities by careful test excavations.
- .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
- .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Departmental Representative.
- .9 Record location of maintained, re-routed and abandoned underground lines.
- .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
  - .3 Protect existing works according to the section 01 56 00.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Hard, durable, abrasion-resistant material which will not disintegrate under wave action or wet-dry, freeze-thaw cycles, wet dry cycle and to Departmental Representative.
  - .1 Relative density (formerly specific gravity): not less than 2 600 kg/m<sup>3</sup>, to ASTM C 127.
  - .2 Absorption: maximum of 2.0%, to ASTM C 127.
  - .3 Test of aggregate degradation in a magnesium sulfate solution (MgSO<sub>4</sub>): maximum loss of 10% after 7 cycles to BNQ 2560-450.
- .2 Fill material for trench in accordance with the following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations within limits specified when tested to ASTM C117, ASTM C136. Sieve sizes to CAN/CGSB-8.2 and Cahier des charges et devis généraux (CCDG) from Government of Quebec.

.3 Fill material Table

Sieve Designation	% Passing				Sieved Quarry-run
	20-0mm	56-0mm	80-0 mm	112-0mm	
300 mm	-	-	-	-	80 - 90
250 mm	-	-	-	-	-
150 mm	-	-		100	40 - 60
112 mm	-	-	100	-	
80 mm	-	100	80-100		-
56 mm	-	82-100	60-85	-	10 - 25
31.5 mm	100	55-85	35-60	-	-
20 mm	90 - 100	-	-	-	-
14 mm	68-93	-	23-45	-	-
10 mm	-	-	-	-	5 -15
5 mm	35 - 60	25 - 50	12-29	22 - 85	-
1.25 mm	19 - 38	11-30	5-17	-	-
0.315 mm	9-17	4-18	1-10	5 - 30	-
0.08 mm	2 - 7	2 -7	0-10	0 - 10	-

- .3 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .4 Class A aggregate material: clean sand.
- .5 Geotextiles: to Section 31 32 19 - Geotextiles.

**Part 3 Execution**

**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**3.2 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.



- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

### **3.3 PREPARATION/PROTECTION**

- .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

### **3.4 STOCKPILING**

- .1 Stockpile fill materials in areas designated by Departmental Representative
  - .1 Stockpile fill materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

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

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29 - Health and Safety Requirements and Health and Safety Act for the Province of Quebec.
  - .1 Where conditions are unstable, Departmental Representative has to verify and advise methods. Contractor is responsible for methods to protect and maintain in same condition structures to preserve.
- .2 If required, Construct temporary Works to depths, heights and locations as indicated or directed by Departmental Representative.
- .3 During backfill operation:
  - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
  - .2 Pull sheeting in increments that will ensure compacted backfill is maintained.

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

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative's review details of proposed dewatering or heave prevention methods.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

- .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures in manner not detrimental to public and private property, or portion of Work completed or under construction.
- .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .6 Provide flocculation tanks, settling basins, or other facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

### **3.7 EXCAVATION**

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Make saw cuts to delineate the excavation trenches.
- .4 Remove concrete, paving and other obstructions encountered during excavation in accordance with Section 02 41 16 – Structure demolition.
- .5 Excavation must not interfere with bearing capacity of adjacent foundations.
- .6 For trench excavation, unless Departmental Representative has given his written authorization, do not excavate more than 30 m of trench before proceeding to the installation of the elements to bury, and do not leave open more than 15 m at the end of a work day.
- .7 Keep excavated and stockpiled materials at a safe distance away from edge of trench as directed by Departmental Representative.
- .8 Restrict vehicle operations directly adjacent to open trenches.
- .9 Dispose of surplus and unsuitable excavated material off site.
- .10 Do not obstruct flow of surface drainage or natural watercourses.
- .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .12 Notify Departmental Representative when bottom of excavation is reached.
- .13 Obtain Departmental Representative's approval for completed excavations.
- .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .15 Correct unauthorized over-excavation as follows:
  - .1 Use unshrinkable fill under supporting surfaces.
  - .2 Fill under bearing surfaces and footings with fill approved by Departmental Representative compacted not less than 95 % of corrected Standard Proctor maximum dry density.

- .16 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .17 Install geotextiles in accordance with Section 31 32 19 - Geotextiles.

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

- .1 Use fill materials as indicated. Compaction densities are not less than 95% of maximum densities obtained from corrected maximum dry density or as indicated on plan.

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

- .1 Place and compact granular material for bedding and surround of underground services as indicated and as specified by Departmental Representative or authority having jurisdiction.
- .2 Place bedding and surround material in unfrozen condition.

### **3.10 BACKFILLING**

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Departmental Representative has inspected and approved installations.
  - .2 Departmental Representative has inspected and approved of construction below finish grade.
  - .3 Inspection, testing, approval, and recording location of underground utilities.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.
    - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
- .6 Place fill with reused materials in areas as indicated.

**3.11 RESTORATION**

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Reinstate pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .3 Clean and reinstate areas affected by Work as directed by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       Section 01 33 00 - Submittal Procedures
- .2       Section 01 74 21 - Construction/Demolition Waste Management And Disposal
- .3       Section 31 23 33 – Excavating, trenching and backfilling

**1.2               REFERENCES**

- .1       American Society for Testing and Materials International, (ASTM)
  - .1       ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - .2       ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
  - .3       ASTM D4716, Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
  - .4       ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2       Canadian General Standards Board (CGSB)
  - .1       CAN/CGSB-4.2 No. 11.2-M, Textile Test Methods - Bursting Strength - Ball Burst Test.
  - .2       CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
    - .1       No.2-M, Methods of Testing Geosynthetics - Mass per Unit Area.
    - .2       No.3-M, Methods of Testing Geosynthetics - Thickness of Geotextiles.
    - .3       No.6.1, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
    - .4       No.7.3, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
    - .5       No. 10, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .3       Canadian Standards Association (CSA International)
  - .1       CAN/CSA-G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2       CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.

**1.3               SUBMITTALS**

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

- .2 Submit to Departmental Representative following samples at least 2 weeks prior to beginning Work.

- .1 At least 300 x 300 mm of geotextile.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

#### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 MATERIAL**

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
  - .1 Composed of: minimum 85% by mass of polypropylene.
- .2 Physical properties:
  - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 2.5 mm.
  - .2 Tensile strength and elongation (in any principal direction): to CAN/CGSB-148-1 No.7.3.
    - .1 Tensile strength: minimum 1 000 N, wet condition.
    - .2 Elongation at break: 70-110 %
  - .3 Bursting strength: to CAN/CGSB-148.1, No.6.1 minimum 2 600 kPa, wet condition.
- .3 Hydraulic properties:
  - .1 Filtration opening size (FOS): to CAN/CGSB-148.1 No.10, 55 to 105 micrometers.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m<sup>2</sup>.
- .5 Factory seams: sewn in accordance with manufacturer's recommendations.
- .6 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

### **Part 3 Execution**

#### **3.1 INSTALLATION**

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position.

- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip above water level and 1 000 below water level.
- .5 Pin successive strips of geotextile with securing pins.
- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 After installation, cover with overlying layer within 24 hours of placement.
- .8 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .9 Place and compact soil layers in accordance with Section 31 23 33– Excavating, Trenching and Backfilling and section 32 11 23 – Aggregate Base Courses

### **3.2 CLEANING**

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

### **3.3 PROTECTION**

- .1 Vehicular traffic not permitted directly on geotextile.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 01 35 43 - Environmental Procedures
- .2    Section 01 74 21 - Construction/Demolition Waste Management And Disposal
- .3    Section 31 05 16 - Aggregate Materials
- .4    Section 31 32 19 - Geotextile

**1.2            REFERENCES**

- .1    American Society for Testing and Materials (ASTM)
  - .1    ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2    ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3    ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4    ASTM D422-63, Standard Test Method for Particle-Size Analysis of Soils.
  - .5    ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .6    ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
  - .7    ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .2    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
  - .2    CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3    Government of Quebec: Department of Transports
  - .1    Cahier des charges et devis généraux (CCDG).

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    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 31 05 16 - Aggregate Materials and Section 01 61 00 - Common Product Requirements
- .2    Storage and Handling Requirements:
  - .1    Stockpile minimum 50% of total aggregate required prior to beginning operation.



- .2 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Crushed, pit run or screened stone, gravel or quarry-run.
- .1 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
- .2 Table 20-0 mm
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 31.5 mm           | 100       |
| 20 mm             | 90-100    |
| 14 mm             | 68-93     |
| 5 mm              | 35-60     |
| 1.25 mm           | 19-38     |
| 0.315 mm          | 9-17      |
| 0.080 mm          | 2-7       |
- .3 Table 80-0 mm
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 112 mm            | 100       |
| 80 mm             | 80-100    |
| 56 mm             | 60-85     |
| 31.5 mm           | 35-60     |
| 14 mm             | 23-45     |
| 5 mm              | 12-29     |
| 1.25 mm           | 5-17      |
| 0.315 mm          | 1-10      |
| 0.080 mm          | 0-10      |
- .4 Other Properties as follows:
- .1 Los Angeles degradation: to ASTM C131. Max% Loss by mass: 50.
- .2 In accordance with "Cahier des charges et devis généraux (CCDG), Department of transports, Government of Quebec".

### **2.2 QUALITY CONTROL**

- .1 Departmental Representative has the right to sample and proceed with tests mentioned in the present specifications on reserve aggregates. If the afore-mentioned tests show non-compliance of materials, Departmental Representative will refuse materials.
- .2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

- .3 Concerned reserve aggregate is accepted when all specifications requirements are met.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.2 PLACEMENT AND INSTALLATION**

- .1 Place granular base after sub-base surface is inspected and approved in writing by Departmental Representative.
- .2 Placing:
  - .1 Construct granular base to depth and grade in areas indicated.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on clean unfrozen surface, free from snow and ice.
  - .4 Begin spreading base material on crown line or on high side of one-way slope.
  - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
  - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
  - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
    - .1 Departmental Representative may authorize thicker lifts(layers) if specified compaction can be achieved.
  - .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
  - .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
  - .1 Ensure compaction equipment is capable of obtaining required material densities.
  - .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.

- .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compacting:
  - .1 Compact to density not less than 90% maximum dry density to ASTM D698.
  - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
  - .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
  - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 Proof rolling:
  - .1 Obtain written approval from Departmental Representative to use non-standard proof rolling equipment.
  - .2 Proof roll at level in granular base as indicated.
    - .1 If use of non-standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.
  - .3 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
  - .4 Where proof rolling reveals areas of defective subgrade:
    - .1 Remove base, sub-base and subgrade material to depth and extent as directed by Departmental Representative.
    - .2 Backfill excavated subgrade with sub-base material and compact.
    - .3 Replace sub-base material and compact
    - .4 Replace base material and compact in accordance with this Section.
  - .5 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new.

### **3.3 SITE TOLERANCES**

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

- .2 Divert unused granular material from landfill to local quarry-facility approved by Departmental Representative.

### **3.5 PROTECTION**

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 11 00 – Description of Work
- .2        Section 01 74 21 – Construction/Demolition Waste Management
- .3        Section 02 41 16 – Structure Demolition

**1.2                PRICE AND PAYMENT PROCEDURES**

- .1        Only material excavated above required level and within side slopes indicated or specified will be measured.
- .2        Operations in connection with field positioning of dredging equipment will not be measured separately for payment.
- .3        No separate payment will be made for Contractor's survey vessel, equipment and crew or diving services.
- .4        Payment will include disposal of dredge material, at locations specified.
- .5        No additional payment for delays during periods when no dredging is permitted.
- .6        No additional payment for downtime and for delays caused by vessel traffic.
- .7        Removal of infilling material will not be measured for payment.
- .8        No separate payment will be made for sweeping.
- .9        Obstructions:
  - .1        Removal of obstructions, authorized by Departmental Representative, will be measured in hours actually used in removal.
  - .2        Dredging equipment used for removal of obstructions will be paid for at rate negotiated in advance and authorized in writing Departmental Representative.

**1.3                REFERENCES**

- .1        Laws and regulations of the federal government of Canada.
  - .1        Canadian Environmental Protection Act (CEPA).
  - .2        Canadian Environmental Assessment Act (CEAA).
  - .3        Transportation of Dangerous Goods Act (TDGA).

**1.4                DEFINITIONS**

- .1        Dredging: excavating, transporting and disposing of underwater materials.
- .2        Class A material: solid rock requiring drilling and blasting or using hydraulic hammer (tramac), and boulders or rock fragments of individual volumes 1.5 m<sup>3</sup> or more.
- .3        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 m<sup>3</sup> ; .
- .4        Obstructions: material other than class A, having individual volumes of 1.5 m<sup>3</sup> or more.
- .5        Debris: pieces of wood, wire rope, scrap steel, pieces of concrete and other waste materials.

- .6 Grade: plane above which material is to be dredged.
- .7 m<sup>3</sup>mp: volume of material in place in m<sup>3</sup>.
- .8 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.
- .9 Chart Datum: permanently established plane from which soundings or tide heights are referenced, usually Lowest Normal Tide (LNT).
- .10 Co-ordinates systems:
  - .1 Universal Transverse Mercator Projection (UTM)
  - .2 Modified Transverse Mercator Projection (MTM) Co-ordinates: plane rectangular coordinates used in grid system in which grid network is applied to MTM. Co-ordinates are the horizontal control information.
- .11 Matrix Block: each dredge area is presented as number of 2 x 2 m long blocks. Dependent on position of sounding, block may have soundings contained within it.
- .12 Least of Minimum Plan: hydrographic survey plan in which least sounding in grouping of matrix blocks is plotted.
- .13 Certificate of Completion: letter or memorandum delivered to the Contractor by Departmental Representative stating that the dredging is completed.
- .14 Estimated Quantity
  - .1 Unless otherwise indicated, volume of material located above the bottom layer, including the material to be removed to form prescribed side slopes.
  - .2 Unless otherwise indicated, area of material located above the required depth level and within dredging work, measured horizontally and in square meters.
- .15 Hydraulic Dredging Plant: equipment that uses the movement of water to excavate and transport underwater materials such as cutter suction dredger, suction dredger or trailing suction hopper dredger.
- .16 Measurements:
  - .1 CPM: cubic metres place measurement at dredging site.
  - .2 CMSM: cubic metres scow measurement.
  - .3 SQM: area in square metres projected on horizontal plane.
- .17 Mechanical Dredging Plant: equipment comprising of the following: clamshell, dragline, dipper or backhoe dredge with dump scows.
- .18 Mechanical Sweep: clearing dredged areas to grade depth using a mechanical device
- .19 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.
- .20 Sub-grade: plane parallel to and [300] mm below grade.
- .21 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 ADMINISTRATIVE REQUIREMENTS**

- .1 Navigation co-ordination:
  - .1 Perform Work in accordance with the Collision Regulations do not obstruct navigation during progress of Work.
  - .2 Observe vessel movements and fishery activities in area affected by dredging operations including movement of vessels at adjacent wharves.
  - .3 Plan and execute Work in manner that will not interfere with fishing operations, marina operations, construction activities at wharf sites, or access to wharves by land or water.
  - .4 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.
  - .5 Keep Watchkeeper Operations Centre, District Manager, Canadian Coast Guard (CCG), Fisheries and Oceans, informed of dredging operations in order that necessary Notices to Mariners will be issued.
  - .6 Make arrangements with CCG to relocate and replace buoys for execution of work. Advise nearest Coast Guard Base of any requirements to relocate channel markers/buoys within dredging area.
  - .7 Arrange operations to minimize interference with users.
  - .8 Maintain a minimum 30 m clear width of channel for passage of recreational boaters at all times. Provide and locate necessary buoys or markers to indicate temporary channel for passage.
- .2 Scheduling:
  - .1 Adhere to schedule and take immediate action to correct any slippage by effectively altering existing dredging operations or mobilizing other equipment. Notify Departmental Representative of corrective action to be taken.

## **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 A sediment control curtain shall be installed during dredging of exclusion zones.

## **1.7 QUALITY ASSURANCE**

- .1 Regulatory agency sustainability approvals:
  - .1 Comply with municipal, provincial and national codes and regulations relating to project.
  - .2 Mark floating equipment with lights in accordance with requirements Collision Regulations.

## **1.8 FLOATING EQUIPMENT**

- .1 The Contractor shall supply and maintain all dredging equipment with sufficient capacity to excavate, load, transport and dispose of all materials mentioned in the specification, taking into account settling of materials and excess dredged materials as applicable. All equipment used to execute the dredging contract shall be at all times satisfactory to the Departmental Representative.
- .2 If while the work is being carried out, the equipment provided is not, in the opinion of the Departmental Representative, suitable and sufficient for performing the work properly,

the Contractor shall, within 15 days following receipt of written notice from the Departmental Representative, provide other equipment subject to prior approval by the Departmental Representative.

- .3 Regulatory agency sustainability approvals:
  - .1 Comply with municipal, provincial and national codes and regulations relating to project.
  - .2 Mark floating equipment with lights in accordance with Regulations for the Prevention of Collisions.

## **1.9 ENVIRONMENTAL PROTECTION**

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

## **1.10 REGULATORY REQUIREMENTS**

- .1 Works shall comply with all federal, provincial and municipal laws. The strictest regulations shall apply in the event of any conflict or contradiction.

## **1.11 ELEVATION**

- .1 All elevation indicated in specifications or on plans refers to chart datum.

## **1.12 SITE CONDITIONS**

- .1 Contractor shall visit and inspect work site and become thoroughly familiar with extent and nature of Work and conditions affecting Work before tendering.
- .2 Results of prior soundings and geotechnical investigations are on drawings. Drawings of existing wharves are also included. It should be noted that this information may differ from site condition. Take this into consideration when submitting tender.
- .3 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area. There will be no additional payment for time lost due to weather conditions.

## **1.13 MATERIAL TO BE DREDGED**

- .1 **The material to be dredged is composed of Class B (superficial deposits and sediments) and Class A (rock). The quantities shown on the slip are approximate.**
- .2 **For information, the top of superficial deposit is composed of sand and the rock is a friable red sandstone or conglomerat.**

## **1.14 QUANTITY OF MATERIAL TO BE DREDGED**

- .1 S/O

## **1.15 SITE CONDITIONS**

- .1 Contractor shall visit and inspect work site and become thoroughly familiar with extent and nature of Work and conditions affecting Work before tendering.
- .2 Material to be dredged consists of Class A and B material.
- .3 Results of prior soundings are made available for tendering purposes only. It should be noted that this information may differ from site condition. Take this into consideration when submitting tender.



- .4 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.
- .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 UTM 2.5 x 2.5m grid to approval of Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIAL AND DREDGING EQUIPMENT**

- .1 The equipment and heavy machinery must be operated in a manner that meets or exceeds the requirements of all applicable fume standards.
- .2 Stop the machines immediately after use, unless extreme temperatures require uninterrupted operation.
- .3 The rock shall be excavated using a hydraulic jackhammer. Blasting is prohibited.
- .4 Sounding equipment shall achieve multibeam surveys with a stitch density of a meter.

### **2.2 BEDROCK DESCRIPTION**

- .1 Red sandstone or conglomerate

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Surveys and acceptance of work:
  - .1 As soon as practical after Contract award, Departmental Representative will complete pre-dredge survey of dredge area locations. Survey will be by electronic survey equipment sounding in instantaneous mode. Survey plan at 1:500 scale plotting average of instantaneous depths obtained in this survey will define actual pre-dredge seabed areas.
  - .2 No area will be dredged prior Departmental Representative's and Contractor's mutual acceptance of pre-dredge survey for that area.
  - .3 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. Survey will be by electronic sweep equipment. Survey plan at 1:500 plotting least of minimum depths obtained in this survey will identify areas requiring reworking to obtain following elevations using least of minimum mode
  - .4 Contractor to redredge as necessary to remove all material within dredge areas which is found to be above specified grade.
  - .5 One additional survey will be undertaken at Departmental Representative's cost, for those areas not meeting acceptance criteria for dredging. Additional surveys required to clear areas will be undertaken by Departmental Representative at Contractor's cost.

- .6 Departmental Representative will take average of instantaneous soundings simultaneously with least of minimum soundings.

### 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, offsets to channel limits co-ordinate system with reference control monuments] and vertical control consisting of water level gauge, and benchmark to define Work and disposal 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 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  $\pm 1$  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 water level gauge 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 Establish and maintain additional temporary targets, markers and buoys for location and definition of designated dredge area limits as required. Remove on completion of work.

### 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 work and disposal areas.
- .3 Lay out Work from bench marks ranges and base lines established by Departmental Representative. Be responsible for accuracy of Work relative to established bench marks and baseline ranges. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.
- .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 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 0.3 metres.

- .8 Remove spillage or shoaling which occurs as result of Work at no expense to Departmental Representative.
- .9 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.
- .10 Remove infilling in dredge areas which occurs prior to acceptance by Departmental Representative.
- .11 Immediately notify Departmental Representative upon encountering object which might be classified as obstruction. By-pass objects after clearly marking its location and continue Work.

### **3.4 SOUNDING SURVEYS**

- .1 Contract drawings are based on latest soundings taken by Departmental Representative. Contract quantity shown on Unit Price Table are based on this survey.
- .2 Pre-dredging and post dredging sounding survey will be taken by Departmental Representative.
- .3 No area will be dredged prior to Departmental Representative's and Contractor's mutual acceptance of pre-dredge survey for that area.
- .4 Departmental Representative will conduct post dredging survey of dredging site at no cost to Contractor. Subsequent surveys as a result of finding high spots or incomplete dredging will be done at Contractor's.
- .5 Results of pre and post dredging surveys will be distributed to Contractor by Departmental Representative upon completion of the work.
- .6 Contractor will be notified of post dredging survey results within 4 working days of survey completion and given subsequent release if successfully fulfilled requirements of Work.
- .7 Final pay quantity will be calculated on basis of pre and post dredging surveys carried out by Departmental Representative.

### **3.5 DISPOSAL OF DREDGED MATERIALS**

- .1 Sea disposal
  - .1 Dispose of dredged material by depositing in designated disposal site and in manner approved by Departmental Representative.
  - .2 Departmental Representative will define disposal site. Supply and install additional markers/buoys necessary for guiding vessels to disposal site. Maintain markers and buoys for duration of contract. Remove markers and buoys upon notification by Departmental Representative that disposal site has been surveyed and meets requirements.
  - .3 Maintain minimum depth of water. Sweep disposal site area to confirm minimum depth. Departmental Representative will survey disposal site to confirm minimum depth requirement has been achieved.
  - .4 Deposit dredged material evenly throughout entire disposal site. Do not concentrate in one area.
- .2 On-Land Disposal

- .1 Dispose of dredged material by depositing in fill disposal area. Restrict disposal activities to those areas indicated. Limits of disposal to be verified on site prior to start of work.
- .2 Fill disposal area to elevation indicated by Departmental Representative. Do not overtop perimeter dykes.
- .3 Ensure scows are sealed and do not leak dredged material during transportation between dredging site and transfer area of containment facility. If spillage or leakage of dredged material occurs, stop work until remedial measures are taken.
- .4 Do not bottom dump loaded scows use methods using trucks.
- .5 Truck boxes to be tightly closed to prevent spillage of material during transit. Clean up spillage as directed and take necessary action to prevent reoccurrence.
- .6 Do not permit dredged material to spill or flow into waterways during disposal of dredged material activities.
- .7 Provide drainage ditch alongside inner edge of dyke upon completion of contract. Grade site and drainage ditch to provide positive surface drainage towards open water areas.
- .8 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.

### **3.6 DISPOSAL OF DEBRIS**

- .1 Do not dispose of debris in open lakes or streams.
- .2 Dispose of debris in containment facility identified or at approved land disposal site.

### **3.7 DREDGING IN VICINITY OF STRUCTURES**

- .1 Take all necessary precautions to protect existing structures located in the vicinity of the work. Any damage to such structures shall be repaired at the Contractor's expense.
- .2 Since dredging and rock excavation are near the existing wharf that is to be maintained, the Contractor shall take the necessary precautions to avoid any accidents and any damage to property. The Contractor shall obtain and provide all necessary insurance policies to this effect.

### **3.8 SWEEPING AND ACCEPTANCE OF WORK**

- .1 On completion of dredging Contractor will conduct in presence of Departmental Representative a mechanical sweep of dredged areas to confirm that grade depth has been achieved. Provide details of sweep system including horizontal and vertical control methods within 15 days after contract award.
- .2 Sweeping equipment to consist of heavy steel beam suspended from a barge at required depth. Beam to be capable of adjustment and calibration.
- .3 Upon successful completion of mechanical sweep as determined by Departmental Representative provided that no high spots were encountered, the Departmental Representative will conduct a post dredging survey.
- .4 Provide a minimum of 48 hours notice to Departmental Representative for commencement of mechanical sweeping of site.
- .5 Post dredging sounding survey takes precedence over mechanical sweep for pay quantity purposes.

### **3.9 RE-DREDGING**

- .1 Re-dredge unsatisfactory work and verify depths with additional sounding or mechanical sweeping to approval of Departmental Representative.

### **3.10 SITE QUALITY CONTROL**

- .1 Site test and inspections:
  - .1 Co-operate with Departmental Representative on inspection of Work and provide assistance requested.
  - .2 Upon request of Departmental, furnish use of such boats, equipment, labour and materials forming ordinary and usual part of dredging plant as may be reasonably necessary to inspect and supervise Work. Volume of material transported in partially filled scows will be determined by .
  - .3 Sweep dredged areas on completion of dredging to confirm that grade depth has been achieved.
  - .4 Sweeping equipment to consist of heavy steel beam suspended from scow at required grade depth. Beam to be capable of adjustment and calibration and approved by Departmental Representative.
- .2 Non-conforming work:
  - .1 If, as result of incomplete Work, additional verification of depths by sounding or sweeping becomes necessary, additional costs involved shall be paid by Contractor.
  - .2 Re-dredge unsatisfactory Work and verify depths with additional sounding or sweeping to approval of Departmental Representative.

### **3.11 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling/reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  - .2 Recyclable materials removed during the dredging activities must be diverted appropriate recycling facilities.
  - .3 Dispose of dredged material by depositing in disposal areas indicated in manner approved by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1      Section 01 33 00 - Submittal Procedures.
- .2      Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

**1.2            MEASUREMENT AND PAYMENT**

- .1      Mobilization/demobilization of equipment will not be measured for payment.
- .2      Construction and maintenance of haul roads will not be measured for payment.

**1.3            REFERENCES**

- .1      American Society for Testing and Materials (ASTM)
  - .1      ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - .2      ASTM C117, Standard Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .3      ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
  - .4      ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .5      ASTM C535-e1 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- .2      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-8.1, Sieves, Testing, Woven Wire.
  - .2      CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

**1.4            SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Shop Drawings:
  - .1      Submit drawings stamped and signed by professional engineer registered or licensed in Québec, Canada.
- .3      Samples
  - .1      Inform Departmental Representative of proposed source of materials and provide access for sampling at least [3] weeks prior to commencing Work.
- .4      Handling:
  - .1      Submit for review by Departmental Representative proposed method of handling existing stone. Submission to cover phases of handling from removal to final position at breakwater.

- .2 Submit for review by Departmental Representative proposed method of handling precast concrete armour units. Submission to cover phases of handling from removal to final position at breakwater.
- .5 At least 4 weeks prior to commencing work, Submit work schedule for approval by Departmental Representative.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Replace defective or damaged materials with new.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 **Contractor shall use the 200 dolosse provided by DFO and recover existing dolosse from breakwater to repair the breakwater head.**
- .2 All the stones shall comply with the entire range of requirements herein set forth. The Departmental Representative may, at any time during construction and throughout the project, refuse materials at the source or the worksite if they do not meet requirements. Materials delivered to the worksite and rejected either in a stockpile or after placement in the work, shall be removed at Contractor's expense.
- .3 In this project, the control plan and QC & QA activities shall systematically apply throughout both the quarrying and construction phases.

### **2.2 STONE SOURCES**

- .1 If, as construction activities unfold, the Contractor is unable to provide acceptable stones in sufficient quantities from the original supply source, he may request an authorisation to use another source. All the expenses resulting from a change in the supply sources, including the required sampling and testing, shall be at Contractor's expense. In addition, no extension of the execution date set for this contract will be allowed.

### **2.3 MATERIALS**

- .1 Rock materials:
  - .1 Stone shall be a rough broken stone from a quarry.
  - .2 The use of conglomerate and sandstone is accepted if in accordance with Specifications.
  - .3 The use of shale or slate and round stone is not accepted in any part of the work.

- .4 All stone shall be highly resistant to weathering, deterioration and disintegration under freeze-thaw cycles and exposure to water, and of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used.
- .5 Stone shall be a rough broken stone from a quarry. Stone shall be durable, sound and free of cracks, seams and other defects that would tend to increase deterioration from natural causes or result in breakage during handling and/or placement.
- .6 Inclusions of dirt, sand, clay, shale, of quartz or mica, pegmatite, oil or oil-stained stones, rock fines or any organic or other deleterious material will not be permitted.
- .7 Maximum petrographic Number: 130.
- .8 All stones of each category to be used shall be evenly distributed into each stone class indicated in specifications.
- .9 Categories of stone to supply
  - .1 Armour and filter stone
    - .1 1 @ 2 mt.
    - .2 300 @ 500 kg.
- .2 Stone sampling and testing method
  - .1 References concerning testing methods are listed above in Section 1.3 - References
  - .2 Stone samples used in laboratory tests shall be typical of the lithologic unit of each category of stone proposed for use in the work of this project.

## 2.4 TRIALS

- .1 At least three (3) weeks prior to stone production start-up, Contractor shall notify Departmental Representative of proposed source of materials.
- .2 A minimum of two (2) weeks is included in this three (3) weeks period for laboratory tests.
- .3 The Departmental Representative may require other tests during the execution of the work.
- .4 The Department Representative will be responsible for the cost of laboratory trials, otherwise trial shall show non-conformance.
- .5 Stone samples to be submitted at any time for laboratory testing shall be taken in the presence of the Departmental Representative or of a representative of the designated laboratory.
- .6 Contractor shall submit report of stone delivered on worksite.
- .7 **Stone from the Magdalen Islands will be accepted if DFO's dolosse, imported stone and existing stone and dolosse are not sufficient to finish Work.**



**Tableau 1 – Required stone quality testing – Methods and acceptance criteria**

Test name	Test method	Acceptance criteria Imported Stone
<b>Field observations / Visual Inspection / Assessment</b>		
Field examination <sup>1</sup>	ASTM D4992-07	No conglomerates No delirious materials; good to excellent quality for intended use
Petrographic examination <sup>2</sup>	ASTM C295-03	No delirious materials; good to excellent quality for intended use
Watering grade	Visual	1A – fresh, unweathered rock 1B – faintly weathered rock (staining on major discontinuity surfaces)
<b>Laboratory testing</b>		
Bulk specific gravity, SSD	ASTM C127-07	≥2.65
Water absorption <sup>3</sup>	ASTM C127-07	≤0.5%
Water resistance micro-Deval <sup>4</sup>	ASTM D6928-06	≤15%
MgSO4 Soundness	ASTM C88-05	≤1.5% loss after 5 cycles

Notes:

1 The field examination shall include the preparation of a written report that includes a summary of the quarry and proposed quarry development plan as per ASTM D4992-07, including : general lithology, geologic unit and age, source homogeneity, stratigraphic faces; metamorphic and weathering phases; dip, strike and thickness of the bedding; proposed blasting procedure and expected curing time.

2 Petrographic examinations shall be repeated before AND after the MgSO4 soundness testing.  
Petrographic examination shall be summarized in a written report that includes the presence of micro-fractures and/or signs of induced stress (and therefore possible stress release – ref. paragraph 3.2) that may be of concern for the proposed use.

3 Water absorption test shall be repeated on five (5) different pieces of rock.

4 Wear resistance test shall be repeated on two (2) different pieces of rock

## 2.5 STONE SORTING

- .1 Pilot stones indicating the limits of stone size will be weighed and placed near worksite to ease the selection of stone.

## 2.6 TOLERANCE ON WEIGHT AND SHAPE OF STONES

- .1 At least 90% in weight of stones of a category placed in structure shall be comprises between weight limits of the category.
- .2 No more than 5% in weight of stones of a category, shall weight between 0.75 to 1 time the minimal weight required for that category.
- .3 All stone weighting less than 0.75 time the minimal weight or more than 1.25 the maximum weight of the category will be refused, deduced from quantity and transported out of worksite. Fees for transport of refused stone will be to Contractor responsibility.
- .4 Stones of a category have to be uniformly divided into size in all breakwater, in order to avoid creating sections of breakwater with concentration of the same size of stone inside a given category.

## **2.7 STONE GRADATION AND SHAPE**

- .1 The methods used for production, transportation and placement must be adjusted to the needs in order to ensure that the materials placed in the final stage are within the prescribe range for weight. Stones must therefore undergo gradation testing and shall not display discontinuities or defects in their individual size ranges.
  - .1 For gradation testing, a random sample of stones must be collected weighing at least 25 times the average weight of stones in the category. Each individual stone in the sample shall be measured over three (3) mutually perpendicular axes. The dimensional ratio and the weight of each stone shall be estimated using the unit weight of the type of rock at hand per unit of volume measured and shall be recorded in a table.
  - .2 In addition, the weight of the whole sample shall be measured. This information is used to produce a “correction factor” to adjust the estimated weight of stones with regard to their actual weight. Each stone in the sample may also be weighed individually. With this data, a gradation chart can be established for the sample.
  - .3 Although it is required that an adequate spreading over the entire range of sizes be obtained each category, at least 50% of the stones – in numbers, shall be heavier than the average weight of the stones.
  - .4 Stones shall display an angular or blocky shape with a maximum 3/1 dimensional ratio (1/d).
  - .5 In each category, only ten percent (10%) of the stones – in numbers, may display a dimensional ratio in excess of 2,5/1.
  - .6 Stones with a dimension ratio comprised between 2.5 and 3.0 shall never be placed flat or under water level.
  - .7 Stones with a dimension ratio over 3 will be refused.

## **2.8 THEORICAL QUANTITIES**

- .1 In order to guide the Contractor in the quantities preparation of his tender, the Department Representative estimates the quantities of each stone category. All considering recovery of stone in demolition work.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Haul roads: construct and maintain haul roads.
- .2 If required, install traffic lights on floating equipment in accordance with international regulations, and maintain on board a radio operator system.
- .3 Install and keep in good state buoys, direction signs, bench marks and traffic lights used to delimit work site.
- .4 Stake and maintain the work based on the proper reference and control points provided by the Departmental Representative. The Contractor shall be responsible for the accuracy of the work in relation to proper reference points, control points and baselines. Obtain written permission from the Departmental Representative before establishing reference points or placing markers on private property and pay all rental fees arising from this practice. If

necessary, repair any damage to private property to the satisfaction of the Departmental Representative and pay all costs arising from this work. Provide all additional control points (over and above those indicated) necessary for the proper execution of operations. Throughout the project, ensure that all control points remain in good condition.

- .5 If necessary, install and maintain in good condition the landmarks used to locate and define the boundaries of designated work areas. The benchmarks used must be appropriate to control work and bathymetric survey operations. Provide the labour and equipment needed for the construction of these benchmarks. Remove the benchmarks once the work is completed.

### **3.2 QUALITY CONTROL DURING PRODUCTION**

- .1 The Contractor shall carry out Quality Control activities throughout the stone production and placement period as required in this section and in section 01 45 00 – Quality control.
- .2 The weighing of stones, or their re-measurement, shall be carried out to ascertain the calculated weight either when the Departmental Representative questions the size of stones or when the inspector deems it appropriate.
- .3 Drop tests shall be carried out when the Departmental Representative questions the quality or integrity of stones or when the inspector deems it appropriate. Drop tests shall be carried out as follows:
  - .1 Visual inspection of the stone on all sides; marking/recording of all existing cracks;
  - .2 Lift the stone to 3 m and drop it onto a rigid surface (bedrock or stone of similar size);
  - .3 Visual inspection of the stone on all sides to identify existing and/or developing cracks;
  - .4 Repeat at least three times as directed by the Departmental Representative;
  - .5 The stone is acceptable for the intended purpose if existing cracks have not open and no new cracks have developed.
- .4 The Contractor is notified that adverse weather conditions (rain, snow, ice, frost and mud) may hide or conceal defects that would otherwise have been identified. Winter conditions may postpone the required inspection of stones until the next Spring. Stones shall not be shipped to the worksite before their inspection.
- .5 Except where gradation tolerances allow it, any broken or cracked stone, stones that do not meet gradation standards and stones that are not correctly placed in the structure shall be removed and replaced with satisfactory stones. This corrective measure is at Contractor's expense. Rejected materials shall be removed from the worksite without delay. Such materials are excluded from measurement and payment.

### **3.3 TRANSPORT AND TEMPORARY STORAGE**

- .1 The Contractor shall take charge of the transportation and storage of the stones and ensure that stockpiles are not contaminated with dirt or other substances; he shall also inhibit size segregation of stockpiled material.

- .2 The Contractor shall implement measures to prevent introduction of invasive alien species in accordance with Section 01 35 43 – Environmental Procedures
- .3 The storage of stones after shipment from the quarry and before permanent placement into the structure shall be submitted to the Departmental Representative for approval.
- .4 Underwater storage of stones is not authorized.

### **3.4 MEASUREMENT OF STONE**

- .1 All stone materials shall be measured for payment by metric ton unit (1 000 kilograms), for material acceptably placed in the work according to certified scale tickets as follows and Section 01 11 11 – Description of Works:
  - .1 The Contractor shall proceed to the installation and the certification of an electronic weigh scale at the barge leading site(s) before shipping the stones. Weigh scale shall be of register type and have a sufficient size and capacity to weigh the stone and their means of transportation. The size of weight scale shall allow the receiving of all the wheels of the means of transportation used by the Contractor or the subcontractor.
  - .2 The Contractor shall supply each day to the Departmental Representative scale ticket copies for all stones delivered on site, separated by category.

### **3.5 TERMINOLOGY**

- .1 In the description of the stone construction, one must refer to the survey control line (CL) and the neat lines. The following definitions shall apply to those items:
  - .1 Survey control line (CL) – Line shown on the contract drawings to which all breakwater surveys shall be referenced;
  - .2 Neat lines – Solid lines shown on the contact drawings which depict the limits of the various types of stone materials. Tolerances for the placement of the stones described in this section are perpendicular to these neat lines.
  - .3 The word “ton” (t) refers to the metric ton (1 m.t. = 1000 kg).

### **3.6 RUBBLE MOUND**

- .1 The Contractor is free to choose the construction process. However, he shall be held responsible for any damage caused during construction and shall make good the work at his own expense and to the Departmental Representative's satisfaction. It would be preferable for the Contractor to place armour stone as work progresses.
- .2 The Contractor shall use suitable equipment to place the stones in the correct location and on the grades and slopes shown on drawings. He shall replace any badly placed stones at his own expense.
- .3 Before placing the stone, ask Departmental Representative to check alignments.
- .4 Discharge of armour stone will not be allowed. Place each armour material, stone by stone, starting from the bottom of slope and so that stone is stable and in contact with all adjacent stones.

### 3.7 CORE STONE

- .1 Place core material to lines, grades and dimensions as indicated. Use dredged material, crushed concrete or quarry-run as indicated on drawings.

### 3.8 ARMOUR AND FILTER STONE

- .1 Place armour stones and filter stones to lines, grades and dimensions as indicated.
- .2 Place armour stone in courses to total layer thickness as indicated on drawings.
- .3 Place each stone or dolosse in stable position.
- .4 Place stone to obtain an optimal stability and criss-cross action.

### 3.9 DEFORMATION

- .1 In case of deformation of any part of the work during construction or after construction but before acceptance, the Contractor shall remove the displaced materials and rebuild this portion of the structure using either new materials or the displaced materials if deemed appropriate.
- .2 Stone placement prior to the installation of the outer protection shall be at Contractor's own risk.

### 3.10 TOLERANCES

- .1 Surfaces obtained shall not deviate from the lines and grades indicated on the contract drawings in a range of plus or minus the tolerances indicated below. Tolerances are measured perpendicularly to the indicated neat lines.
- .2 Extreme limits of the tolerances given below shall not be continuous in any given direction over five (5) times the average dimension of a stone and/or over more than ten square metres of structure surface area.
- .3 Any section of a stone course built to the upper tolerance limit shall not be in the immediate vicinity of a section built to the lower limit and vice-versa. In other words, transitions between tolerance limits shall be smooth.

MATERIAL	ABOVE CHART DATUM	BELOW CHART DATUM
Armour stone	40 cm	50 cm
Filter stone	25 cm	30 cm
Quarry-run	20 cm	20 cm

- .4 In addition to the above-indicated perpendicular tolerances with reference to the slope, the horizontal position of every break in grade of finished stone courses shall be less than 60 cm to the indications on drawings. The variation shall not be systematic in one way or the other. Lines, arcs and curves lines shall be continuous and smooth, without visible deflection, bends or kinks.
- .5 The above tolerances aim at ensuring that the work is constructed to the required heights, slopes and levels. Placed material that would not meet these requirements shall be removed or reworked as directed by the Departmental Representative.

### **3.11 CIRCULATION ON THE BREAKWATER**

- .1 n/a

### **3.12 DEBRIS**

- .1 Unless otherwise indicated by the Departmental Representative, all the timbers, the unsatisfactory materials and the debris within the construction zone shall be removed and become the Contractor's property. All the materials shall be disposed of as required in sections 01 35 43 – Environmental Protection and 01 14 00 – Work restrictions.

### **3.13 TURBIDITY CONTROL**

- .1 The Contractor shall control stone placement in such way to minimize water turbidity. Contractor operations shall comply with the requirements of Sections 01 35 43 Environmental Protection and 01 14 00 – Work restrictions.

### **3.14 CLEANING**

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

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 01 33 00 – Submittals procedures
- .2        Section 01 61 00 – Common Product Requirements

**1.2            REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2        CAN/CSA O80, Wood preservation.
  - .3        CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
  - .4        CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .5        CSA W59, Welded Steel Construction (Metal Arc Welding) [Metric].

**1.3            SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Provide shop drawings or data sheets of floating dock components:
  - .1        Anchor blocks
  - .2        Aluminum Gangway to modify

**1.4            SHOP DRAWINGS**

- .1        Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Erection drawings: indicate details and information necessary for assembly and erection purposes including:
  - .1        Methods description.
  - .2        Sequence of erection.
  - .3        Type of equipment used in erection.
  - .4        Modification of existing gangway**

**1.5            QUALITY CONTROL**

- .1        Remove defective or deemed non-compliant with the contract documents and rejected by the Departmental Representative, either because they were not conducted according to the rules of the art, either because they were made of materials or defective products, even if they have already been included in structure. Replace or repair components as required by the contract documents.

**1.6            TRANSPORTING, STORING AND HANDLING**

- .1        Packing, Shipping, Handling and Unloading:

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 – Basic Product Requirements.
- .2 Handle steel pieces so as to avoid permanent deformations.
- .3 Handle with care steel pieces that have received a special coating.
- .2 Storage and Protection:
  - .1 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel:
  - .1 All steel parts must be galvanized in compliance with standards ASTM A123/123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Production.
    - .1 Galvanize the various parts in accordance with the following rates:
      - .1 Bolts and nuts: 460 g/m2;
      - .2 Section, plates and rods: 705 g/m2
  - .2 All mechanical bolts, lag screw, nails shall be galvanized, medium grade steel in accordance with ASTM A-307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - .3 Machine bolts, lag screw and drift bolt will have forged heads.
- .2 Aluminum Gangway to modify
  - .1 All items that are part of the gangway shall be designed and built in accordance with codes and standards, including CAN/CSA-S157/S157.1- Strength Design in Aluminum.
  - .2 **Modification of gangway of floating docks includes but is not limited to:**
    - .1 **Recovery and reinstallation of transition plates, guardrails, pivot and other structural components.**
    - .2 **Cutting gangway over a bracing to obtain the required length of around 8 900 mm.**

### **2.2 MANUFACTURE**

- .1 Where possible, works to be adjusted and built in shop, and delivered ready to fix.

## **Part 3 Execution**

### **3.1 FLOATING DOCKS INSTALLATION**

- .1 Install floating docks in accordance with the required dimensions and as shown on details, to create configurations as shown on drawings.



**3.2 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspections:
  - .1 Provide Departmental Representative with minimum of 10 days notice of date of beginning Work on floating docks and provide access to Work for inspection.
  - .2 Final inspection of floating docks will be made in place.

**3.3 CLEANING**

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

**END OF SECTION**