

The enclosed drawings (plans) listed hereunder form part of the documents referred to as "Plans and Specifications" and marked in the Articles of Agreement and consists of the following:

Public Services and Procurement Canada
Wood Islands Ferry Terminal Infrastructure Rehabilitation - Phase 3
Wood Islands, PEI
Project No. R.101745.001

<u>Drawing No.</u>	<u>Title</u>
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S02	West Berth East Wall Existing Conditions, Removals & Repairs
S03	East Berth East Wall Existing Conditions & Removals
S04	East Berth East Wall Concrete Copewall Repairs
S05	East Berth East Wall Concrete Copewall Repair Sections & Details
S06	Outer East Dolphin Existing Conditions & Repairs
S07	Inner East Dolphin Repair Plan, Elevations & Sections
S08	Centre Dolphin Plan & Elevation
S09	Bollard and Water Box Removals & Repairs
S10	Miscellaneous Sections & Details

----- END OF SECTION-----

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| <u>1.1 Documents
Required</u> | .1 | Maintain at job site, one copy each of the following: <ul style="list-style-type: none">.1 Contract drawings;.2 Specifications;.3 Addenda;.4 Reviewed shop drawings/submissions;.5 Change Orders;.6 Other modifications to Contract;.7 Field test reports;.8 Copy of approved work schedule;.9 Manufacturer's installation and application instructions. |
| <u>1.2 Site
Conditions</u> | .1 | Records of existing geotechnical reports may be available for inspection at the offices of Public Works and Government Services Canada, 161 St. Peter's Road, Charlottetown, PEI. This material is not necessarily up-to-date and is for information purposes only. It should be complemented with site visits and consultation with appropriate expertise. |
| <u>1.3 Work Schedule
and Completion
Dates</u> | .1 | Prepare and submit to the Departmental Representative with five (5) days of notification of Contract award, one (1) copy of the construction schedule, in the form of a bar chart, showing the dates for commencement and completion of each major activity of the work, including the work of subcontractors; dates of submissions, review and return of all drawings, etc.; the dates of Substantial Completion; and intended man hours of labour and equipment for each major items of work. If the schedule as submitted is unacceptable in any way, submit without delay a revised schedule satisfactory to the Departmental Representative. |
| | .3 | The Departmental Representative is to notify the Contractor in writing of acceptance of the Construction Schedule. Comply with the Construction Schedule at all times. If, for any reason the Construction Schedule is not followed, immediately notify the Departmental Representative of the changes and submit a revised schedule for acceptance. Upon written acceptance by the Departmental Representative, this schedule will become the Construction Schedule. |

- .4 Whenever required, give further written particulars concerning this schedule. The submission to and acceptance by the Departmental Representative of the Contractor's Construction Schedule or the furnishing of details and particulars thereto will not relieve the Contractor of any duties and responsibilities under the Contract.
- 1.4 Measurement Responsibilities .1 Notify Departmental Representative sufficiently in advance of operations to permit required measurements for payment purposes.
- 1.5 Contractor's Use of Site .1 This Site will be partially occupied by the Owner and there will be other contractors on site. Cooperate with Northumberland Ferries Ltd., ferry personnel and other contractors. All work taking place will be coordinated and agreed to so that there will be minimal impact to the daily ongoing activities of the adjacent Department of Fisheries (DFO) harbor and normal ferry operations.
- .2 Provide terminal staff continual access to dolphins and piers at the facility. This work will require the provision of safe access through the construction area to the eastern dolphins for the ferry operator stevedore/shore personnel. Supply, install and maintain any necessary walkways, railings or other structures to permit such safe access for ferry operations staff, all in accordance with applicable codes and Occupational Health and Safety standards.
- .3 Coordinate work and use of site with other contractors and do not obstruct their work.
- .4 Should interferences occur, take directions from Departmental Representative.
- .5 Do not unreasonably encumber site with materials or equipment.

- .6 Move stored products or equipment which interfere with operations of Departmental Representative or other Contractors.
- .7 Obtain and pay for use of additional storage or work areas needed for operations.
- .8 Comply with all regulations and authorities having jurisdiction over the work, whether on land or on water.
- .9 Do not allow damage to occur to existing structures as a result of operations. Repair any said damage at no additional expense to the Contract.
- .10 Provide temporary barriers and warning signs in locations where work is adjacent to areas used by public or ferry personnel.
- .11 Cooperate with the Ferry Operator, other contractors and the users of the existing facilities. All work taking place will be coordinated and agreed to so that there will be a minimum impact to the ongoing operations of the ferry system.

1.6 Codes and
Standards

- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements will apply.
- .2 Meet or exceed requirements of specified standards, codes and referenced documents. When a standard or code is outdated, the latest edition will supersede the referenced date.
- .3 Observe and enforce construction safety measures by Canadian Construction Safety Code and Construction Safety Code of Prince Edward Island. In the event of conflict between any provisions of above authorities, the most stringent provision will apply.

1.7 Project Meeting

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

1.8 Setting Out of Work

- .1 Do all detail surveys necessary for the work, including locating and maintaining working points, and establishing lines and elevations. Perform all layout work, and carefully preserve benchmarks, reference points and stakes.
- .2 Provide such masts, scaffolds, batter boards, lines, straight edges, templates and other devices as may be necessary to facilitate layout, construction and inspection of the work. Whenever necessary, suspend work for such reasonable time as may be necessary to permit the Departmental Representative to check or inspect any portion of the work. The contractor will not be allowed any extra compensation or time for completion because of this suspension of work.
- .3 Elevations for the various features of the specified works to be referenced and properly related to a benchmark, which will be approved by the Departmental Representative.
- .4 Verify all grades, lines, levels, and dimensions shown on the drawings and report any errors or inconsistencies to the Departmental Representative before commencing work. Establish all grades, lines, levels required to facilitate the work.
- .5 Where new work ties into existing structures, the size, dimension and elevation of the existing structure is to be verified before work commences.

1.9 Existing Services

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.

- .2 Before commencing work, establish location and extent of service lines in area of work and notify Department Representative of findings.
 - .3 Submit schedule to and obtain acceptance from Departmental Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
 - .4 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.
- 1.10 Contract Documents
- .1 Contract Drawings:
 - .1 The drawings listed in these "Plans and Specifications" marked "A" and any additional drawings issued at a later date by the Departmental Representative.
 - .2 Departmental Representative may furnish additional drawings to assist in proper execution of work. These drawings will be issued for clarification only. Such drawings will have same meaning and intent as if they were included with plans referred to in Contract Documents.
 - .3 The drawings indicate the extent and general dimensions of the work. Make all necessary measurements to ensure that the result of the work is in accordance with the intent.
 - .4 Verify all existing conditions in field prior to proceeding with work.
 - .2 Contract Specifications:
 - .1 The general requirements and technical specifications are written solely for the General Contractor. They are organized into the NMS format of separate divisions and sections.
 - .2 Specification language is the "Short Form Type", for example, where the word "provide" occurs, interpret it to mean "the Contractor shall furnish all labour, material and equipment necessary to complete the work".

.3 These Specifications and accompanying drawings are intended to describe and provide for a finished project. They are intended to be complementary, and what is called for by either will be as binding as if called for by both. The Contractor shall understand that the work herein described will be complete in every detail, notwithstanding that every item necessarily involved is not particularly mentioned, and Contractor will be held to provide all labour, materials and equipment necessary for the entire completion of the work and will not avail himself of any errors or omissions.

1.11 Permits and
Regulations

.1 Apply for, obtain and pay for all necessary permits, approvals and other authorizations required for the work.

.2 Comply with all by-laws, ordinances and regulations of all authorities having jurisdiction.

.3 Pay for any Municipal permits at no additional expense to the contract.

1.12 Cutting, Fitting
& Patching

.1 Execute cutting (including excavation), fitting and patching required to make work fit properly.

.2 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

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

.4 Obtain Departmental Representative's approval before cutting, boring or sleeving, or excavating adjacent to load-bearing members.

1.13 Record of
Construction

.1 As work progresses, maintain accurate records to show all deviations from the contract drawings, with particular reference to work which will be concealed. Prior to the inspection of the work for the issuance

of the Final Certificate of Completion, provide the Departmental Representative with one set of white prints of the drawings with all deviations shown neatly thereon.

1.14 Payment

- .2 Provide "as built" cross sections of any excavation, dredging or fill work.
- .1 See Section 01 29 00 for work item payment breakdown.
- .2 No separate payment will be made for work specified under General Conditions, Supplementary Conditions or any sections of Specification under Division 01. The cost of this work is to be considered as overhead and to be included in the unit prices of the Contract.
- .3 Dimensional changes are directed by the Departmental Representative to suit existing conditions, but not resulting in additional work or materials, will not be considered as extra to the Contract.

1.15 Site Examination

- .1 All parties tendering should visit the site of the work prior to submission of tenders and make themselves thoroughly acquainted with site conditions, conditions of existing objects to be removed, tides, degree of exposure and all information necessary for the proper carrying out of the work covered by the drawings and this Specification. Submission of Tender will be deemed that Contractor is conversant with site conditions. Department Representative must be notified prior to the site visit(s).
- .2 The Departmental Representative will give no consideration whatsoever to any claim by the Contractor resulting from Failure to have made all the necessary investigations prior to tendering.
- .3 Advise the Canadian Coast Guard, Marine Communication & Traffic Services (MCTS) Sydney at 902-564-7751 or toll free at 1-800-686-8676 sufficiently in advance of commencement of work or deploying or removing site markings in order to allow for appropriate notice to shipping/mariners.

- .4 Any material or equipment used in construction will be marked in accordance to the "Collisions Regulations" of the Canadian Shipping Act 2001" when located in the waterway.
- 1.16 Maintenance of Shipping
- .1 Liaise with the local port officials to coordinate activities such that any interference is minimized.
- 1.17 Cooperation and Assistance to Departmental Representative
- .2 Provide assistance when requested.
- .3 Provide small motorboat with operator for Departmental Representative's use when requested.
- 1.18 Datum
- .1 The datum referred to in this Specification is Chart Datum. Chart Datum is, by International Agreement a plan below which the tide will seldom fall. The Canadian Hydrographic Service has adopted the plane of the lowest normal tide (L.N.T.) as Chart Datum. As the rise, fall and range of tides varies daily, the Canadian Tide and Current Tables, as issued by the Canadian Hydrographic Service, should be consulted for tidal predictions and other tidal information relating to work.
- 1.19 Contractor's Representative
- .1 Continuously maintain on the site an authorized representative to whom communication may be addressed and who will be competent to speak for the Contractor in discussing work methods.
- 1.20 Workers' Compensation
- .1 Contractor and all sub-contractors must be registered under the Workers Compensation Act and provide evidence of good standing.
- .2 At completion of Contract and before final payment is made, the Contractor will present to the Departmental Representative a Letter of Certification from the Workers Compensation Board, showing that all

required assessments are paid in connection with all trades.

1.21 <u>Laws, Standards Taxes and Fees</u>	.1	Comply with all laws and standards governing all or any part of the work, pay all applicable taxes and pay for all permits and certificates required in respect of the execution of the work. Where variances exist between the requirements of agencies governing all or any part of the work, the most restrictive will govern, but in no instance will the standards established by the drawings and this Specification, which exceed such requirements, be reduced.
1.22 <u>Protection and Repair</u>	.1	Repair any damage resulting from operations under this contract.
1.23 <u>Location Fixtures</u>	.1	Location of equipment, fixtures or any Equipment appurtenances indicated are to be considered approximate.
1.24 <u>Inspection and Testing</u>	.1	The Departmental Representative may employ an Inspector and/or Testing Company to confirm work conforms with the specifications and drawings.
1.25 <u>Disposal of Debris</u>	.1	Dispose of debris, including construction materials not incorporated in the work, oil products and containers and other materials of this nature, in suitable locations off the site.
	.2	Material from the work will not be permitted to go adrift or otherwise become a menace to navigation.
1.26 <u>Existing Soils Conditions</u>	.1	Any information pertaining to soils and all boreholes logs are furnished by the Departmental Representative as a matter of general information only and borehole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those described by the boreholes themselves.
1.27 <u>Relics and Antiquities</u>	.1	Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative

plaques, inscribed tablets, and similar objects found during course of work.

- .2 Give immediate notice to Departmental Representative and await written instructions before proceeding with work in this area
- .3 Relics, antiquities and items of historical or scientific interest remain Departmental Representative's property.

1.28 Temporary
Navigational Buoys

- .1 Maintain temporary navigation light to mark the position of the outer end of the structure as construction proceeds. Navigation light is to meet the requirements of Canadian Coast Guard Standard TP968 and be equipped with radar reflectors.
- .2 During construction, mark the construction area with yellow cautionary buoy(s) to be placed 20 m from the seaward end of construction area in order to identify the location of ongoing work and will carry the following:
 - a) Radar reflector
 - b) 2nm amber light displaying characteristics (F1) 4S from dusk to dawn and during periods of reduced visibility.
- .3 Coordinate the navigation light installation with the local Harbour Authority.
- .4 Cover all costs associated with the supply, installation and removal of all temporary navigation light.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Scope of Work
- .1 The work involves the rehabilitation of ferry terminal infrastructure at the Wood Islands facility in Prince Edward Island. The work can be broken into six (6) separate work items. The work includes, but is not limited to:
- .1 West Berth, East Wall:
- .1 Remove loose or delaminated concrete in the areas indicated on the contract drawings.
- .2 Saw cut the existing concrete cope wall to facilitate the new concrete repair.
- .3 Install reinforcing dowels and/or steel channels to existing concrete or steel sheet piling to provide anchorage for the new concrete cope wall repair.
- .4 Install a reinforced concrete cope wall to the elevations as shown on the contract drawings.
- .5 Removal of existing waterbox and installation of new water box on center pier.
- .2 Center Dolphin:
- .1 Remove the existing tire fender systems. Fender systems (including chains, shackles and accessories) to be stored neatly on site at a location as specified by the owner.
- .2 Remove the top U-bolt support of tire fender system. U-bolts to be ground flush to the face of the existing cope wall.
- .3 Install of new hot dipped galvanized steel fender brackets complete with threaded rods and chemical adhesive at the same location as existing U-bolt, and at the elevations indicated on Contract Drawings.
- .4 Reinstate existing tire fender systems.
- .3 East Berth, East wall:
- .1 Remove the existing panel fender systems as noted on the contract drawings (including chains, brackets, and U-bolts). Fenders (including chains, shackles and accessories) are to be stored neatly on site at a location as specified by the Owner.

- .2 Install new connections to the existing wale at fifty-one (51) locations.
- .3 Install steel channel anchors to the existing steel sheet piling to provide anchorage for the new concrete cope wall.
- .4 Install reinforcing dowels into the existing concrete cope wall as shown on the contract drawings.
- .5 Install a reinforced concrete cope wall to the elevations as shown on the contract drawings.
- .6 Fabricate and install hot dip galvanized steel fender brackets at locations and elevations as shown on the contract drawings.
- .7 Reinstate of the existing panel fender systems and chains and shackles.
- .8 Remove loose and delaminated concrete as shown on the contract drawings on the end buttress of the east berth.
- .9 Install steel reinforcing dowels into the end buttress.
- .10 Install a reinforced concrete repair for the end buttress.
- .11 Removal of existing ladder on East Berth cope wall.
- .12 Fabrication, supply and installation of new ladder to be installed on east berth East face cope wall.
- .13 Removal of existing bollard adjacent to existing transfer ramp.
- .14 Installation of new reinforced concrete mooring block including embedded anchor bolts. 35-tonne bollard to be supplied and installed.
- .4 Inner East Dolphin:
 - .1 Remove loose and delaminated concrete within the damaged areas as shown on the contract drawings.
 - .2 Saw cut the perimeter of the existing damaged areas.
 - .3 Install a concrete repair to the damaged areas as shown on contract drawings.
 - .4 Remove the existing tire fender systems. Fender systems including chains, shackles and accessories to be stored neatly on site at a location as specified by the owner.

- .5 Remove the existing top U-bolt fender connections. U-bolts to be ground flush with the existing concrete cope wall.
- .6 Install new hot dip galvanized fender brackets at the same location as existing U-bolts and at the elevations as shown on Contract Documents.
- .7 Reinstate the existing tire fender systems.
- .5 Outer East Dolphin:
 - .1 Remove the existing tire fender systems. Tire fender systems including chains, shackles and accessories, to be stored neatly on site at a location as specified by the owner.
 - .2 Remove the existing navigational aid structure. Navigational aid to be stored on site for reinstatement.
 - .3 Remove the existing Aluminum gangway accessing the outer dolphin from the inner dolphin. Aluminum gangway to be stored on site for reinstatement.
 - .4 Remove and dispose of existing timber wheel guards, existing reinforced concrete slab and steel bollards complete with anchorage.
 - .5 Place granular fill to extents as shown on Contract Drawings.
 - .6 Construct a new reinforced concrete slab including wheel guards and 35.0 tonne bollards complete with anchorage. Bollard to be supplied by the owner.
 - .7 Install a new hot dipped galvanized steel railing on the reinforced concrete wheel guard, as shown on the contract drawings.
 - .8 Install new hot dipped galvanized steel equipment rack complete with anchorage.
 - .9 Reinstate the existing navigational aid.
 - .10 Install new hot dipped galvanized fender brackets to support tire fender systems. Brackets to be located at same plan location as existing and to the elevations shown on Contract Drawings.
 - .11 Reinstate the existing tire fender systems.

- .12 Reinstall the existing aluminum gangway. Anchorage of the gangway to match the existing anchorage detail.
- .13 Fabricate, supply and install new ladder support and reinstall existing chain ladders.

1.2 List of Drawings

.1 Drawing

<u>Number</u>	<u>Title</u>
S01	Existing Layout
S02	West Berth East Wall Existing Conditions, Removals & Repairs
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S10	Miscellaneous Sections & Details

1.3 General

.1

This section details the measurement method to be used for payment purposes. Incidental items covered in the various sections of the specification are to be allowed for in the pricing of each pay item. The work is broken into three separate work areas and will be measured and paid for based on these areas.

1.4 Measurement for Payment

- .1 Mobilization / Demobilization:
Unit of measurement: Lump Sum (LS)
Mobilization/ Demobilization consist of, but is not necessarily limited to, transport of equipment to and from the project site, temporary facilities, security, permits, preparation and implementation of health and safety

plan, environmental protection, site office, and all other items which are necessary to complete the work but not included in other unit price items. There will be no change in the price for mobilization and demobilization due to contract extensions. Mobilization and demobilization will each be considered 50% of the lump sum price provided by the contractor during tendering, as per the contract documents.

- .2 East Berth Fender Removals:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: disconnect and remove each existing complete fender system from the dock face and to transport it to a storage location on site at the Wood Islands terminal until needed for reinstatement, removal of the existing top U-bolt connections for the fender system, and removal of the existing steel fender brackets.

- .3 East Berth Fender Reinstatement:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: reinstate the complete fender system including fender panels, rubber elements, chains and shackles.

- .4 New 35 tonne Bollard and foundation:
Unit of Measurement: Each (Ea)

This item includes all labour, equipment and materials to: Form, supply and install reinforced concrete and reinforcing steel as indicated, including but not limited to the installation of embedded items such as but not limited to the anchor bolts for the bollard and incidentals necessary to complete the work. This item also includes all earthworks including excavation and material relocation on

site as directed by the Departmental Representative as well as the supply, placement and compaction of all engineered gravels and asphalt to lines and grades indicated.

- .5 Center Dolphin Fender Removals:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: disconnect and remove each existing complete tire fender system from the dock face and to transport it to a storage location on site as the Wood Islands terminal until needed for reinstatement, and removal of the existing top U-bolt connections for the fender system.

- .6 Center Dolphin Fender Reinstatement:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment, and materials to: reinstate complete tire fender system to the positions shown on the contract drawings.

- .7 Inner East Dolphin Fender Removals:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: disconnect and remove each existing complete tire fender system from the dock face and to transport it to a storage location on site at the Wood Islands terminal until needed for reinstatement, and removal of the existing top U-bolt connections for the fender system.

- .8 Inner East Dolphin Fender Reinstatement:
Unit of measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: reinstate the complete tire fender system to the positions shown on the contract drawings.

- .9 Outer East Dolphin Removals:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: disconnect and remove each existing complete tire fender system from the dock face and to transport it to a storage location on site at the Wood Islands Terminal until needed for reinstatement, remove the existing top U-bolt connections for the fender system, remove and dispose of the existing 35 tonne bollard, remove and dispose of the existing reinforced concrete top slab , remove and dispose the existing timber wheel guards, remove existing navigation light to be stored on site until reinstated, remove the aluminum gangway to be stored on site until reinstated.

- .10 Outer East Dolphin Fender
Reinstatement:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: reinstate the complete tire fender system to the positions shown on the contract drawings.

- .11 Reinstatement of Navigation light and
Aluminum gangway:
Unit of Measurement: Lump Sum (LS)

This item includes all labour, equipment and materials to: reinstate the existing navigation light and reinstate the existing aluminum gangway between the inner and outer east dolphins with anchorage to match the existing.

- .12 New Guard Rail Outer East Dolphin:
Unit of measurement: LS

This item includes all labour, equipment and materials to: Fabricate, galvanize, supply and install a new

guard rail system to be installed at the locations shown on the drawings.

- .13 Install of 35.0 tonne bollard Outer East dolphin:
Unit of measurement: LS

This item includes all labour, equipment, and materials to: install anchor bolts within the slab to facilitate installation of the owner supplied 35 tonne bollard.

- .14 Removal and replacement of existing water box.

This item includes all labour equipment and materials to: disconnect existing water lines, excavation and removal of existing steel framed water box. This item also includes placement of clearstone, supply and installation of precast concrete catch pit risers, fabrication and installation of new stainless steel hatch assembly and backfilling compaction to lines indicated on drawings.

- .15 West Berth Concrete Cope wall repair:
Unit of Measurement: Square metre (m²)

This item includes all labour, equipment and materials to: remove any spalled concrete, prepare existing concrete surface for casting of new concrete, welding of steel anchored to existing steel sheet piling, form and cast reinforced concrete, including dowels, chemical adhesive, steel reinforcing and embedded items as required.

- .16 East Berth Steel Sheet Pile Repair:
Unit of measurement: Cubic Metre (m³)

This item includes all labour, equipment and materials to: prepare existing steel sheet pile surface for casting of new concrete, prepare existing concrete surface for casting

of new concrete, installation of new steel connections to the existing wale system, supply and install steel anchorage to existing steel sheet piling, form and cast reinforced concrete, including dowels, chemical adhesive, steel reinforcing and embedded items as required.

- .17 East Berth New Fender Brackets:
Unit of measurement: Each (Ea)

This item includes all labour, equipment, and materials to: Fabricate, galvanize, supply and install eight (8) fender brackets, thirty two (32) threaded rod anchors, eight (8) shackles, hole drilling for anchor rods and chemical adhesive to facilitate reinstatement of existing fenders on the east berth.

- .18 End Buttress Concrete Repairs:
Unit of Measurement: cubic metre (m³)
This item includes all labour, equipment and materials to: remove any spalled concrete, prepare existing concrete surface for casting of new concrete, form and cast reinforced concrete, including dowels, chemical adhesive, steel reinforcing and embedded items as required.

- .19 New Ladder and Holdfasts:
Unit of Measurement: Each (Ea)

This item includes all labour, equipment and materials to: Fabricate, galvanize, supply and install new ladder and holdfasts on the East Berth.

This item includes anchors and chemical adhesive anchoring systems required to facilitate installation.

- .20 New Fender Brackets Center Dolphin:
Unit of measurement: Each (Ea)

This item includes all labour and equipment, and materials to: Fabricate,

galvanize, supply and install fourteen (14) fender brackets, twenty-eight (28) threaded rod anchors, fourteen (14) shackles, hole drilling for anchor rods and chemical adhesive to facilitate the reinstatement of the existing tire fender system on the center dolphin.

- .21 New Fender Brackets Inner East Dolphin:
Unit of measure: Each (Ea)\

This item includes all labour, equipment, and materials to: Fabricate, galvanize, supply and install eight (8) fender brackets, thirty-two (32) anchor bolts, eight (8) shackles, hole drilling for anchor bolts and chemical adhesive to facilitate the reinstatement of the existing tire fender system on the center dolphin.

- .22 Concrete Cope wall Repairs Inner East Dolphin:
Unit of measurement: square metre (m²)

This item includes all labour, equipment and materials to: remove any spalled concrete, prepare existing concrete surface for casting of new concrete, form and cast reinforced concrete, including dowels, chemical adhesive, steel reinforcing and embedded items as required.

- .23 Granular Fill:
Unit of measurement: tonne (t)

This includes all labour, equipment and materials to: supply, place and compact granular fill materials to the lines and grades indicated within the outer east dolphin. Only loads certified by the Departmental Representative as being placed in the works at the required locations shall be included in measure for payment. The weight shall be computed in tonnes, rounded to one decimal place. Measurement for payment will only be made for those materials accepted for use under this

specification and then only when incorporated into the work at the required locations and thicknesses as indicated on the plans.

- .24 New Concrete Deck and Wheel Guard
(outer east dolphin):
Unit of Measurement: square metre (m²)

This item includes the supply and installation of cast-in-place concrete for the concrete deck and wheel guard complete with steel reinforcement, formwork, and all embedded items.

- .25 New fender brackets Outer east dolphin
Unit of measurement: Each (Ea)

This item includes all labour, equipment, and materials to: Fabricate, galvanize, supply and install thirteen (13) fender brackets, fifty-two (52) anchor bolts, thirteen (13) shackles, hole drilling for anchor rods and chemical adhesive to facilitate reinstatement of existing fenders on the outer East dolphin.

- .25 Reinstall existing chain ladders on outer East dolphin including standoff components.

This item includes fabrication, supply and installation of standoff components, supply and install of anchorage for ladder reinstatement onto new concrete slab.

- .27 New Ladder Standoffs
Unit of Measurement: each

This item includes all labour, equipment and materials to: fabricate, supply and install new ladder standoffs to existing chain ladder.

- .28 New Equipment/Navigation Light Stand

This item includes all labour equipment and materials to: fabricate, supply and

install a new galvanized stand to house existing navigation lights and rescue equipment including required anchorage and grouting, as shown on the Contract Drawings.

----- END OF SECTION -----

PART 1 - GENERAL

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| <u>1.1 General</u> | <ul style="list-style-type: none">.1 Submit to Departmental Representative, for review, shop drawings, product data, samples and other information specified..2 Until submission is reviewed, work involving relevant product may not proceed. |
| <u>1.2 Shop Drawings</u> | <ul style="list-style-type: none">.1 Drawings to be originals prepared by contractor, subcontractor, supplier or distributor, which illustrate appropriate portion of work, showing fabrication, layout, setting or erection details as specified in appropriate sections..2 Identify details by reference to sheet and detail numbers shown on Project Drawings..3 Maximum sheet size 860mm X 1120 mm. |
| <u>1.3 Product Data</u> | <ul style="list-style-type: none">.1 Certain specification sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance chart, illustrations and other standard descriptive data will be accepted in lieu of shop drawings. |
| <u>1.4 Samples</u> | <ul style="list-style-type: none">.1 Submit samples in sizes and quantities specified..2 Construct field samples and mock-ups at locations acceptable to Departmental Representative..3 Accepted samples will become standards of workmanship and material against which, installed work will be checked on project. |
| <u>1.5 Miscellaneous Data</u> | <ul style="list-style-type: none">.1 Provide certificates, methodologies, design and test results as required. |
| <u>1.6 Coordination of Submissions</u> | <ul style="list-style-type: none">.1 Review shop drawings, product data, samples and miscellaneous data prior to submissions..2 Verify:<ul style="list-style-type: none">.1 Field Measurements..2 Field Construction Criteria..3 Catalogue numbers and similar data. |

- .3 Coordinate each submission with requirements of work and contract documents. Individual submissions will not be reviewed until all related information is available.
 - .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
 - .5 Contractor's responsibility for deviations in submission from requirements in Contract documents is not relieved by Departmental Representative's review of submission, unless Departmental Representative gives written acceptance of specified deviations.
 - .6 Notify Departmental Representative, in writing at time of submission, of deviations from requirements of contract documents stating reasons for deviations.
 - .7 After Departmental Representative's review, distribute copies.
- 1.7 Submission Requirements
- .1 Schedule submissions at least 14 days before dates reviewed submissions will be needed.
 - .2 Submit number of opaque diazo copies of shop drawings, product data which Contractor requires for distribution, plus two (2) copies which will be retained by Departmental Representative. Provide one (1) electronic file in pdf file format for all submittals.
 - .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
 - .4 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:

- .1 Subcontractor.
- .2 Supplier.
- .3 Manufacturer.
- .4 Separate details when pertinent.

- .4 Identification of product or material.
- .5 Relation to adjacent structure or materials.
- .6 Field dimensions, clearly identified as such.
- .7 Specification Section Number.
- .8 Applicable standards such as CSA or CGSB numbers.
- .9 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with contract documents.

1.8 Shop Drawings
Review

- .1 The review of shop drawings by Public Works and Government Services Canada or its authorized Departmental Representative, is for the sole purpose of ascertaining conformance with the general concept. This review does not mean that Public Works and Government Services Canada approves the detail design inherent in the shop drawings, responsibility for which remains with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

1.9 Other Reviews

- .1 As for shop drawings above, other reviews are for the sole purpose of ascertaining the general concept.

-----END OF SECTION-----

PART 1 - GENERAL

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| <u>1.1 Section Includes</u> | <ul style="list-style-type: none">.1 Fire Safety Requirements..2 Hot Work Permit..3 Existing Fire Protection and Alarm Systems. |
| <u>1.2 Related Sections</u> | <ul style="list-style-type: none">.1 Section 01 35 29.06: Health and Safety Requirements.2 Section 01 35 25: Special Procedures on Lockout Requirements |
| <u>1.3 References</u> | <ul style="list-style-type: none">.1 National Fire Code, latest edition.2 National Building Code, latest edition.3 FCC No. 301-June 1982 Standard for Construction Operations.4 FCC No. 302-June 1982 Standard for Welding and Cutting |
| <u>1.4 Definitions</u> | <ul style="list-style-type: none">.1 Hot Work defined as:<ul style="list-style-type: none">.1 Welding work..2 Cutting of materials by use of torch or other open flame devices..3 Grinding with equipment which produces sparks. |
| <u>1.5 Submittals</u> | <ul style="list-style-type: none">.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid..2 Submit in accordance with section 01 33 00. |
| <u>1.6 Fire Safety Requirements</u> | <ul style="list-style-type: none">.1 Implement and follow fire safety measures during Work. Comply with following:<ul style="list-style-type: none">.1 National Fire Code, latest edition..2 National Building Code, latest edition..3 Fire Protection Standards FCC 301, Standard for welding and cutting as issued by the Fire Protection Services of Human Resources Development Canada..4 Federal and Provincial Occupational Health and Safety Acts and Regulations. |

- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.
- 1.7 Hot Work Authorization
 - .1 Obtain the Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site as may be required in the course of work.
 - .2 To obtain authorization submit to the Departmental Representative:
 - .1 Contractor's typewritten Hot Work Procedures to be followed on site, in accordance with Clause 1.8 below.
 - .2 Description of the type and frequency of Hot Work required.
 - .3 Sample Hot Work Permit to be used.
 - .3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, the Departmental Representative will give authorization to proceed as follows:
 - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
 - .4 Requirement for individual authorization will be based on:
 - .1 Nature or phasing of work;
 - .2 Risk to Facility operations;
 - .3 Quantity of various trades needing to perform hot work on project or;
 - .4 Other situation deemed necessary by the Departmental Representative to ensure fire safety on premises.
 - .5 Do not perform any Hot Work until receipt of the Departmental Representative's written "Authorization to Proceed" for that portion of work.

- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow the Departmental Representative's directives in this regard.

1.8 Conformance

- .1 Stringently follow Hot Work Procedures, as established for project and agreed upon with Department Representative. Enforce use and compliance by all workers.
- .2 Brief all workers and subcontractors on Hot Work Procedures and Permit system.
- .3 Failure to comply with the established Hot Work Procedures may result in the issuance of a Non-compliance Notification at Departmental Representative's direction with possible disciplinary measures imposed, as specified in Section 01 35 29.06 - Health and Safety Requirements.

1.9 Hot Work Procedures

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Describe safe work practices to be followed on site by Contractor and workers to minimize the potential occurrence of a fire resulting from Hot Work. Hot Work Procedures to include:
 - .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29.06.
 - .2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
 - .3 Permit required for each Hot Work event.
 - .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 30-60 minutes immediately following the completion of

- the Hot Work.
- .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
- .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label document as being the Hot Work Procedures for this contract.
- .4 Hot Work Procedures to be in type-written format, listing step-by-step procedures and worker instructions, clearly establishing and allocating responsibilities of:
 - .1 Worker(s),
 - .2 Designated person authorized to issue the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractor(s) and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.10 Hot Work Permit

- .1 Hot Work Permit to include the following:
 - .1 Project name and project number;
 - .2 Building name and specific room or area where hot work will be performed;
 - .3 Date of issue;
 - .4 Description of hot work type needed;
 - .5 Special precautions to be followed, including type of fire extinguisher needed;
 - .6 Name and signature of authorized person, designated by Contractor, to issue the permit.
 - .7 Name of worker(s), clearly printed, to which the permit is being issued.
 - .8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
 - .9 Worker's signature with time/date of hot work completion.
 - .10 Specified time period of safety watch.
 - .11 Fire Safety Watcher's signature with

time/date certifying that the surrounding area was under his/her continual watch and inspection for the minimum fire period specified in permit and commenced immediately upon the completion of Hot Work.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.11 Fire Protection
And Alarm Systems

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut-off, unless approved by Departmental Representative.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Costs incurred, from the fire department, Facility owner [and tenants], resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.12 Documents On Site

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

----- END OF SECTION -----

PART 1 - GENERAL

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|-----------------------------|----|---|
| <u>1.1 Section Includes</u> | .1 | Procedures to isolate and lockout electrical facility and other equipment from energy sources. |
| <u>1.2 Related Sections</u> | .1 | Section 01 35 29.06 - Health and Safety. |
| | .2 | Section 01 35 24 - Special Procedures of Fire Safety Requirements. |
| <u>1.3 References</u> | .1 | CSA C22.1-2018, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations. |
| | .2 | CAN/CSA-C22.3 No.1-15, Overhead Systems. |
| | .3 | CSA C22.3 No.7-15, Underground Systems. |
| | .4 | COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code. |
| <u>1.4 Definitions</u> | .1 | Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons. |
| | .2 | Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated. |
| | .3 | De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD). |
| | .4 | Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent |

or reduce danger to any person who might touch or go near such item.

- .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.5 Compliance Requirements

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
 - .1 Canadian Electrical Code.
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29.06 - Health and Safety Requirements.
 - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
 - .4 Procedures specified herein.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 Submittals

- .1 Submit copy of proposed Lockout Procedures and sample of lockout tags for review.
- .2 Submit documentation within seven (7) calendar days of contract award. Do not proceed with work until submittal has been reviewed by Departmental Representative.

- .3 Submit above documents, in accordance with the submittal-general requirements specified in Section 01 33 00.
 - .4 Resubmit Lockout Procedures with noted revisions as may result from Departmental Representative's review.
- 1.7 Isolation of Existing Services
- .1 Obtain the Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.
 - .2 To obtain authorization, submit to the Departmental Representative the following documentation:
 - .1 Written request to isolate the particular service or facility and;
 - .2 Copy of Contractor's Lockout Procedures.
 - .3 Make a Request for Isolation for each event, unless directed otherwise by the Departmental Representative, as follows:
 - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
 - .2 Where no form exist, make written request indicating:
 - .1 The equipment, system or service to be isolated and its location;
 - .2 Duration of isolation period (i.e.: start time & date and completion time & date).
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
 - .3 Document to be type-written format.
 - .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing to proceed with the

isolation of designated equipment or facility.

.1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.

.5 Conduct safe, orderly shutdown of equipment or facility, de-energize and isolate power and other sources of energy and lockout items, in accordance with requirements of Clause 1.8.

.6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

.7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.

.8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.06.

1.8 Lockouts

.1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.

.2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.

.3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.

- .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
 - .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
 - .2 Duties of person managing the permit system to include:
 - .1 Issuance of permits and lockout tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Making a Request for Isolation to Departmental Representative when required as specified above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated.
 - .7 Collecting and safekeeping lockout tags returned by workers as a record of the event.
- .5 Clearly establish, describe and allocate responsibilities of:
 - .1 Workers.
 - .2 Person managing the lockout permit system.
 - .3 Safety Watcher.
 - .4 Subcontractor(s) and General Contractor.
- .6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
 - .1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.
 - .2 Clearly label the document as being the Lockout procedures applicable to work of this contract.

- .7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .8 Use industry standard lockout tags.
- .9 Provide appropriate safety grounding and guards as required.

1.9 Conformance

- .1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.
- .2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.
- .3 Failure to perform lockout in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Departmental Representative's direction with possible disciplinary measures imposed as specified in Section 01 35 29.06 - Health and Safety Requirements.

1.10 Documents On-Site

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to the Departmental Representative or to authorized safety representative for inspection.

-----END OF SECTION-----

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 35 24: Special Procedures on Fire Safety Requirements.
- .2 Section 01 35 25: Special Procedures on Lockout Requirements.
- 1.2 References .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Province of Prince Edward Island
- .1 Occupational Health and Safety Act for Prince Edward Island, and Occupational Health and Safety Regulations made Pursuant to the Act.
- .3 National Building Code of Canada 2015
- 1.3 Definitions .1 Competent Person: means a person who is:
- .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
- .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
- .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .2 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .3 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

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| 1.4 | <u>Action and Informational Submittals</u> | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures. |
| | | .2 | Contractor will be required to include Health and Safety requirements to protect their workers and the project site. These must include a site specific Health and Safety Plan including precautions and mitigations related to the hazard of contracting and spreading of COVID-19 disease. |
| | | .3 | Submit site-specific Health and Safety Plan: Within 15 days after date of Notice to Proceed and prior to commencement of Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site. Health and Safety Plan must include: <ul style="list-style-type: none">.1 Results of site specific safety hazard assessment..2 Results of health and safety risk or hazard analysis for site tasks and operations..3 On-site Contingency and Emergency Response Plan..4 On-site Communication Plan..5 Name of Contractor's designated Health and Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company..6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes..7 Address all activities of the Work including those of subcontractors..8 Precautions and mitigations related to the hazard of contracting and spreading of COVID-19 disease. |
| | | .4 | Submit copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative. |
| | | .5 | Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors. |
| | | .6 | Submit copies of incident and accident reports. |
| | | .7 | Submit copies of Workplace Hazardous Materials Information System (WHMIS) Safety Data Sheets |

(SDS) for all products delivered to site to the Departmental Representative.

- .8 Submit copies of building permits, compliance certificates and other permits obtained.
- .9 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .10 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 10 days after receipt of comments from Departmental Representative.
- .11 Departmental Representative's review of Contractor's Health and Safety plan should not be construed as approval, be interpreted as a warranty of being complete, accurate and legislative compliant and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .12 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .13 On-site Contingency and Emergency Response Plan:
 - .1 Address standard operating procedures to be implemented during emergency situations.
 - .2 Evacuation Plan: site plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of firefighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
 - .4 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.

- .3 Local emergency resource organizations.
 - .4 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.
- .14 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.
- 1.5 Filing of Notice .1 File Notice of Project with Provincial authorities prior to beginning of Work.
 - .2 Upon request, Departmental Representative will assist in locating address if needed.
- 1.6 Safety Hazard Assessment .1 Perform site specific safety hazard assessments related to project.
 - .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site, a Change Order is issued or when a potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety representative.
 - .3 Record results and address in Health and Safety Plan.
- 1.7 Meetings .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work
 - .2 Designated Health & Safety Site Representative
 - .3 Subcontractors

- .2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
- .3 Keep documents on site.

1.8 Project/Site
and Conditions

- .1 The following are potential health, environmental safety hazards at the site for which Work may involve contact with:
 - .1 Existing hazardous substances or contaminated wharf materials:
 - .1 Creosote treated timber.
 - .2 Known latent site and environmental conditions:
 - .1 Wildlife activity.
 - .2 Water tidal action.
 - .3 Electrical.
 - .3 Facility on-going operations:
 - .1 Continued pedestrian use of facilities.
 - .2 Continued vehicular use of facilities.
 - .3 Continued vessel use of facilities.
 - .4 Vessel travel around area of Work.
- .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
- .3 Include above items in the hazard assessment of the Work.
- .4 WHMIS SDS data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.9 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 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
- .3 Post copy of the Health and Safety Plan, and updates, prominently on Work Site.

- .4 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
 - .5 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task. Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
 - .6 Ensure that workers, subcontractors and other authorized persons granted access to site are trained and have been fully instructed by a competent instructor, on:
 - .1 Safe operation of tools and equipment.
 - .2 Proper wearing and use of personal protective equipment (PPE) as applicable to the purpose and activities to be conducted on site.
 - .3 Safe work practices and procedures to be followed during the performance of their given work tasks or function on site.
 - .4 Site conditions and minimum site safety rules provided through site orientation sessions.
 - .7 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss incident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
- 1.10 Responsibility
- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
 - .2 Control the Work and entry points to Work Site. Approve and grant access only to workers and

authorized persons. Immediately stop and remove non-authorized persons.

- .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
- .3 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 - TEMPORARY FACILITIES for minimum acceptable requirements.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs.
- .4 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
- .5 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
- .6 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.
- .7 Provide temporary facilities for protection and safe passage of public pedestrians and vehicular traffic around and adjacent to work site.
- .8 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.
- .9 Comply with and enforce compliance by all

workers, sub-contractors and other persons granted access to Work site with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

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

1.11 Compliance Requirements

- .1 Comply with Occupational Health and Safety Act, for Province of Prince Edward Island, and Occupational Health and Safety Regulations made pursuant to the Act.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .3 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .4 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.
- .5 Observe and enforce construction safety measures of:
 - .1 National Building Code of Canada 2015, Part 8.
 - .2 Provincial Workers Compensation Board.
 - .3 Municipal by-laws and ordinances.
- .6 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

- .7 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- 1.12 Unforeseen Hazards
 - .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety Site Representative and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
- 1.13 Health and Safety Site Representative
 - .1 Employ and assign to Work, competent and authorized representative as Health and Safety Site Representative. Health and Safety Site Representative may be the Superintendent of the Work or other person designated by the Contractor. Health and Safety Site Representative must:
 - .1 Have site-related working experience specific to activities associated with the Work.
 - .2 Have working knowledge of occupational health and safety regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work or are escorted by a competent person while on site.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site at all times during execution of Work.
- 1.14 Inspections
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.
 - .2 Follow up and confirm corrective measure are taken.
 - .3 Keep inspection reports and supervision related documentation on site.
 - .4 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

- .5 Stop the Work as deemed necessary for reasons of health and safety.
- 1.15 Posting of Documents
 - .1 Ensure applicable permits, licenses, compliance certificates, items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.
 - .2 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
 - .3 Maintain and make readily available on Work Site copy of WHMIS Safety Data Sheets (SDS) for all products delivered to site.
 - .4 Make available to Departmental Representative, or authorized safety representative, for inspection upon request.
 - .5 Brief workers on site safety rules, and on the disciplinary measures to be taken for violation or non-compliance of such rules. Post such information on site.
- 1.16 Correction of compliance Non-compliance
 - .1 Immediately address health and safety non-issues identified by authority having jurisdiction or by Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.
- 1.17 Blasting
 - .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.
- 1.18 Powder Actuated Devices
 - .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.19 Work Stoppage .1 Give precedence to safety and health of public
and site personnel and protection of environment
over cost and schedule considerations for Work.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not applicable.

PART 3 - EXECUTION

3.1 NOT USED .1 Not applicable.

----- END OF SECTION-----

PART 1 - GENERAL

1.1 References

- .1 Canada Shipping Act, Transport Canada, 2001, amended 2013-12-01
- .2 Canadian Coast Guard Regulations, Fisheries and Oceans Canada
- .3 Canadian Environmental Assessment Act, 2012, amended 2013-11-25
- .4 Canadian Environmental Protection Act, 1999, amended on 2014-03-28
- .5 Fisheries Act, 1985, Fisheries and Oceans Canada, amended 2013-11-25
- .6 Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, 1998
- .7 Migratory Birds Convention Act, 1994, Environment Canada, amended 2010-12-10
- .8 Navigation Protection Act, 1985. Transport Canada, amended 2014-04-01
- .9 Species at Risk Act, 2002, amended 2013-03-08
- .10 The Federal Policy on Wetland Conservation, 1991, Environment Canada
- .11 Transportation of Dangerous Goods Act, 1992, Transport Canada, amended 2009-06-16
- .12 Workplace Hazardous Materials Information System, Health Canada.
- .13 Prince Edward Island - Environmental Protection Act.

1.2 Definitions

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

- .2 Deleterious substance: (a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
- .3 Fish habitat: spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.
- .4 Hazardous material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .5 Invasive or alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.
- .6 Navigable water: a canal and any other body of water created or altered as a result of the construction of any work.
- .7 Surface watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.

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

1.3 Transportation

- .1 Transport hazardous materials and hazardous waste in compliance with the Transportation of Dangerous Goods Act.
- .2 Eliminate free board spillage when excavating, loading and hauling dredged/excavated material.
- .3 Trucks transporting excavated material will have watertight boxes.
- .4 Do not overload trucks when hauling dredged/excavated material.
- .5 Maintain trucks clean and free of mud, dirt and other foreign matter.
- .6 Secure contents against spillage. Avoid potential release of contents and of any foreign matter onto highways, roads and access routes used for the work. Immediately clean any ground spills and soils to extent as directed by authority having jurisdiction.
- .7 Prior to commencement of work, advise and seek approval from the Departmental Representative of the existing roads and temporary routes / roads (including the construction of any temporary causeways or access roads for the purposes of the project) proposed to be used to access work areas and to haul material to and from the site, including roads to the excavated material disposal site.
- .8 Work activities must comply with all / any conditions of the Navigation Protection Act (NPA) approval issued by Transport Canada. A copy of the NPA approval will be provided to

the Contractor and must be kept on-site while the work is in progress.

- .9 Avoid potential release of contents and any foreign matter onto highways, roads and access routes used for the work. Take extra care when hauling material and other hazardous materials. Immediately clean any spillage and soils.
- .10 All materials and equipment used in construction must be marked in accordance with the Collision Regulations of Canada Shipping Act 2001 when located on the waterway.

1.4 Temporary
Causeways and
Access Roads

- .1 It will be the Contractor's responsibility to gain access to the construction areas. The construction and removal of temporary causeways and access roads will be at the Contractor's expense and will be removed immediately after clearance of the project area.
- .2 Identify a location for the disposal of material imported by the Contractor for the construction of temporary causeways and access roads.
- .3 All material used for construction of temporary causeways and access roads must be clean and free from excessive fines, organics, debris and non-toxic (i.e., free of fuel, oil, grease and/or any other contaminants), non-ore bearing and from a provincially approved non-water source.
- .4 Material is to be screened, if required, to prevent any fines or stones less than 0.2 kilograms are placed in the work.
- .5 Heavy machinery and equipment will not be allowed in the water and must be operated from a dry platform only. Temporary causeways and access roads shall be constructed at an elevation such that machinery and equipment is operating completely out of the water at all stages of the tide. If tidal work is being carried out, machinery and equipment shall be

relocated back to a suitable elevation to prevent operating in submerged waters.

- .6 Maintain temporary buoys to mark the position of the access road including the outer toe as construction proceeds. All buoys are to meet requirements of the applicable Canadian Coast Guard standard and be equipped with radar reflectors.

1.5 Operation of Machinery

- .1 Confirm machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
- .2 Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the water body.
- .3 Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

1.6 Disposal of Excavated Material

- .1 All excavated material from below chart datum must be disposed of in a provincially acceptable manner.
- .2 Water that decants from the exhausted material shall not enter any waterways.
- .3 Items such as rubber tires, bottles, cans and other debris or litter must be removed from the disposal site following regrading. Failure to remove such debris may constitute a littering offence under applicable regulations.
- .4 Control runoff of water containing suspended materials or other harmful substances in accordance with requirements of all federal, provincial and municipal authorities having jurisdiction.

1.7 Containment and Spill Management

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

- .2 Do not place fuel storage tanks and store fuel or other petroleum products within a 30-metre buffer zone of watercourses and wetlands. Do not fuel or lubricate equipment within this 30-metre buffer zone. Obtain approval from Departmental Representative of acceptable location on site for fuel storage and equipment service.
 - .3 Do not dump petroleum products or any other deleterious substances on ground or in the water.
 - .4 Be diligent and take all necessary precautions to avoid spills and contaminate the soil and water (both surface and subsurface) when handling petroleum products on site and during fueling and servicing of vehicles and equipment.
 - .5 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre (55 gallon) overpack spill kit for containment and cleanup of spills.
 - .6 Maintain vehicles and equipment in good working order to prevent leaks on site.
 - .7 In the event of a petroleum spill, immediately notify the Departmental Representative and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour report line). Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.
 - .8 Materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals are not to enter the watercourse.
 - .8 Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance.
- 1.8 Hazardous Material Handling
- .1 Store and handle hazardous materials in accordance with applicable federal and provincial regulations, codes, standards and guidelines. Store in a location that will prevent spillage into the environment.

- .2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
 - .3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and storage date.
 - .4 Store and handle flammable and combustible materials in accordance with National Fire Code.
- 1.9 Disposal of Wastes
- .1 Do not bury rubbish, construction and demolition debris (i.e., concrete, creosote timbers, steel, impacted soil materials etc.) and waste materials on site.
 - .2 Construction material and debris are not allowed to become waterborne.
 - .3 No person shall permit any tools, equipment, vehicles, temporary structures or parts thereof used or maintained for the purpose of building or placing a work in a navigable water to remain in such water after the completion of the project.
 - .4 All work(s) and associated equipment shall be removed from the waterway at Contractor's expense in the event the operation of the work(s) is terminated.
 - .5 Dispose and recycle construction and demolition debris and waste materials in accordance with Provincial Waste Management Requirements.
 - .6 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners etc.) and petroleum products into waterways, storm or sanitary sewers or in waste landfill sites.
 - .7 Dispose of hazardous waste in accordance with applicable federal and provincial, regulations, codes, standards and guidelines.

- .8 Daily clean-up of floating or sinking construction materials, litter, and other debris arising from the work site will be conducted to ensure protection of the marine environment. Any construction debris/material that enters the marine environment should be removed immediately and be disposed of in a provincially approved manner.
- .9 Concrete waste:
 - .1 Do not discharge residual or rejected concrete on site.
 - .2 Immediately clean any accidental release of concrete on site prior to solidification.
 - .3 Do not wash and clean concrete vehicles on site.
 - .4 Perform dumping of residual material and truck cleaning operations only at the concrete plant. Follow environmental regulations and good practices as approved by the Provincial Department of the Environment and other authorities having jurisdiction.

1.10 Water Quality

- .1 Conduct any excavation work over a watercourse in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times.
 - .1 Maintain appropriate production speed and momentum of the excavation equipment. Make adjustments as required and as approved by Departmental Representative.
 - .2 Strategically position excavator equipment and haul vehicles to avoid over the water swings of excavated material whenever possible.
- .2 Where work may affect the water quality adjacent to water intake lines used by Lobster Holding Facilities, Fish Processing Facilities and other harbour users, schedule work in cooperation with the Harbour Authority as directed by Departmental Representative to minimize interference and impact to harbour users.
- .3 Visually monitor the water turbidity of the surrounding areas adjacent to the work area

on a daily basis during the in-water work periods.

.1 Should excessive change occur in the turbidity of the water outside the work area, such as a distinct colour difference; the work must stop and the Area Habitat Coordinator of the Department of Fisheries and Oceans - Habitat Management division will be contacted to determine if additional mitigation measures are required.

- .4 Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the water body during all phases of the work. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the water body or settling basin and runoff water is clear. The plan should, where applicable, include:
- .1 Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
 - .2 Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a water body (via settling basin or other filtration system).
 - .3 Site isolation measure (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., excavation, dredging, underwater cable installation).
 - .4 Measures for containing and stabilizing waste material (e.g., excavated material, dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby water bodies to prevent re-entry.
 - .5 Regular inspection and maintenance of erosion and sediment control measures and structures during the course of the work.

- .6 Repairs to erosion and sediment control measures and structures if damage occurs.
 - .7 Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
 - .5 Water contamination by preservative treated wood:
 - .1 Preservative treated lumber and timber, whether plant or site treated, shall be cured for a minimum of 30 days from date of the treatment application before their installation in areas which will be in contact with the water.
 - .2 Do not cut treated wood lumber over the surface of a watercourse or wetland.
 - .3 Do not use liquid applied preservative products over the surface of a watercourse or wetland.
 - .4 Wood treated with Chromate Copper Arsenate (CCA) or Ammoniac Copper Zinc Arsenate (ACZA) must be CSA or American Wood Preserver Association (AWPA).
 - .5 Do not use timber and lumber treated with creosote, petroleum and pentachlorophenol for any part of the work.
 - .6 Do not wash down equipment within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.
- 1.11 Socioeconomic Restrictions
 - .1 Abide by municipal and provincial regulations for any restrictions on work performed during the night time and on flood lighting of the site. Obtain applicable permits.
 - .2 Place flood lights in opposite direction of adjacent residential and business areas.
 - .3 Work equipment and machinery must be equipped with purposely designed mufflers to reduce noise on site to lowest possible level. Maintain mufflers in good operating condition at all times.

1.12 Bird and Bird
Habitat

- .1 Comply with Federal and Provincial laws, Migratory Birds Convention Act (MBCA) in regards to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.
- .2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.
- .3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves or ferrying supplies.
- .4 During night time work, position flood lights in opposite direction of nearby bird nesting habitat.
- .5 Do not use beaches, dunes and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the Departmental Representative.
- .6 Should nests of migratory birds in wetlands be encountered during work, immediately notify Departmental Representative for directives to be followed.
 - .1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
 - .2 Minimize work immediately adjacent to such areas until nesting is completed.
 - .3 Protect these areas by following recommendations of Canadian Wildlife Service.
- .7 All machinery must be well muffled. If necessary, trucks may be required to avoid the use of 'hammer' braking along specific sections of the route.
- .8 Contractors must ensure that food scraps and garbage are not left at the work site.
- .9 All equipment to be used in or over the marine environment is to be free from leaks or coating of hydrocarbon-based fluids and/or lubricants harmful to the environment. Hoses and tanks are to be

inspected on a regular basis to prevent fractures and breaks.

- .10 Construction activities will be carried out during times acceptable to local authorities.

1.13 Fish and Fish
Habitat

- .1 Avoid wet, windy and rainy periods that may increase erosion and sedimentation.
- .2 Confirm in-water activities or associated in-water structures do not interfere with fish passage, constrict the channel width or reduce flows.
- .3 Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
- .4 Be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced in the water.
- .5 To minimize the possibility of fish habitat contamination, all construction equipment which will be immersed into the water of a watercourse, or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species.
 - .1 Equipment shall include boats, barges, cranes, excavators, haul trucks, pumps, pipe lines and other all miscellaneous tools and equipment previously used in a marine environment.
- .6 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.
- .7 Conduct cleaning and washing operations as follows:
 - .1 Scrape and remove heavy accumulation of mud and dispose appropriately.

- .2 Wash all surfaces of equipment by use of a pressurized fresh water supply.
- .3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.
- .4 Check and remove all plant, animal and sediment matter from the all bilges and filters.
- .5 Drain standing water from equipment and let fully dry before use.
- .6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.
- .8 Do not perform cleaning and washdown within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.
- .9 Record of Assurance Logbook:
 - .1 Maintain an on-going log of past and present usage and washdowns of all equipment to illustrate mitigation measures undertaken against fish habitat contamination by alien species.
 - .2 Write data in a hard cover bound logbook.
 - .3 Include the following:
 - .1 Date and location where equipment was previously used in a watercourse or wetland;
 - .2 Type of work performed.
 - .3 Dates of wash down for each piece of equipment;
 - .4 Cleaning method and cleaning agent(s) used.
- .10 Keep Record of Assurance Logbook updated from project to project. Upon request, submit logbook to Departmental Representative for review.
- .11 Abide by requirements and recommendations of Environment Canada and the Department of Fisheries and Oceans - Oceans and Habitat Branch in cleaning and wash down of equipment.

- .12 Marine equipment may be inspected by PSPC DFO to ensure invasive species are not introduced to the marine environment.

1.14 Air Quality

- .1 Keep airborne dust and dirt resulting from the work on site to an absolute minimum.
- .2 Dust suppression by the application of water must be employed, when required. Apply dust control measures to roads, parking lots and work areas. The Departmental Representative will determine locations where water is to be applied, the amount of water to be applied, and the times at which it will be applied. Waste oil must not to be used for dust control under any circumstances.
- .3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the work.
- .4 Do not use oil or any other petroleum products for dust control.

1.15 Fires

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

1.16 Archaeological

- .1 All construction personnel are responsible for reporting any unusual materials unearthed during construction to the construction supervisor. If the find is believed to be an archaeological resource, the construction supervisor will immediately stop work in the vicinity of the find and notify their immediate supervisor.
- .2 If an archaeological and/or historically significant item is discovered during work activities, work in the area will be stopped immediately and the Departmental representative will be contacted as well as the provincial Archaeological Services unit.
- .3 Work can only resume in the vicinity of the find when authorized by the PSPC Project Manager and Construction Supervisor, after

approval has been granted by the provincial
Archeological Services Unit.

----- END OF SECTION -----

PART 1 - GENERAL

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| 1. <u>Related Requirements</u> | .1 | Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections. |
| 2. <u>Appointment and Payment</u> | .1 | Departmental Representative will appoint and pay for services of testing laboratory except for the following: <ul style="list-style-type: none">.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities..2 Inspection and testing performed exclusively for Contractor's convenience..3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems..4 Mill tests and certificates of compliance..5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative. |
| | .2 | Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Departmental Representative may require to verify acceptability of corrected work. |
| 3. <u>Contractor's Responsibilities</u> | .1 | Furnish labour and facilities to: <ul style="list-style-type: none">.1 Provide access to work to be inspected and tested..2 Facilitate inspections and tests..3 Make good work disturbed by inspection and test..4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples. |
| | .2 | Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory 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

----- END OF SECTION -----

PART 1 - GENERAL

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| <u>1.1. Access</u> | <ul style="list-style-type: none">.1 Provide and maintain adequate access to project site..2 If authorized to use existing roads or structures for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads..3 The contractor is to maintain full access to the work site. Should a court injunction be required ordering a person or group to refrain from impeding access to the site, such as a demonstration, picketing or union action, then obtaining the injunction and any associated costs will be considered incidental to this contract. Any delays associated with such activity will be considered incidental to this contract. |
| <u>1.2. Contractor's Site Office</u> | <ul style="list-style-type: none">.1 Establish on the site of the work and keep open at all times during the execution of the work an office where all letters, orders, notices and other communications may be received or acknowledged either by the Contractor or his authorized agent or representative. Provide a telephone in the office..2 Keep one up-to-date copy of contract documents, bulletins and other materials as specified under Section 01 10 10. |
| <u>1.3. Departmental Representative's Site Office</u> | <ul style="list-style-type: none">.1 Provide furnished temporary office for sole use of Departmental Representative complete with heat, lights, phone/fax connection and internet connection. Insulated office required if used during October to May. Locate on or adjacent to site..2 Types and locations of barricades, etc. to be in accordance with local regulations and to the satisfaction of Departmental Representative..3 The presence of such barricades, lights, etc. will not relieve the Contractor of the responsibility for any damages. |

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| <u>1.4. Storage Sheds</u> | .1 | Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather. |
| | .2 | Make arrangements for on-site storage areas with the Departmental Representative. |
| <u>1.5. Sanitary Facilities</u> | .1 | Provide sanitary facilities for work force in accordance with governing regulations and ordinances. |
| | .2 | Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. |
| <u>1.6. Parking</u> | .1 | Make arrangements to provide parking space for work force with the Departmental Representative. |
| <u>1.7. Power</u> | .1 | Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances. |
| | .2 | Install temporary facilities for power such as pole lines and cables to approval of local power supply authority. |
| <u>1.8. Water Supply</u> | .1 | Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances. |
| <u>1.9. Barricades</u> | .1 | Provide and maintain sufficient barricades, fencing, notices, warning signs, light signals, etc. for the protection of adjoining property and to warn others and workers engaged on the job of the dangers caused by the work. |
| | .2 | Types and location of barricades, etc. to be in accordance with local regulations and to the satisfaction of Departmental Representative. |
| | .3 | The presence of such barricades, lights, etc. shall not relieve the Contractor of the responsibility for any damages. |
| <u>1.10. Security</u> | .1 | Contractor to make their own arrangements for security of their equipment, materials, damages resulting from fire and theft. |

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| <u>1.11. Site Signs
and Notices</u> | <ul style="list-style-type: none">.1 Only Project Identification and Departmental Representative / Contractor signboards and notices for safety or instruction are permitted on site..2 Format, location and quantity of site signs and notices to be accepted by Departmental Representative..3 Signs and notices for safety or instruction to be in English and French languages, or commonly understood graphic symbols. |
| <u>1.12. Removal of
Temporary
Facilities</u> | <ul style="list-style-type: none">.1 Remove temporary facilities from site when directed by Departmental Representative..2 When project is closed down for a period of time, keep temporary facilities operational until no longer required by Departmental Representative. |

----- END OF SECTION -----

PART 1 -GENERAL

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| <u>1. General</u> | <ul style="list-style-type: none">.1 Use new material and equipment unless otherwise specified..2 Submit following information for any or all materials and products proposed for supply within seven (7) days of request by Departmental Representative:<ul style="list-style-type: none">.1 name and address of manufacturer..2 trade name, model and catalogue number..3 performance, descriptive and test data..4 manufacturer's installation or application instructions..5 evidence of arrangements to procure..3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available..4 Use products of one (1) manufacturer for equipment or material of same type or classification unless otherwise specified. |
| <u>2. Manufacturers Instructions</u> | <ul style="list-style-type: none">.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods..2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed. |
| <u>3. Fastenings-General</u> | <ul style="list-style-type: none">.1 All fastenings are to be the sizes indicated on the contract plans and are to be hot dipped galvanized to ASTM A123 unless or CSA G164, unless otherwise noted. |
| <u>4. Delivery and Storage</u> | <ul style="list-style-type: none">.1 Deliver, store and maintain packaged material and equipment with manufacturer's seal and labels intact..2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site. |

- .3 Store material and equipment in accordance with supplier's instructions.
- 5. Conformance
 - .1 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.
- 6. Substitution
 - .1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.
 - .2 Proposals will be considered by Departmental Representative if:
 - .1 Products selected by tenderer from those specified, are not available, or
 - .2 Delivery date of products from those specified would unduly delay completion of Contract, or
 - .3 Alternative products to those specified, which are brought to attention of, and considered by Departmental Representative as equivalent to those specified and will result in a credit to Contract amount.
 - .3 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.
 - .4 Amounts of all credits arising from approval of substitutions will be determined by Departmental Representative and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of Departmental Representative.
 - .5 Departmental Representative reserves the right for acceptance or rejection of substitution of materials.

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| 7. <u>Construction
Equipment and Plant</u> | .1 | On request, prove to the satisfaction of Departmental Representative that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed. |
| | .2 | Maintain construction equipment and plant in good operating order. |
| 8. <u>Damaged and
Rejected Materials</u> | .1 | Immediately replace, repair or otherwise make good any material damaged, broken or defaced during construction to the satisfaction of Departmental Representative. |
| | .2 | Remove rejected materials from site. |

----- END OF SECTION -----

PART 1 - GENERAL

1.1 Record
Drawings

- .1 Departmental Representative will provide two (2) sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and accurately record deviations from contract documents caused by site conditions and changes ordered by Departmental Representative.
- .3 Mark changes in red coloured ink.
- .4 Record following information:
 - .1 Elevations of various elements in relation to Chart Datum.
 - .2 Field changes in dimensions and details.
 - .3 Changes made by Change Order.
- .5 At completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to Departmental Representative.

----- END OF SECTION -----

PART 1 - GENERAL

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|---|---|
| <u>1.1 General</u> | <ul style="list-style-type: none">.1 Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws..2 Store volatile waste in covered metal containers and remove from premises at end of each working day..3 Prevent accumulation of waste which creates hazardous conditions. |
| <u>1.2 Cleaning during Construction</u> | <ul style="list-style-type: none">.1 Maintain the work, at least on a daily basis free from accumulations of waste material and debris..2 Provide on-site containers for collection of waste materials, and debris..3 Remove waste materials, and debris from site..4 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces. |
| <u>1.3 Final Cleaning</u> | <ul style="list-style-type: none">.1 In preparation for acceptance of the project on an interim or final certificate of completion perform final cleaning..2 Remove grease, dust, dirt, stains, and other foreign materials, from exterior finished surfaces. |

----- END OF SECTION -----

PART 1 - GENERAL

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|-----|-----------------------------------|----|--|
| 1.1 | <u>Related Sections</u> | .1 | Section 01 78 00 - Closeout Submittals. |
| 1.2 | <u>Inspection and Declaration</u> | .1 | Contractor's Inspection: Coordinate and, perform in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents. <ul style="list-style-type: none">.1 Notify the Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work. |
| | | .2 | Departmental Representative's Inspection: Accompany the Departmental Representative during all interim and final inspections of the Work. <ul style="list-style-type: none">.1 Address defects, faults and outstanding items of work identified by such inspections..2 Advise Departmental Representative when all deficiencies identified have been rectified. |
| | | .3 | Note the Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that the Contractor performs the following work and turns over the specified documents: <ul style="list-style-type: none">.1 Project record as-built documents;.2 Final Operations and Maintenance manuals;.3 Maintenance materials, parts and tools;.4 Compliance certificates from applicable authorities;.5 Reports resulting from designated tests;.6 Demonstration and training complete with user manuals;.7 Manufacturer's Guarantee certificates..8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports..9 Commissioning of equipment and systems specified. |
| | | .4 | Correct all discrepancies before the Departmental Representative will issue the |

Certificate of Completion.

----- END OF SECTION -----

PART 1 - GENERAL

1.1 Project Record Documents

- .1 Departmental Representative will provide two (2) white print sets of contract drawings and two (2) copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
 - .2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
 - .3 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
 - .4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
 - .5 Record following information:
 - .1 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.
 - .2 Horizontal and vertical location of various elements in relation to Chart Datum;
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
 - .4 Field changes of dimension and detail;
 - .5 Location of all capped or terminated services and utilities.
 - .6 Chases for mechanical, electrical and other services;
 - .7 Electrical service installation locations; all to be dimensioned

- and referenced to building columns or load bearing walls;
 - .8 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;
 - .9 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
 - .5 As-built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
 - .2 Changes made by Addenda and Change Orders.
 - .3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.
 - .6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.
- 1.2 Reviewed Shop Drawings
 - .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations & Maintenance manuals.
 - .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance manuals specified.
- 1.3 Updating of provide Digital Drawings
 - .1 Be aware that beyond the requirement to "red marked" as-built paper documents, as specified in Clause 1.3 above, Contractor shall also provide the service of updating the digital drawings which were used to

produce the contract drawings.

- .2 The Departmental Representative will provide one set of AutoCAD Lite Release 2010 drawing files specifically for "as-built" purposes. The AutoCAD drawing files shall be updated to record same as-built information as specified in above clauses for the provision of paper as-built drawing documentation.
- .3 All "As-Built" changes to the electronic files provided shall be done following the standards as specified in the Atlantic Region CADD Data Specification manual. A copy of this manual will be provided by the Departmental Representative upon request.
- .4 Make revisions to electronic files found to be in non-conformance with the CADD Data Specifications Manual as directed by Departmental Representative.
- .5 In regards to updating the digital files to reflect changes resulting from Change Orders, the change in cost of completing the As-Built documentation of changes is to be included in the amount for each Change Order issued. The amount included will constitute only the increase or decrease in CADD related costs resulting directly from the change. In determining the cost difference, full consideration will be given to the fact that other clauses of this section require As-Built CADD updates to the drawings irrespective of any Change Orders.
- .6 Deliver the digital information in same format and sequence as per contract drawings. Submit on CD diskettes.
- .7 Submit the digital as-built files at the same time as submission of the marked-up paper white prints. Supply of digital documents does not replace the requirement to provide marked-up white prints specified.
- .8 Also provide 1 set of reproducible velum plots of the updated electronic as-built CADD drawing files.

Maintenance Manual

operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

- .2 Manual Language: final manuals to be in both English and French languages.
- .3 Number of copies required:
 - .1 Submit interim pdf digital copy and one (1) hard copy binder of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
 - .2 Upon review and acceptance by Departmental Representative, final pdf digital copy and one (1) hard copy binder. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.
- .5 Binding:
 - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
 - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
 - .3 Where multiple binders are needed, correlate data into related consistent groupings.
 - .4 Identify contents of each binder on spine.
 - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
 - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
 - .7 Type lists and notes. Do not hand write.
 - .8 Drawings, diagrams and manufacturers' literature must be legible. Provide

with reinforced, punched binder tab.
Bind in with text; fold larger drawings
to size of text pages.

- .6 Manual Contents:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Contractor, and all Sub-contractors.
 - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .3 List of maintenance materials.
 - .4 List of spare parts.
 - .5 List of special tools.
 - .6 Original or certified copy of warranties and product guarantees.
 - .7 Copy of approval documents and certificates issued by Inspection Authorities.
 - .8 Copy of reports and test results performed by Contractor as specified.
 - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:
 - .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
 - .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
 - .3 Parts list.
 - .4 Installation details.
 - .5 Operating instructions.
 - .6 Maintenance instructions for equipment.
 - .7 Maintenance instructions for finishes.
- .7 Shop drawings:
 - .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
 - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
 - .3 When large quantity of data is submitted, place into separate binders

of same size as O&M binders.

- .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
 - .1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Servicing and lubrication schedule, and list of lubricants required.
 - .7 Manufacturer's printed operation and maintenance instructions.
 - .8 Sequence of operation by controls manufacturer.
 - .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .10 Provide installed control diagrams by controls manufacturer.
 - .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
 - .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .14 Include test and balancing reports.

- .15 Additional requirements as specified in individual specification sections.
- .9 Materials and Finishes Maintenance Data:
 - .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
 - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .4 Additional Requirements: as specified in individual specifications sections.
- 1.5 Spare Parts, Tools and Maintenance Materials
 - .1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.
 - .2 Tag all items with associated function or equipment.
 - .3 Provide items of same manufacture and quality as items in Work.
 - .4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.
 - .5 Clearly mark as to contents indicating:
 - .1 Part number.
 - .2 Identification of equipment or system for which parts are applicable.
 - .3 Installation instructions or intended use as applicable.
 - .4 Name, address and telephone number of nearest supplier.
 - .6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Work Included .1 This section specifies the requirements for the removal and disposal of materials including, but is not limited to:
- .1 Steel plating, bollards, anchors, miscellaneous steel sections.
 - .2 Pressure treated timber wheelguards, miscellaneous timber.
 - .3 Reinforced concrete slabs and foundations.
 - .4 Asphalt pavement, gravels and backfill materials (above Chart Datum).
 - .5 Water service lines.
 - .6 Electrical equipment, conduit, wiring, cabling and hydrographic station.
- 1.2 Existing Conditions .1 Items to be relocated or removed are to be noted on contract drawings.
- .2 A site visit for bidders has been scheduled as noted in the tender solicitation documents.
 - .3 Native fill material may contain creosote treated timber debris.
- 1.3 Regulatory Requirements .1 Perform work in compliance with applicable Federal, Provincial and Municipal Regulations.
- .2 Carry out Work in accordance with the Prince Edward Island Occupational Health and Safety Act and Section 01 35 29.06 - Health and Safety.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not applicable.

PART 3 - EXECUTION

- 3.1 Preparation .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal and items to remain.
- 3.2 Safety Code .1 Observe construction safety measures of Provincial Government, including but not limited to the Occupational Health and Safety Act, Workers' Compensation Board and Municipal authority provided that in any case of conflict

or discrepancy the more stringent requirement applies.

- .2 Exercise pollution and environmental control of construction activities as specified and as required during the Work.
- .3 Submit to the Departmental Representative prior to commencement of Work, printed information detailing means and methods so the following will be carried out:
 - .1 To ensure that health and safety of persons at or near the Work.
 - .2 To ensure the measures and procedures of the regulatory agencies specified are carried out.
 - .3 To ensure every employee, self-employed person and employer performing Work under this Contract complies with the regulatory agencies specified.

3.3 Saw Cutting .1 Cut concrete and asphalt at joints and along straight lines.

3.4 Disposal .1 Dispose of all removed items off site in an environmentally acceptable location at no additional cost to the Contract.
.2 Management of creosote treated timber debris and impacted soils present in native fill will be required. Dispose of material off-site and in accordance with local disposal regulations.

3.5 Cleanup .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

3.6 Reinstatement .1 Protect items designated for reinstatement. Repair and replace any item damaged as a result of inadequate protection.
.2 Reinstall items in accordance with Section 32 98 00.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Concrete Reinforcing: Section 03 20 00
 - .2 Concrete: Section 03 30 00
 - .3 Refer to Section 01 33 00 for shop drawings/submissions requirements.
- 1.2 References
- .1 Canadian Standards Association (CSA International)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA 086-14 (latest edition), Consolidation - Engineering Design in Wood.
 - .3 CSA 0121-08(latest edition), Douglas Fir Plywood.
 - .4 CSA 0153-M1980(latest edition), Poplar Plywood.
 - .5 CSA 0437 Series-93(latest edition), Standards for OSB and Waferboard.
 - .6 CAN/CSA-S269.1-16, Falsework and Formwork.
- 1.3 Submittals
- .1 Provide submittals in accordance with Section 01 33 00
 - .2 Shop Drawings:
 - .1 Upon request, submit to Departmental Representative for review four (4) sets of formwork and falsework shop drawings, in accordance with Section 01 33 00, at least four (4) weeks prior to erection.
 - .2 All such drawings to be stamped and signed by a professional engineer registered in the Province of Prince Edward Island.
 - .3 Clearly indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts.
 - .4 Comply with CSA S269.1 for falsework drawings.
 - .3 Product Data/Samples:
 - .1 Provide product data and samples for form ties.

- .2 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
 - .3 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.
- 1.4 Measurement for Payment .1 This item will not be measured separately but will be considered incidental to the Work, in accordance with Section 01 29 00 - Project Particulars and Measurement.
- 1.5 Delivery, Storage and Handling .1 Waste Management and Disposal:
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Divert wood materials from landfill to a recycling facility as approved by Departmental Representative.
 - .3 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative.
 - .4 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

PART 2 - PRODUCTS

- 2.1 Materials
 - .1 Formwork lumber: plywood and wood formwork materials to CSA A23.1.
 - .2 Falsework materials: to CSA S269.1.
 - .3 Form-Stripping Agent: colourless mineral oil, free of kerosene, with viscosity between 70 and 110, Saybolt Universal, 15 to 14mm 2/5 at 40°C, flash-point minimum 150°C, open cup.
 - .4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface. When forms are removed, no metal will be less than 50mm from the surface of the concrete.

PART 3 - EXECUTION

- 3.1 Fabrication and Erection
 - .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
 - .2 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 Shop Drawings reviewed by the Departmental Representative.
- .5 Do not place shores and mud sills on frozen ground.
- .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .7 Fabricate and erect formwork in accordance with CAN/CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.
- .8 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .9 Use 25 mm chamfer strips on external corners.
- .10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
- .12 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.
- .13 Leave formwork in place for at least 7 (seven) days, exclusive for days when temperature falls below 5°C, unless otherwise directed by Departmental Representative.
- .14 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.
- .15 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

- .16 All holes from form ties and rods to be plugged with mortar to requirements of CSA A23.1/A23.2. When forms are removed, no metal will be less than 25 mm from the surface of the concrete.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Submittal Procedures: Section 01 33 00
 - .2 Concrete Forming and Accessories: Section 03 10 00
 - .3 Concrete: Section 03 30 00
- 1.2 References
- .1 ASTM A123/A123M, latest edition, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143/A143M-07 latest edition, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A1064/A1064M-15, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .4 Canadian Standards Association (CSA):
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA A23.3-14, Design of Concrete Structures.
 - .3 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-M1990(R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
 - .5 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
- 1.3 Source Sampling
- .1 Upon request, provide Departmental Representative with certified copy of mill test of steel supplied, showing physical and chemical analysis not less than two (2) weeks prior to commencement of work.

- 1.4 Submittals
- .1 Provide submittals in accordance with Section 01 33 00.
 - .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and SP-66.
 - .3 Shop Drawings:
 - .1 Clearly indicate bar sizes, spacing, location and quantities of reinforcement and mesh with identifying code marks to permit correct placement without reference to structural drawings; to Reinforcing Steel Manual of Standard Practice.
 - .2 Detail placement of reinforcing where special conditions occur.
 - .3 Design and detail lap lengths and bar development lengths to CSA standard A23.1, unless otherwise specified on drawings.
 - .4 Product Data/Samples:
 - .1 Provide product data for supports and spacers.
 - .5 Test Results:
 - .1 Provide Mill Test Certificates cross referenced to the product supplied to the site.
- 1.5 Delivery, Storage and Handling
- .1 Store reinforcing steel on racks or sills that will permit easy access for identification and handling, and prevent it from becoming coated with material which would adversely affect bond.
 - .2 Do not store reinforcing steel in direct contact with the ground.

- 1.6 Measurement for_ .1 This item will not be measured separately but shall be considered incidental to the Work in accordance with Section 01 29 00 - Project Particulars and Measurement.
Payment

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 Wire ties: to ASTM 1064 plain, cold drawn annealed wire.
.5 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
.6 Mechanical splices: subject to approval of Departmental Representative.
- 2.2 Fabrication .1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2, SP-66, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
.2 Obtain the Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
.3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- 2.3 Source Quality .1 Upon request, provide the Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum two (2) weeks prior to beginning reinforcing work.
Control

- .2 Upon request inform the Departmental Representative of proposed source of material 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 Prior to placing concrete, obtain the Departmental Representative's approval of reinforcing material and placement.
- .3 Maintain cover to reinforcement during concrete pour.

3.3 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 00.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
- .4 Place materials defined as hazardous or toxic in designated containers.

3.4 Inspection

- .1 Do not place concrete until Department Representative has inspected and accepted reinforcement work in place.

3.5 Surface Conditions

- .1 Reinforcement, at the time concrete is placed, to be free from mud, oil or other non-metallic coatings that adversely affect bonding capacity.

- .2 Reinforcement with rust, mill scale, or combination of both to be considered as satisfactory, provided minimum dimensions, including height of deformation, and mass of hand wire brushed test specimen are not less than specified requirements in applicable CSA standards.

----- END OF SECTION -----

PART 1 - GENERAL

1.1 Related Work

- .1 Refer to other Specification Sections for related information on aggregates, form work and false work, concrete reinforcement, underwater concreting and miscellaneous items.
- .2 Refer to Section 01 33 00 for Shop Drawing/ Submissions requirements.

1.2 Reference Standards

- .1 Do structural concrete work in accordance with CSA A23.1-14, Concrete Materials and Methods of Concrete Construction, except where more stringent standards specify otherwise.
- .2 CSA A3000-18, Cementitious Materials Compendium.
- .3 ASTM C494-17, Chemical Admixtures for Concrete.
- .4 ASTM C881/C881M-15, Standard Specification for Epoxy - Resin-Base Bonding Systems for Concrete.

1.3 Submissions

- .1 Shop Drawings:
 - .1 Upon request, submit shop drawings and erection drawings for formwork and falsework. All such drawings to be stamped and signed by a Professional engineer registered in the Province of Prince Edward Island.
 - .2 Submit placement drawings for reinforcing steel.
 - .3 Submit placement drawings for miscellaneous items.
- .2 Product Data/Samples:
 - .1 Provide technical data and/or samples for curing compounds (winter/summer/green/ white/red), evaporation retardant and finishing aids, expansion joint materials/ sealants, grouts.
 - .2 Submit concrete mix design.
- .3 Certificates:

- .1 Minimum four (4) weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Admixtures.
 - .2 Provide certification that plant, equipment, and materials to be used in concrete work comply with requirements of CSA A23.1.
 - .3 Provide certification that mix proportions selected will produce concrete of specified quality, yield, and strength and will comply with CSA A23.1.
 - .4 Minimum two (2) weeks prior to commencing concrete work, submit a concrete mix design stamped by an engineer licensed to practice in the Province of Prince Edward Island, to the Departmental Representative for review containing the following for each concrete mix:
 - .1 Cement type.
 - .2 Minimum compressive strength and age as per class of exposure.
 - .3 Class of exposure.
 - .4 Nominal size of coarse aggregate.
 - .5 Air content.
 - .6 Slump at time and point of discharge.
 - .5 Provide certification that only compatible components and non-reactive aggregate will be used in the concrete mix designs. Use of admixtures to neutralize or mitigate potential alkali-aggregate reactivity (AAR) will not be accepted.
- .4 Methodology and Quality Control:
- .1 Submit for review methodology and quality control procedures for the following:
 - .1 Cold weather concreting.
 - .2 Hot weather concreting.
 - .3 Concrete placement operations.
Provide details of pour sequence

- and proposed layout of construction joints. Unless otherwise approved, the spacing of deck construction joints shall not exceed 13.5m.
 - .4 Concrete deck finishing operations.
 - .5 Supporting reinforcing steel.
 - .6 Protection and curing of concrete in cold and hot weather.
 - .5 Test Results:
 - .1 Provide design mix tests results.
 - .2 Provide mill test certificates for reinforcing steel.
- 1.4 Storage of Materials
 - .1 Store all materials to prevent contamination or deterioration, whether at the plant or at the job site.
 - .2 Store cement in watertight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment whether at the plant or at the job site.
 - .3 Prevent stored liquid admixtures and compounds from freezing and powdered admixtures and compounds from absorbing moisture.
- 1.5 Source Sampling
 - .1 At least three (3) weeks prior to commencing work, inform Departmental Representative of proposed source of aggregates and provide access for sampling.
- 1.6 Ready-Mix Concrete Supply
 - .1 Provide, with each load of concrete delivered to site, duplicate delivery slips containing following:
 - .1 Name of ready-mix batch plant.
 - .2 Serial number of ticket.
 - .3 Date and truck number.
 - .4 Project identification.
 - .5 Class of concrete or mix.
 - .6 Amount of concrete in cubic metres.
 - .7 Time of loading or first mixing of aggregate, cement and water.
 - .8 Time of discharge of concrete.
 - .9 Admixtures added at plant.
 - .10 Amount of water added at plant.

- | | | | |
|-----|--------------------------------|----|---|
| 1.7 | <u>Measurement for Payment</u> | .1 | Heating of water, aggregates and concrete and providing cold weather protection will not be measured but will be considered incidental to the work. |
| | | .2 | Cooling of concrete and providing hot weather protection will not be measured but will be considered incidental to the work. |
| | | .3 | Supply of anchor bolts, washers and nuts shall not be measured but will be considered incidental to the work. |
| | | .4 | Bolt grouting will not be measured but will be considered incidental to the work. |
| | | .5 | Supply and installation of rigid PVC drains and conduits/sleeves, curing compounds and other compounds will be considered incidental to the work. |
| | | .6 | Cast-in-place concrete will be measured in accordance with the item to which applies in Section 01 29 00 - Project Particulars and Measurement. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|--|
| 2.1 | <u>Materials</u> | .1 | Aggregates: to CSA A23.1. |
| | | .2 | Portland Cement: to CSA A3000. |
| | | .3 | Water: to CSA A23.1. |
| | | .4 | Admixtures: to applicable standards. |
| | | .5 | Non-shrink grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents, of pouring and/or pumping consistency, capable of developing compressive strength of 50 MPa at 28 days. |
| | | .6 | Curing compound: To ASTM-C309 and CSA A23.1 type 1, ID, or 2. |
| | | .7 | Adhesive Anchors: Two component, tube-injected system conforming to ASTM C881. Type I, II, IV and V, Grade 3. Adhesive to be tested in accordance with the ICC-ES acceptance criteria for post-installed |

adhesive anchors in concrete elements (AC308). Technical data to be published in an ICC-ES Evaluation Service Report showing compliance with ACI 318 and/or CSA A23.3. Installation of adhesive anchors, including drilling of holes, preparation, storage, usage, and curing, to be in accordance with the manufacturer's written instructions.

.1 Acceptable products:

- .1 Hilti HIT-RE 500 V3, as manufactured by Hilti (Canada) Corporation.
- .2 Approved equivalent.

2.2 Concrete Mixes

- .1 Prior to starting concrete work, submit to the Departmental Representative the proposed mix design(s) for approval. Mix design (s) to be in accordance with Alternative 1 of Table 5 in CSA A23.1. Comply with additional requirements of CSA A23.1, clause 4.1.1.5 for concrete exposed to sea water or sea water spray.
 - .1 For concrete used in copewall repair, dolphin slab, bollard bases and buttress repairs, use concrete mix designed to produce air entrained concrete meeting the following requirements:
 - .1 Cement: to CSA A23.1.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Exposure: Class C-1 and S-3.
 - .4 Nominal size of coarse aggregate: 20mm.
 - .2 Modify concrete mix to the approval of the Departmental Representative to accommodate pumping.
 - .3 Admixtures to the approval of the Departmental Representative and the recommendation of the manufacturer. Admixtures must be dispersed separately into mixing water.
 - .4 Do not use calcium chloride or compounds containing calcium chloride.
 - .5 Weigh aggregates, cement, water and admixtures separately when batching. Inspect and test scales for accuracy as directed. Accuracy to be such that successive quantities can be measured to within one percent of desired

- amounts. Test certificates to be submitted to Departmental Representative upon request.
- .6 Where seven day strength is less than 70% of specified 28 day strength, provide additional protection and curing, and make changes to mix proportions to the satisfaction of the Departmental Representative.
 - .7 Provide certification that plant, equipment and all materials to be used in concrete comply with the requirements of CSA A23.1.
 - .8 Provide certification from independent testing and inspection company that mix proportions selected will produce concrete of specified quality and can be effectively placed and finished for all work under this contract.
 - .9 Use plasticizer to increase slump and workability.

PART 3 - EXECUTION

3.1 General

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours' notice of intended placement. Place concrete in dry form condition.
- .2 Place, consolidate, finish, cure and protect concrete to CSA A23.1 except where specified otherwise.
- .3 Prior to placing of concrete, obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .4 Comply with additional requirements of CSA A23.1 except where specified otherwise, for concrete exposed to seawater environment.
- .5 Do not commence placing concrete until Departmental Representative has inspected/reviewed forms, inserts, dowels, reinforcing steel, joints; conveying, consolidation and protective methods.
- .6 Do not disturb reinforcement and anchorage during placing.

- .7 Maintain accurate records of placed concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .8 Do not place load(s) upon new concrete until Departmental Representative is satisfied that the Contractor has carried out all calculations and tests necessary to confirm that the load(s) will not cause damage or create a safety hazard. Calculations and tests to be stamped by a Professional engineer registered in the Province of Prince Edward Island.
- .9 Comply with additional requirements of CSA A23.1, for concrete exposed to seawater environments during placement and curing.
- .10 Clean pile surface with high pressure water jets, mechanical scrapers and other means prior to placement of concrete.

3.2 Reinforcing

- .1 Place new reinforcing steel according to Section 03 20 00.
- .2 Provide 75 mm minimum cover for all reinforcing steel unless indicated otherwise on drawings.

3.3 Formwork

- .1 Verify field dimensions to determine applicable sizes of formwork.
- .2 Design and construct form work to allow adequately for proper placement and consolidation while conforming to shape and dimensions shown on plans.
- .3 Formwork design will include closures at both top and bottom of form, and all necessary hardware to support the forms.
- .4 Upon request, submit drawings for review by the Departmental Representative, at least 3 weeks before placement of concrete. Drawings, will show formwork details and illustrate dimensions, method of placing of concrete, connections and support.

- .5 Strip formwork after minimum seven (7) days. This condition might be waived only if an alternative method to curing and preventing alternate wetting and drying is provided, to the satisfaction of the Departmental Representative. This condition will be waived if the forms are left permanently in place, where approved by the Departmental Representative.
- 3.4 Placement of Concrete
- .1 Place and consolidate concrete to CSA A23.1. Concrete to be placed in dry form condition, by coordinating pour with low tide.
 - .2 Place concrete in areas that are completely clean, free from water, ice, debris, and all unsuitable materials. Permit the Departmental Representative to review the prepared substrate prior to placement of concrete.
 - .3 Place all concrete within 1.5 hours of initial mixing. If 1.5 hours is insufficient, provide a set retarder sufficient in quantity to allow for proper placement.
 - .4 If allowed by Departmental Representative, pump concrete to following requirements:
 - .1 Arrange equipment so that no vibrations result which might damage freshly placed concrete.
 - .2 Where concrete is conveyed and placed by mechanically applied pressure, provide suitable equipment.
 - .3 Operate pump so that concrete, without air pockets, is produced.
 - .4 When pumping is discontinued and concrete remaining in pipe line is to be used, void pipe line in a manner that prevents contamination of concrete or separation of ingredients.
 - .5 Concrete will be deposited in all cases as neatly as practicable, directly in its final position, and will not be caused to flow in a manner to permit or cause segregation.
 - .6 Vibrate and tamp each layer of concrete with an appropriate vibrator as allowed by the Departmental Representative. The concrete

must be compacted to the maximum practicable density, free of air pockets, and until it is in complete contact with the reinforcement and formwork.

- .7 Concrete with a temperature less than 10°C or greater than 30°C at the time of delivery or placement shall not be used.

3.5 Inserts

- .1 Set galvanized sleeves and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100mm not indicated on the structural drawings must be approved by the Departmental Representative.
- .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Departmental Representative before placing of concrete.
- .3 Any galvanized items embedded in concrete shall be completely separated from reinforcing steel.
- .4 Anchor bolts:
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With Departmental Representative's agreement, grout anchor bolts in pre-formed holes or holes drilled after concrete has set. Formed holes to be at least 100mm in diameter. Drilled and epoxied or grouted holes to be minimum 25mm larger in diameter than bolts used, unless indicated otherwise by manufacturer's recommendations.
 - .3 Protect anchor bolt holes from water accumulations.
 - .4 Set bolts and fill holes with non-shrink grout.

3.6 Finishing

- .1 Finish concrete in accordance with CSA A23.1.
- .2 Grind off fins, nibs and other raised protuberances with an approved hand stone.

- .3 When concrete has hardened sufficiently, give deck surface a uniform finish free from porous spots, irregularities, depressions, small pockets or rough spots.
 - .4 On exterior slabs provide coarse broom finish using steel wire or stiff, coarse, fibre broom. Use broom in a transverse ridges satisfactory to Departmental Representative. Brooming will be delayed until concrete is sufficiently hard to retain ridges.
 - .5 Interior slabs and floor finish classification:
 - .1 Concrete slab-on-grade are to have a moderately flat finish as defined in CSA A23.1, Table 21, Class B.
 - .2 Surface tolerances are to be within the specified limits of CSA A23.1, Table 15.
 - .6 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise detailed.
- 3.7 Protection and Curing
- .1 Provide protection and curing in accordance with CSA A23.1.
 - .2 Protect concrete with windproof shelter(s) to allow free circulation of inside air around fresh concrete. Do not let walls of shelter touch formwork. Provide sufficient space in shelters for removal of formwork.
 - .3 Keep concrete surfaces continuously moist during concrete curing and protection stage and allow concrete to dry gradually before removal of protection.
 - .4 Protect freshly deposited concrete from premature drying and excessively hot and cold temperatures and shall maintain concrete without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete. Freshly deposited concrete shall be protected from the harmful effects of sunshine, drying winds, cold and hot weather, running or

surface water, mechanical shock, vandalism, etc.

- .5 When the air temperature is at or below 10°C or when there is a probability of falling below 10°C within 24 hours of placing, as forecast by the nearest official meteorological office, all materials and equipment needed for adequate protection and curing during cold weather shall be on hand and ready for use before concrete placement is started. Extent of such preparation shall be in accordance with the requirements of CSA A23.1 and to the approval of the Departmental Representative.
- .6 When placing concrete during cold weather, adequate protection of concrete shall be provided for the duration of the curing and protection period as defined in CSA A23.1, clause 7.4.1. Protection shall be provided by means of heated enclosures, coverings, insulation, or a suitable combination of these methods.
- .7 Enclosures:
 - .1 Construct to withstand wind and snow loads.
 - .2 Make reasonably air tight.
 - .3 Housing to provide sufficient space between the concrete and the enclosure to permit free circulation of warmed air.
 - .4 Supply heat to the enclosure by live steam, forced hot air, stationary heaters or other heaters of various types. Exhaust fumes shall be exhausted from enclosures and there shall be no build-up of exhaust fumes within heated enclosures.
- .8 Take extreme care with curing methods during cold or hot weather concreting and shall supply approved equipment in order to maintain inside air within the following temperatures.
 - .1 For initial three (3) consecutive days at not less than 10°C and not more than 25°C, at surfaces.
 - .2 Wet cure concrete for additional four (4) consecutive days at not less than

- 10°C and not more than 35°C for the time necessary to attain 70% of the specified strength.
- .3 Maintain temperature of concrete as close as possible to suggested minimum temperature of 10°C during the curing period.
 - .4 If using silica fume in concrete, use additional curing procedures and extend cure time, as necessary.
 - .5 Reduce temperature near end of curing period at rate not exceeding 20°C per day.
 - .6 No salt or other chemical shall be used to lower the freezing point of the concrete as a substitute for the specific curing and protection.
 - .7 Do not overheat concrete.
- .9 Hot Weather Concreting: When the air temperature is at or above 27°C (25°C for high performance concrete), or is likely to rise above 27°C within 24 hours, take special measures, as detailed in CSA A23.1 to protect the concrete from the effects of hot and/or drying weather conditions. The temperature of the formwork, reinforcing steel or the material which the concrete is to be placed, must not exceed 27°C (25°C for high performance concrete). Concrete temperatures must not exceed those specified in CSA A23.1, Table 16.
- .10 Protection classes: Protection and curing depends upon the outside temperature, the wind velocity, and the size of the concrete section. Under normal circumstances the following methods of protection may be required to maintain the protection necessary for the conditions described.
- .1 Heating of the mixing water and/or aggregated will be required for all classes of protection.
 - .2 When the outside temperature during placing or during the protection period may fall below 5°C, provide adequate covering of all surfaces with tarpaulins or polyethylene sheets.
 - .3 When the outside temperature during placing or during the protection period may fall below 0°C, cover all

- surfaces with an approved insulating material, over which tarpaulins or polyethylene sheets are placed.
- .4 When the outside temperature during placing or during the protection period may fall below -5°C , a complete housing of the concrete, together with supplementary heat, shall be provided. Confirm heat is supplied uniformly around the concrete.
 - .5 For mass concrete, defined as minimum section dimension in excess of 2m, the temperature gradient must not exceed $20^{\circ}\text{C}/\text{m}$ from the interior of the element to the exterior face.
 - .6 In thin sections, less than 2m, the temperature gradient must not exceed 20°C .
 - .7 Steam or hot air blowers may be used, but provide a means of maintaining relative humidity of not less than 95%.
 - .8 When dry heat is used, hot air is not to be permitted to flow directly onto the concrete surface. Vent exhaust fumes.
 - .9 The protection and curing will continue to maintain the temperature of the concrete at not less than 10°C for five (5) days after placing. Keep the concrete above 0°C for a total period of fourteen (14) days.
 - .10 At the end of the curing and protection period, withdraw protection and heating in such a manner as not to induce thermal shock stresses in the concrete.
 - .11 Gradually reduce the temperature of the concrete to avoid cracking due to sudden temperature changes near the end of the curing period. Do not fully remove the protection until the concrete has cooled to the temperature differential stated in Table 18 of CSA A23.1.
- 3.8 Field Quality Control .1 Inspection and testing of concrete and concrete materials will be carried out by Testing Laboratory designated by the Departmental Representative in accordance with CSA A23.1.

- .2 Departmental Representative will pay for Quality Control costs of tests as specified in Section 01 45 00.
- .3 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 If tests do not meet requirements of the Departmental Representative, take such measures as indicated in CSA A23.1 and CSA A23.2. Additional testing required due to defective materials or failed test shall be at Contractor's cost.
- .5 Arrange and pay for inspection and testing when necessary for production control to meet requirements.
- .6 Inspection and testing by Departmental Representative will not augment Contractor's quality control or relieve him of contractual responsibility.

3.9 Defective Work

- .1 Concrete is defective when:
 - .1 It fails to meet any requirement of this specification.
 - .2 The concrete contains honeycombing or embedded debris.
 - .3 The 56-day strength in any area is less than 95% of specified minimum.
 - .4 Concrete test results fail any other aspect/test of CSA A23.1.
- .2 If concrete is found to not meet these specifications or code requirements, repair or remove and replace defective work as directed by Departmental Representative, at no additional cost to the Contract.
- .3 If necessary, take corrective measures as directed by the Departmental Representative to prevent the occurrence of further defective concrete.

----- END OF SECTION -----

PART 1 - GENERAL

1.1 Reference
Standards

- .1 Do Concrete work in accordance with CSA standard A23.1-14, Concrete Materials and Methods of Concrete Construction, except where stricter standards specify otherwise.
- .2 Do testing for concrete in accordance with CSA standard A23.2-14, Methods of Test for Concrete, except where stricter standards specify otherwise.
- .3 CAN/CSA A3000-13, Cementitious materials compendium.
- .4 ASTM C494-15A, Chemical Admixtures for Concrete

1.2 Definitions

- .1 Tremie concrete is placed underwater through a tube called a tremie pipe. Tremie pipe has a hopper at upper end and may be open ended or may have a foot valve, plug or travelling plug to control flow of concrete. Concrete is placed in hopper and a sufficient head of concrete is maintained in tremie pipe to provide desired rate of flow.
- .2 Pumped concrete method of placing concrete underwater uses a concrete pump with a discharge line used in a similar manner to a tremie pipe.

1.3 Samples

- .1 Submit shop drawings in accordance with Section 01 33 00
- .2 Shop drawings shall clearly indicate the size and location of existing voids and the procedures for filling and restraining the pumped concrete. All materials shall be clearly identified on these drawings.

1.4 Certificates

- .1 Minimum two (2) weeks prior to starting concrete work submit to Departmental Representative, manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials will meet specified requirements:
 - .1 Cement Type: as per CSA A23.1.
 - .2 Admixtures.

- .3 Aggregates.
 - .4 Water.
 - .2 Provide certification that plant, equipment and materials to be used in concrete comply with requirements of CSA standard A23.1
 - .3 Provide certification that mix proportions selected will produce concrete of specified quality, yield, strength, and will comply with CSA standard A23.1
 - 1.5 Ready-Mix Concrete Supply
 - .1 Provide with each load of concrete delivered to site, duplicate delivery slips containing following:
 - .1 Name of ready-mix batch plant.
 - .2 Serial number of ticket.
 - .3 Date and truck number.
 - .4 Name or number of project.
 - .5 Class of concrete or mix.
 - .6 Amount of concrete in cubic metres.
 - .7 Time of loading or first mixing of aggregate, cement and water.
 - .8 Time that discharge of concrete begins and ends.
 - .9 Type and quantity of admixtures added at plant.
 - .10. Quantity of water added at plant.
 - 1.6 Measurement For Payment
 - .1 Underwater concrete placed by the tremie pipe method or the pumped concrete method will not be measured as a separate item. Refer to Section 01 29 00 for basis of payment.
 - .2 Underwater Concrete: Removal of silt, soft material and debris as specified will be considered incidental to the work and no separate payment will be made.
- PART 2 - PRODUCTS
- 2.1 Materials
 - .1 Concrete materials: to Section 03 30 00, Cast-in-Place Concrete.
 - .2 Reinforcing Steel: Comply with Section 03 20 00.

2.2 Concrete Mixes

- .1 For underwater concrete:
 - .1 Class C3 with exposure requirements S3.
 - .2 Compressive strength and 28 days:
35MPa.
 - .3 Aggregate size: 20m.

2.3 Admixtures

- 1. Admixtures will be subject to approval of Departmental Representative. Admixtures will only be permitted to correct deficiencies in mix or to improve placement of concrete.
- 2. Departmental Representative may withdraw prior approval of admixture if conditions encountered during course of work indicate unsatisfactory performance.
- 3. Do not use calcium chloride or materials containing calcium chloride.

PART 3 - EXECUTION

3.1 General

- .1 Do concrete work in accordance with CSA standard A23.1

3.2 Preparation

- .1 Notify Departmental Representative at least 48 hours in advance of intention to commence underwater work.
- .2 Prior to placement of pumped concrete, remove silt, soft material, organic material and debris from the area. Use high pressure water jets or an airhose.
- .3 Place concrete in one continuous operation to full depth required, except as may be indicated on drawings, related to maximum "lift" height. Provide sufficient supply of concrete to complete pour without interruption and supply complete equipment for every phase of operation.
- .4 Where concrete must bond to existing surfaces, clean surfaces just prior to concrete placement. Use water jets, mechanical scrapers and other means to remove marine growth, deteriorated concrete and rust scale on metal surfaces.

3.3 Tremie Method

- .1 Provide tremie pipe which is watertight and sufficiently large to allow free flow of concrete. Diameter of tremie pipe to be not less than 200 mm or less than eight times maximum size of coarse aggregate.
- .2 Provide hopper at top of tremie pipe and means to raise and lower tremie.
- .3 Provide plug or foot valve at end of tremie pipe to permit filling pipe with concrete initially.
- .4 Provide minimum of two (2) tremie pipes for every 9m² of pour plan area or maximum of 3 m centre to centre. Do not move tremie pipes laterally by dragging through concrete.
- .5 Start pour with tremie pipe full of concrete and keep end of pipe buried in freshly placed concrete at least 300 m. Control rate of flow by increasing or decreasing depth of end in concrete.
- .6 If seal is lost, allowing water to enter pipe, withdraw pipe immediately.
- .7 If tremie operation is interrupted so that a horizontal construction joint has to be made, cut surface laitance by jetting, within 24 to 36 h and remove loose material by pumping or air lifting before placing next lift.
- .8 Do not place concrete in flowing water. Do not vibrate, disturb or puddle concrete after it has been placed.

3.4 Pumped Concrete Method

- .1 Follow procedures as for tremie method in placing concrete using discharge line from concrete pump as tremie pipe.
- .2 Pump discharge line to have minimum diameter approved by Departmental Representative.

----- END OF SECTION -----

PART 1 - GENERAL

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|-----|----------------------------|-----|--|
| 1.1 | <u>Work Included</u> | .1 | This section specifies the requirements for furnishing all materials, labour, tools and equipment, and performing all operations necessary to complete all miscellaneous metal and fabricated items, as shown on the Project Drawings and specified in this section. |
| 1.2 | <u>Reference Standards</u> | .1 | ASTM A53/A53M latest edition, Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless. |
| | | .2 | ASTM A123/A123M latest edition, Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. |
| | | 3 | ASTM A153/A153M-16a, Standard Specification for Zinc Coatings (hot-dip) or Iron and Steel Hardware. |
| | | .4 | ASTM A307-14, Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength. |
| | | .5 | ASTM A193/193M-19, Standard Specification for Alloy-Steel and Stainless-Steel bolting for High Temperature or High-Pressure Service and Other Special Purpose Applications. |
| | | .6 | ASTM A563-15, Standard Specification for Carbon and Alloy Steel Nuts. |
| | | .7 | ASTM F3125/F3125M-15a, Standard Specifications for High Strength Structural Bolts, Steel and Alloy Steel, Heat-Treated, 120ksi (830MPa), and 150ksi (1040MPa) minimum tensile strength, inch and metric dimensions. |
| | | .8 | CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel. |
| | | .9 | CSA G164-18, hot-dip galvanizing of irregularly-shaped articles. |
| | | .10 | CAN/CSA-S16.1-14, Limit States Design of Steel Structures. |
| | | .11 | CSA-W59-13, Welded Steel Construction (Metal-arc Welding). |

- .12 CAN/CGSB-85.10-99, Protective Coatings for Metals.
 - .13 Stainless-steel: conform to Grade 316 and be in accordance with following standard:
 - .1 Bolts-ASTM F593.
 - .2 Nuts-ASTM F594
 - .3 Plates-ASTM A240 and or ASME SA-240.
 - .4 Rolled bars and angles-ASTM A276.
 - 1.3 Related Work
 - .1 Refer to other Specification sections for related information.
 - .2 Refer to Section 01 33 00 for shop drawings/submission requirements.
 - 1.4 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Shop Drawings:
 - .1 Clearly indicate the following items:
 - .1 General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures.
 - .2 Locations, sizes and installation tolerances of anchor bolts, eye bolts and embedded parts.
 - .3 Types of materials used, finishes and core thickness.
 - .4 All other pertinent details and accessories.
 - .3 Test Results:
 - .1 Provide test results for any galvanized items.
 - .2 Provide manufacturer mill certificates for threaded bars and H-piles with material shipped to site and have submitted for review.

PART 2 - PRODUCTS

- 2.1 Materials
 - .1 Structural Steel: hot-rolled structural steel conforming to CSA G40.20/G40.21, Grade 350w (Fy=350MPa) or, alternatively, ASTM A992 (Fy=345MPa) for wide flange shapes channels, plates, round bar and angles.
 - .2 Hollow structural sections (HSS) shall be Class C, Grade 350W (Fy=350MPa) or,

alternatively, ASTM A500, Grade C (Fy=345MPa).

- .3 Anchor bolts (rods): to ASTM A307, ASTM F1554 (Grade 36ksi/248MPa Yield Strength) and ASTM F593, unless otherwise noted.
- .4 Bolts, nuts, and washers: to ASTM F3125/F3125M.
- .5 Welding materials: to CSA W59 and certified by Canadian Welding Bureau, Electrodes: E49XX.
- .6 Galvanizing: hot-dipped galvanizing with minimum zinc coating at 705 g/m² to ASTM A123 or CSA G164.
- .7 Steel plates for fender brackets and channels: to CSA G40.20-13/G40.21-13 Grade 350w or ASTM A992, Grade 50.
- .8 Miscellaneous plates, angles and round bar to CSA G40.20-13/G40.21-13 Grade 300w.
- .9 Threaded rods for fender brackets: A193/193M-19, Grade B7.
- .10 Adhesive Anchors: Two component tube-injected system conforming to ASTM C881 Type 1, II, IV and V Grade 3. Adhesive to be tested in accordance with the ICC-ES acceptance criteria for post-installed adhesive anchors in concrete elements (AC308). Technical data to be published in an ICC-ES Evaluation Service Report showing compliance with ACI 318 and/or CSA A23.3 installation of adhesive anchors, including drilling of holes, preparation, storage, usage, and curing to be in accordance with the manufacturers written instructions.
 - .1 Acceptable products:
 - .1 Hilti HIT-RE500 V3, as manufactured by Hilti (Canada) Corporation.
 - .2 Approved equivalent.

2.2 Fabrication

- .1 Workmanship and finish must be equal to the best practice of modern shops for each item of work.
- .2 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

- .3 Provide exposed surfaces with a smooth finish and sharp, well defined lines and arises. Form sections to shape and size shown with sharp lines and angles.
 - .4 Confirm castings have sharp corners and edges, and are clean, smooth and true to pattern.
 - .5 Make exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.
 - .6 Where possible, fit and shop assemble work, ready for installation.
 - .7 Fabricate miscellaneous steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop Drawings.
- 2.3 Miscellaneous Metal Work Items
- .1 Anchors, adhesive anchors, bolts and inserts:
 - .1 Provide as required to fasten miscellaneous metal items to concrete.
 - .2 Where sizes, kinds and spacing of anchors are not indicated or specified, provide as necessary for the purpose as approved by the Departmental Representative.
 - .3 Hot-dip galvanize all anchors, bolts and inserts.

PART 3 - EXECUTION

- 3.1 Installation
- .1 Install metalwork square, plumb and true using welded connections wherever possible to provide rigid structures. Provide anchor bolts, bolts and plates as necessary for connecting to structure of types acceptable to the Departmental Representative.
 - .2 Hand over items for casting into concrete to appropriate trades together with setting templates.
 - .3 Touch-up field welds, bolts, and burnt or scratched surfaces with primer after installation.
 - .4 Touch-up galvanized surfaces with zinc-rich primer.

- 3.2 Connection to
Existing Work
- .1 Verify dimensions and condition of existing work, report any discrepancy and potential problem areas to Departmental Representative for direction before commencing fabrication.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification Sections for related information.
- .2 Refer to Section 01 33 00 for Shop Drawing/Submission requirements.
- 1.2 Source Approval .1 Source of materials to be incorporated into work or stockpiled requires acceptance.
- .2 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .3 If, in opinion of Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements.
- .4 Should a change of material source be proposed during work, advise Departmental Representative 4 weeks in advance of proposed change to allow sampling and testing.
- .5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- 1.3 Production Sampling .1 Aggregate will be subject to continual sampling during production.
- .2 Provide Departmental Representative with ready access to source and processed material for purpose of sampling and testing.

PART 2 - PRODUCTS

- 2.1 Materials .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or

- laminated particles, organic material or other deleterious substances.
- .2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.
- .3 Fine aggregates satisfying requirements of applicable section shall be one, or a blend of following:
 - .1 Screening produced in crushing of quarried rock, boulders, gravel or slag
 - .2 Coarse aggregates satisfying requirements of applicable section shall be one of following:
 - .1 Crushed rock or slag
 - .2 Gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

- 3.1 Processing .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregate if required to obtain gradation requirements specified. Use approved methods and equipment.
 - .3 Wash aggregates if required to meet specifications. Use only equipment accepted by Departmental Representative.
- 3.2 Handling .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- 3.3 Stockpiling .1 Stockpiling aggregates on stabilized, clean and well drained surfaces.
 - .2 To ensure that no material other than stockpiled aggregate is used, do not incorporate bottom 250 mm of stockpile into work, if aggregates are stockpiled on ground.
 - .3 Stockpile far enough apart to prevent intermixing.
 - .4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed.

- .5 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .6 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Description of Work
- .1 This Section specifies requirements for work above Chart Datum, such as furnishing all materials, labour, tools and equipment and performing all operations necessary to strip and remove over burden from areas designated, complete excavation of all types of material encountered, placing of excavated material as backfill in trenches and embankments, disposal of unsuitable or frozen material, disposal of surplus material, furnishing and placing backfill material as specified below, all as shown on the Project Drawings and as specified.
- .2 The work generally includes, but is not necessarily limited to, the following items:
- .1 All normal removals as required to complete the work. All items to be verified by a site visit prior to submission of a tender as per Section 01 10 10, Clause 1.14.
- .2 Preparing ground for excavation.
- .3 Excavation and backfilling.
- .4 Structure excavation and backfilling.
- .5 Control of water by dewatering.
- .6 Providing borrow material when required.
- .7 Removal and disposal of frozen or unsuitable material.
- .8 Removing surplus material.
- .9 Sheet piling, shoring and bracing to support sides of excavations, existing structures or utilities.
- .10 Stripping, and replacing asphalt and granular surfaces.
- 1.2 Related Sections
- .1 Refer to Section 01 33 00 for Submissions/Shop Drawings.
- .2 Section 32 11 23 - Granular Base
- .3 Section 32 98 00 - Reinstatement
- 1.3 References
- .1 ASTM C117-17, Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

- .2 ASTM C136/C136M-14, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63(R2007), Standard Test Method for Particle-size Analysis of Soils.
 - .4 ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12400 ft-lbf/ft²(600 kN-m/m³)).
 - .5 ASTM D4318-17E1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .6 Prince Edward Island Department of Transportation, Infrastructure and Energy Standard Specifications.
- 1.4 Definitions
- .1 Excavation: excavation of materials of whatever nature including dense tills, hardpan, frozen materials, boulders, bedrock, debris and all other materials encountered on the site.
 - .2 Selected Backfill: excavated on-site material suitable for grading work.
- 1.5 Protection of Existing Features
- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed. Carry out test digs as required to locate services, etc.
- 1.6 Shoring and Bracing
- .1 Comply with Section 01 35 29.06 - Health and Safety Requirements and applicable local regulations.
 - .2 Provide shoring and bracing as required to prevent movement, failure or settlement, to safeguard and maintain integrity of structures, utilities, earth, benchmarks, services and adjacent grades.

- .3 Engage services of qualified Professional Engineer registered in the Province of Prince Edward Island to inspect and approve shoring equipment required for work.

1.7 Samples

- .1 When requested, submit samples in accordance with Section 01 33 00 - Submissions/Shop Drawings.
- .2 At least two (2) weeks prior to commencing work, inform Departmental Representative of proposed source of bedding, backfill or cover materials and provide access for sampling.

PART 2 - PRODUCTS

2.1 Materials

- .1 Select Backfill Material: approved material from site excavation or borrow pits. Such material must be free from stumps, trees, roots, sod, muck or other deleterious material. The material shall be free from frost, and shall not be placed on frozen ground or in water. It must have a moisture content that will allow compaction to the specified densities.
- .2 Sandstone Fill: native excavated material in accordance with PEI DOTIE Specifications for Select Borrow.

PART 3 - EXECUTION

3.1 Site Preparation

- .1 Remove obstructions from surfaces to be excavated within limits indicated.

3.2 Preparation/Protection

- .1 Keep excavations clean, free of standing water and loose soil.
- .2 Protect natural and man-made features required to remain undisturbed.
- .3 Protect buried services that are required to remain undisturbed.

- 3.3 Dewatering
- .1 Keep excavations free of water while work is in progress.
 - .2 Protect open excavations against flooding and damage due to surface run-off.
 - .3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.
- 3.4 Excavation
- .1 Carry out excavations and removals. Excavate to lines, grades, elevations and dimensions as indicated.
 - .2 Remove rubble and other obstructions encountered during excavation.
 - .3 Dispose of surplus and unsuitable excavated material in approved location off site in accordance with PEI Department of Environment regulations.
 - .4 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density not less than undisturbed soil.
 - .5 Obtain excavation permit prior to starting any on-site excavations.
- 3.5 Backfilling
- .1 Generally, the backfill will be sourced from the excavated material on-site. If additional backfill is required to replace unsuitable material, provide backfill from offsite source that matches the description provided herein. If additional engineered structural fill is required, provide in accordance with the specifications provided herein.
 - .2 Do not proceed with backfilling operations until the Departmental Representative has inspected and approved installation.
 - .3 Backfill areas that are free from debris, snow, ice, water and frozen ground.
 - .4 Do not use backfill material which is frozen or contains ice, snow or debris.

- .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.
- .6 Where earth pressures are liable to develop permit concrete to cure for minimum 28 days to withstand earth and compaction pressures. Do not install earth or backfill until concrete has cured completely.
- .7 Place protective material layer under, around and over minor installations until 600 mm of cover is provided. Dumping material directly on installations will not be permitted.
- .8 Place backfill materials of earth fill around structure in uniform layers not exceeding 150 mm compacted thickness up to finish grade. Compact each layer before placing succeeded layer.
- .9 Compact common backfill and sandstone fill materials:
 - .1 In all areas, compact to a minimum 98% of Standard Proctor maximum dry density, maximum density ASTM D698, AASHTO T099, Method C.
- .10 Compact granular surface material to a minimum 98% of Standard Proctor maximum dry density, maximum density AASHTO T099, Method C.
- .11 No fill shall be placed against reinforced concrete wall panels until the threaded bars are installed and tightened. Fill will be brought up evenly along the length of wall panels.
- .12 Initial fill placement activities to be scheduled during low tide periods to minimize the amount of fill to be placed directly in water.
- .13 Filling below the chart datum may be carried out by the simple end dumping process. The Contractor will ensure that large pieces, which will not render good consolidation and

compaction do not enter the work.

- .14 Commence infill above the chart datum as soon as possible with maximum 300 mm layers. Each layer will be brought to its required degree of compaction before the next layer is placed. When using hand operated tamping devices, deposit backfill material
- .15 Compact using approved mechanical tamping devices, or by hand tamping to achieve specified compaction.

3.6 Restoration

- .1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Departmental Representative.
- .2 Clean and reinstate areas affected by work as directed by Departmental Representative.
- .3 Restore site to its normal state prior to excavation.

----- END OF SECTION -----

PART 1 - GENERAL

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|-----|----------------------------|----|--|
| 1.1 | <u>Related Work</u> | .1 | Section 31 05 17 - Aggregates - General. |
| | | .2 | Section 31 23 33 - Excavating, Trenching and Backfilling. |
| 1.2 | <u>Reference Standards</u> | .1 | ASTM D698-12e1, Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) - Method C. |

PART 2 - PRODUCTS

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|-----|------------------|----|--|
| 2.1 | <u>Materials</u> | .1 | Sub-base material to Section 31 05 17. |
| | | .2 | The use of additional backfill material other than the material on site is subject to the approval of the Departmental Representative and is to be free from rocks larger than 150 mm, cinders, ashes, sods, refuse, or other deleterious materials. |

PART 3 - EXECUTION

- | | | | |
|-----|--|----|---|
| 3.1 | <u>Inspection of Existing Sub-Base Surface</u> | .1 | Do not place new granular sub-base until underlying backfill material is compacted, inspected and approved by the Departmental Representative. |
| 3.2 | <u>Placing</u> | .1 | Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow or ice. |
| | | .2 | Place sub-base material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved. |
| | | .3 | Shape each layer to a smooth contour and compact to specified density before the succeeding layer is placed. |
| | | .4 | Remove and replace portion of a layer in which material has become segregated during spreading. |
| 3.3 | <u>Compacting</u> | .1 | Compact sub-base material to density of not less than 98% maximum dry density in accordance with ASTM D698. |
| | | .2 | Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base. |

- .3 Apply water as necessary during compaction to obtain specified density. If sub-base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.
 - 3.4 Finish Tolerances
 - .1 Compact backfill material to the thickness as required to attain the grades indicated on the drawings.
 - .2 Finish compacted surface to within plus or minus 25 mm of established grade but not uniformly high or low.
 - .3 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
 - 3.5 Maintenance
 - .1 Maintain finished sub-base in condition conforming to this section until sub-base is accepted by Departmental Representative.

----- END OF SECTION -----

PART 1 - GENERAL

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|--|----|---|
| 1.1 <u>Work</u> | .1 | This section describes the work necessary to place granular base "Class A" (as per PEI DOTIE Specifications (latest edition)), granulars as shown on the drawings and as indicated in the specifications. It includes all labour, equipment and material necessary to execute the work. |
| 1.2 <u>Related Work</u> | .1 | Refer to Section 31 23 10 Excavating, Trenching and Backfilling. |
| 1.3 <u>Measurement
For Payment</u> | .1 | Granular base will be measured in accordance with Section 01 29 00. |
| 1.4 <u>References</u> | .1 | ASTM C 117-17, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing. |
| | .2 | ASTM C 131-14 (No. 200), Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine. |
| | .3 | ASTM C 136/136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. |
| | .4 | ASTM D 698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ³ (600kN-m/m ³)). |
| | .5 | ASTM D 1883-16, Standard Test Method for California Bearing Ratio of Laboratory Compacted Soils. |
| | .6 | ASTM D 4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils. |
| | .7 | PEI Department of Transportation, Infrastructure and Energy General Provisions and Contract Specifications for Highway Construction (latest edition). |

PART 2 - PRODUCTS

2.1 Materials

.1 Granular Base: Material to meet the following requirements:

- .1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Class "A" granular fill gradation will be within following limits:

ASTM SIEVE SIZE	% PASSING BY MASS
31.5 mm	100
25.0 mm	95 - 100
12.5 mm	50 - 83
4.75 mm	30 - 60
1.18 mm	15 - 40
0.600 mm	1 - 32
0.300 mm	5 - 22
0.075 mm	3 - 9

PART 3 - EXECUTION

3.1 Inspection of
Underlying Fill

.1 Do not place granular base until finished sub-grade surface is inspected and approved by Departmental Representative.

3.2 Placing

- .1 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
- .2 Place using methods which do not lead to segregation or degradation of aggregates.
- .3 Place material to full width in uniform layers not exceeding 150mm compacted thickness.
- .4 Shape each layer to a smooth contour and compact to specified density before succeeding layer is placed.

- 3.3 Compacting
- .1 Compact to density not less than 100% maximum dry density in accordance with ASTM D698.
 - .2 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.
- 3.4 Finish Tolerances
- .1 Finished surface shall be within plus or minus 10 mm of established grade but not uniformly high or low.
 - .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.5 Maintenance
- .1 Maintain finished base in a condition conforming to this section until succeeding material is applied or until acceptance.

----- END OF SECTION -----

PART 1 - GENERAL

- | | | | |
|-----|---|----|--|
| 1.1 | <u>Description</u> | .1 | This section specifies requirements for supplying, hauling, placing, shaping and compacting of hot-mix asphalt concrete. |
| 1.2 | <u>Reference Standards</u> | .1 | PEI Department of Transportation, Infrastructure and Energy General Provisions and Contract Specifications for Highway Construction (Latest Edition). |
| 1.3 | <u>Related Work Specified Elsewhere</u> | .1 | Refer to Section 32 11 23 - Granular Base. |
| 1.4 | <u>Source Sampling</u> | .1 | Inform Departmental Representative of proposed source of asphaltic concrete, and provide access for sampling at least two weeks prior to commencing hauling this material to plant site. |
| 1.5 | <u>Production Sampling</u> | .1 | Use only material approved by Departmental Representative. |
| | | .2 | One or more samples per day to be taken of mix, or components thereof, being produced to determine compliance with general and special requirements. |
| 1.6 | <u>Measurement For Payment</u> | .1 | Hot mix asphalt paving will be measured in accordance with Section 01 29 00. |
| | | .2 | Regarding of base material prior to placement of new asphalt will be considered incidental to the work. |
| | | .3 | Supply and application of tack coat will be included in the cost of asphalt. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|---|
| 2.1 | <u>Materials</u> | .1 | Hot-mix Asphaltic Concrete design mix formula to be provided to Departmental Representative two weeks prior to commencing paving operations. Submit design mix for review providing at least the following information: |
| | | .1 | Nominal aggregate size |
| | | .2 | Marshall Strength at 60°C |
| | | .3 | Marshall Stability at 60°C |
| | | .4 | Flow Index |
| | | .5 | Percent Air Voids in Mixture |

- .6 Min. % Voids in Mineral Aggregate
- .7 Retained Stability
- .2 Hot mix asphalt paving shall meet the requirements of PEI Department of Transportation, Infrastructure and Energy standard specifications and shall be:
 - .1 Base, Type A.
 - .2 Seal, Type B.
- .3 Do not change job mix without prior approval of Departmental Representative. Should a change in a material source be contemplated, a new job mix formula to be provided to Departmental Representative and approved prior to installation.
- .4 Asphalt tack coat meeting the requirement of PEI Department of Transportation, Infrastructure and Energy standard specifications.

PART 3 - EXECUTION

- 3.1 Equipment
 - .1 Pavers: Provide mechanical grade controlled self-powered pavers capable of spreading mix, within specified tolerances, true to line, grade, and crown indicated on plans.
 - .2 Rollers: Provide sufficient number of rollers of type and weight to obtain specified density of compacted mix.
 - .3 Haul Trucks: Provide trucks of such size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and mass to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each box.
 - .4 Trucks which cannot be weighed in a single operation on scales supplied will not be accepted.
 - .4 Hand Tools:
 - .1 Provide lutes or rakes with covered teeth during spreading operation when finishing by hand.
 - .2 Provide straight edges, 2.4 m in length to test finished surface.

- .3 Provide tamping irons having weight not less than 12 kg and a bearing area not exceeding 310 sq. cm for Consolidating material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, approved by Departmental Representative, may be used instead of tamping irons.
- 3.2 Preparation
 - .1 When paving over existing asphalt surface, clean pavement surface to remove dust, contaminants, loose and foreign materials, oil and grease and apply asphalt tack coat.
 - .2 Prior to laying mix, clean surfaces of loose and foreign material.
- 3.3 Transportation of Mix
 - .1 Transport mix to job site in vehicles cleaned of foreign material which may affect mix.
 - .2 Paint or spray truck beds with light oil, limewater, soap or detergent solution, at least once a day or as often as required. After this operation, elevate truck bed and thoroughly drain; no excess solution is permitted.
- 3.4 Placing
 - .1 General
 - .1 Place asphalt mixtures only when base of lower course is dry and air temperature is above 5°C.
 - .2 When surface temperature on which material is to be placed falls below 10°C, provide extra rollers to compact mix before it cools too much to obtain required density.
 - .3 Do not mix and place hot-mix asphalt when moisture of aggregate in stockpile or from dryer interferes with quality of mix production or with normal plant operations, or when pools of water are observed on surface to be paved.
 - .2 Construct asphalt concrete to design depth, width, and grade.
 - .3 Place asphalt concrete mix at temperature not less than 120°C at time of placing.
 - .4 Place asphalt concrete mix in layers with minimum thickness of 25 mm.
 - .5 Commence spreading at high side of pavement or at crown.

- .6 Employ experienced racers to correct irregularities prior to rolling.
- .7 Spread and strike off mixture with self-propelled mechanical finisher.
 - .1 Construct longitudinal joints and edges to true line markings.
 - .2 When paving against a compacted mixture that has cooled, paint edge of previously laid lane with a thin coating of asphaltic material or heat joint with an Infra Red-type joint heater mounted on side of paving machine.
 - .3 When segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
 - .4 Correct irregularities in alignment left by paver by trimming directly behind machine.
 - .5 Correct irregularities in surface of pavement course directly behind paver.
- .8 When hand spreading is used:
 - .1 Distribute material uniformly. Broadcasting of material will not be permitted.
 - .2 Provide heating equipment used for keeping hand tools free from asphalt. Prevent high heating temperatures which may burn material. Temperature of tools when used shall not be greater than temperature of mix being placed.
- 3.5 Compacting
 - .1 Start rolling operations as soon as placed mixture can bear mass of roller without undue displacement of material or cracking of surface.
 - .2 Operate roller slowly initially to avoid displacement of material. Subsequent rolling not to exceed 5 km/h for steel-wheeled rollers and 8 km/h for pneumatic-tired rollers.
 - .3 Overlap successive trips of roller by at least one half width of roller and alternate trip lengths.
 - .4 Keep wheels of roller slightly moistened with water to prevent pick-up of material, but do not over water.

- .5 Roll material continuously to a density not less than 98% of density obtained with marshal specimen prepared from plant mix.
- .6 General:
 - .1 Provide minimum two rollers and as many additional rollers as necessary to achieve specified pavement density. When more than two rollers are required, one roller must be a pneumatic-tired type.
 - .2 Operate rollers at a slow but uniform speed with drive roll or wheel nearest paver.
 - .3 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling. Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
- .7 Breakdown Rolling:
 - .1 Commence breakdown rolling immediately following rolling of longitudinal joint and edges.
 - .2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.
 - .3 Operate breakdown roller with drive roll or wheel nearest finishing machine. Exceptions may be made when working on steep slopes or super-elevated sections.
 - .4 Use only experienced roller operators for this work.
- .8 Second Rolling:
 - .1 Use pneumatic-tired, tandem or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix is still of a temperature that will result in maximum density from this operation.
 - .2 Rolling shall be continuous after initial rolling until mix placed has been thoroughly compacted.
- .9 Finish Rolling:
 - .1 Accomplish finish rolling with two-axle tandems or three- axle tandems while material is still warm enough for removal of roller marks. If necessary to obtain desired surface finish, Departmental

Representative shall specify use of
pneumatic-tired rollers.

- .2 Conduct rolling operations in close
sequence.

3.6 Joints

.1

General:

- .1 Trim vertical face to provide true surface
and cross section against which new pavement
may be laid. Remove loose particles.
- .2 Paint joint face with thin coat of hot
asphalt cement or cut back asphalt or
preheat joint face with approved heater,
prior to placing of fresh mixture.
- .3 Overlap previously laid strip with spreader
by 100 mm.
- .4 Rake fresh mixture against joint and
thoroughly tamp and roll.
- .5 Remove any material from surface of
previously laid strip.
- .6 Do not throw surplus material on freshly
screened mat surface.

.2

Longitudinal joints:

- .1 Roll longitudinal joints directly
behind paving operation.
- .2 Before rolling, carefully remove with a lute
or rake, and discard coarse aggregate in
material overlapping joint.

.3

Ensure joints are offset at least 150 to 200 mm
from those in lower layers.

3.7 Finish

Tolerances

.1

Finish pavement surfaces smooth and true to
design line, crown, and grade.

.2

Remove irregularities exceeding 5 mm when checked
with a 2.4 m long straight edge placed in any
direction and replace with new material and
compact.

.3

Use straight edge at transverse joints and along
pavement to check for surface irregularities.

3.8 Defective Work

.1

Repair areas showing checking or hairline
cracking to the approval of the Departmental
Representative.

----- END OF SECTION -----

PART 1 - GENERAL

- 1.1 Work Included
- .1 The work of this Section consists of furnishing all materials, labour, tools and equipment and performing all operations necessary for the complete reinstatement of surfaces and structures disturbed by work of this Contract.
 - .2 Repair damage or disturbance to surfaces, properties and structures, within limits of the Site or elsewhere on other properties occupied, traversed or otherwise used by the Contractor during the Contract period to a condition equal to or better than that before work began, at no additional cost to the Contract.
- 1.2 Related Work
- .1 Excavating, Trenching and Backfilling: Section 31 23 10.
- 1.3 References
- .1 PEI Department of Transportation, Infrastructure and Energy Standard Specifications.
- 1.4 Maintenance
- .1 Maintain all reinstated areas until final acceptance of the work.
 - .2 Repair damaged areas to the approval of the Departmental Representative.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Structural Fill: in accordance with Section 31 23 10.
 - .2 Asphalt material: as specified by PEI DOTIE, Division 500 and in accordance with Section 32 12 16.

PART 3 - EXECUTION

- 3.1 General
- .1 Maintain surfaces to be reinstated level with adjoining existing surfaces with gravel until

final reinstatement.

- .2 Stockpile and protect removed items scheduled for reinstatement. Repair or replace any item that has been damaged due to inadequate protection.
- 3.2 Concrete Surfaces
 - .1 Carry out final reinstatement of concrete surfaces as follows:
 - .1 Cut back broken edges of original pavement to full depth, in straight lines.
 - .2 Before placing final surface material, remove existing gravel to a depth indicated over disturbed area, grade and re-compact. Add gravel to compacted depths indicated. Compact to not less than 100% Maximum Corrected Dry density.
 - .3 Place and finish concrete in accordance with Section 03 30 00.
 - .4 Ensure finished surface is even, dense and matches grade of existing road or surface, as approved by the Departmental Representative.
- 3.3 Asphalt Surfaces
 - .1 Keep surface of asphalt paved roads and surfaces in good condition by repairing settlement of backfilling as described in Section 31 23 10.
 - .2 Carry out final reinstatement of asphalt surfaces as follows:
 - .1 Cut back broken edges of original pavement to full depth, in straight lines. Cut back 300 mm minimum from edge of excavation to eliminate tension cracks. Clean contact surfaces and apply tack coat before placing asphalt concrete.
 - .2 Before placing final surface material, remove existing gravel to a depth indicated over disturbed area, grade and re-compact. Add gravel to compacted depths indicated. Compact to not less than 100% Maximum Corrected Dry density.
 - .3 Mill asphalt to offset joints between the asphalt seal and base layer by 300 mm.
 - .4 Supply, place, roll and compact asphalt mixture in accordance with Section.
 - .5 Compact asphalt concrete in lifts not exceeding 50 mm in thickness.

.6 Confirm finished surface is even, dense
and matches grade of existing road or surface,
as approved by the Departmental
Representative.

----- END OF SECTION -----

PART 1 - GENERAL

1.1 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1-04/A23.2-latest edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA G30.18M-09, latest edition, Carbon Steel Bars for Concrete Reinforcement.
- .3 American Society of Testing and Materials (ASTM)
 - .1 ASTM C478/C478M-18, Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.

1.2 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submission/Shop Drawings.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 Delivery, Storage and Handling

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 60 00 - Materials and Equipment.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 Materials

- .1 Precast square catch pit riser units: to ASTM C478M.

PART 3 - EXECUTION

- | | | |
|--|----|---|
| 3.1 <u>Manufacturer's Instructions</u> | .1 | Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets. |
| 3.2 <u>Excavation and Backfill</u> | .1 | Excavate and backfill in accordance with Section 31 23 33 - Excavating Trenching and Backfilling and as indicated. |
| 3.3 <u>Installation</u> | .1 | Construct units in accordance with details indicated, plumb and true to alignment and grade. |
| | .2 | Set precast concrete base on 300 mm minimum of 25m clearstone bedding. |
| | .3 | Compact granular backfill to 98% correct maximum dry density. |

END OF SECTION

PART 1 - GENERAL

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|-----|-----------------------------|----|---|
| 1.1 | <u>Related Requirements</u> | .1 | Section 05 50 00: Metal Fabrications. |
| 1.2 | <u>References</u> | .1 | American Society of Testing and Materials International (ASTM). |
| | | .1 | ASTM A27 Steel Castings, Carbon, for General Applications. |
| | | .2 | ASTM F3125/3125M-15a. Standard specification for high-strength structural bolt, steel and alloy steel, heat-treated 830MPa and 1040 MPa minimum tensile strength, inch and metric dimensions. |
| | | .3 | ASTM A123/123M-15. Standard specification for zinc (hot-dip galvanized) coatings on iron and steel products. |
| | | .4 | ASTM A153/153M-16a. Standard specification for zinc coating (hot-dip) on iron and steel hardware. |
| | | .5 | Canadian Standards Association (CSA International): |
| | | .1 | CSA G40.20/G40.21, latest edition. General requirements for rolled or welded structural quality steel/structural quality steel. |
| | | .2 | CSA C22.1-06, Canadian Electrical Code, Part 1 (20 th Edition). Safety Standard for Electrical Installation. |
| 1.3 | <u>Description</u> | .1 | Design Requirements: |
| | | .1 | Design bollards and anchor bolts with a minimum factor of safety of 3.0 against failure and to conform to an internationally accepted Standard. |
| 1.4 | <u>Submittals</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submissions/Shop Drawings. |
| | | .2 | Product data: submit manufacturer's printed product literature, specifications and datasheet. |
| | | .3 | Submit shop drawings, indicating following items: |
| | | .1 | Bollard assemblies, with dimensions as installed on structures. |

.2 Anchorage assemblies, with dimensions as installed on structures.

PART 2 - PRODUCTS

2.1 Materials

- .1 Bollards: ductile iron casting (spheroidal graphite cast iron) to ASTM A536-84(R2014).
 - .1 35.0 tonne:
 - .1 Safe working load: 343 kN.
 - .2 Bollard fixing hardware: hot dip galvanized as per ASTM A123.
- .2 Grout: shrinkage compensating non-metallic.
- .3 Paint:
 - .1 Supply the bollards with a high performance protective coating system. Protective coating system to consist of blast cleaning, supply and application of an inorganic zinc primer coat, and two (2) or more coats of immersion grade epoxy and the proper curing of the coatings.
 - .2 Surface preparation, application and the dry film thickness (DFT) of each coat to be as recommended by the paint manufacturer. The total DFT of the coating system shall, however, not be less than 350µm (14mils).
 - .3 Supply the complete coating system from the same paint manufacturer and each component of the system must be compatible with the rest of the systems.
 - .4 Colours:
 - .1 Departmental Representative to confirm.

PART 3 - EXECUTION

3.1 Application

- .1 Install bollards in accordance with manufacturer's instructions.

3.2 Setting and Grouting

- .1 Set bollards at locations and elevations as indicated on Project Drawings.
 - .1 After tightening of anchor bolts or positioning wedges, grout under base.
 - .2 Confirm temperatures of concrete, air, base and grout are within range specified by

grout manufacturer.

- .2 Do not grout until location of anchor bolts and bollards have been approved by the Departmental Representative.

----- END OF SECTION -----

PART 1 - GENERAL

- | | | | |
|-----|------------------------------------|----|--|
| 1.1 | <u>Description
of Work</u> | .1 | This section specifies requirements for the following items: <ul style="list-style-type: none">.1 Ladders.2 Rubber tire fender reinstatement |
| 1.2 | <u>Reference
Standards</u> | .1 | ASTM A123-15, Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products. |
| | | .2 | ASTM A307-14, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile. |
| | | .3 | CAN/CSA-G40.21-13, Structural Quality Steels. |
| 1.3 | <u>Related Work</u> | .1 | Refer to other Specification Sections for related information. |
| | | .2 | Refer to Section 01 33 00 - Submissions/Shop Drawings. |
| 1.4 | <u>Submissions</u> | .1 | Shop Drawings: <ul style="list-style-type: none">.1 Clearly indicate the following items:<ul style="list-style-type: none">.1 General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures..2 Locations, sizes and installation tolerances of anchor bolts, eye bolts and embedded parts..3 Types of materials used, finishes and core thickness..4 All other pertinent details and accessories. |
| | | .2 | Test Results: <ul style="list-style-type: none">.1 Provide test results for the galvanized items. |
| | | .3 | Submissions <ul style="list-style-type: none">.1 Provide submissions in accordance with Section 01 33 00. |
| 1.5 | <u>Measurement
For Payment</u> | .1 | Ladders, rungs, holdfasts and fasteners will be measured in accordance with the item to which applies in Section 01 29 00 - Project Particulars and Measurements. |

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Hardware and miscellaneous items must meet the following specifications:
 - .1 Angles, steel plates, ladder rungs, holdfasts and miscellaneous steel: to CSA G40.21, Grade 300W.
 - .2 Do not use items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties.
 - .3 Hot dip galvanize, bolts, anchor bolts, nuts, washers, steel plates, rungs, holdfasts and any other miscellaneous steel to ASTM A123 with minimum zinc coating of 705 g/m².

PART 3 - EXECUTION

- 3.1 Ladders
- .1 Assemble ladder units and holdfasts and install completed units in locations shown on plan or as indicated by Departmental Representative.
- 3.2 Rubber Tire Fender
- .1 Existing tire assembly to be re-installed on the Outer East and Center Dolphins to original locations. Confirm locations with the Departmental Representative.
 - .2 Tires to be hung from the brackets with existing chains. Tires to be connected horizontally, vertically and diagonally. Do not cut new holes in tires.
 - .3 Connect each row of tires to the new top brackets.
 - .4 Secure tires to form a level and straight fendering surface.

----- END OF SECTION -----