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SPECIFICATIONS TROUT RIVER BRIDGE REHABILITATION GROS MORNE NATIONAL PARK

Issue For Tender



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PART 1 – GENERAL

1.1 Description of Work

- .1 Carry out work to Trout River Bridge, Gros Morne National Park, NL.
- .2 The work of this contract includes the provision of all materials, labour, equipment and ancillaries, as needed for the completion of the work as indicated on the drawings and as described in the specifications and notes. Work of this project consists generally of, but is not limited to:
 - .1 Supply and operate traffic control, signage, environmental protection and temporary structures for the duration of the project. The bridge can be closed to all traffic from September 10, 2017 to October 31, 2017.
 - .2 Securing structure to allow for the delivery of materials
 - .3 Raising (jacking) existing superstructure
 - .4 Removal and disposal of existing timber abutments, excluding timber piles, at an approved waste facility
 - .5 Removal and disposal of existing guiderail
 - .6 Removal and disposal of existing asphalt as depicted within drawings
 - .7 Excavate to true lines depicted within drawings and dispose of all materials at an approved dump site outside Park boundaries
 - .8 Supply and install timber cribs at each abutment.
 - .9 Supply and install reinforced concrete pile caps at each abutment.
 - .10 Supply and install new concrete cap beams at each end of the bridge.
 - .11 Modify baseplates at one end of bridge.
 - .12 Replace traffic barriers railings and posts
 - .13 Make good the road surface disturbed during construction.
 - .14 Clean work site, including removal of construction waste, debris and recyclable materials, remove and dispose of all demolished and surplus components. Clear debris from bearing seats.
 - .15 Provide mobilization and demobilization to the site, access to the site, temporary utilities, construction facilities, and temporary barriers and enclosures.

- .3 Carry out all work in accordance with applicable Federal and Provincial Regulations for those agencies having jurisdiction for the work. The work is subject to the National Park Act and Regulations, Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.
- 1.2 Familiarization with Site
- .1 Before submitting a bid, it is recommended that bidders visit the bridge site and its surroundings to review and verify the form, nature and extent of the work, materials necessary for the completion of the works, the means of access to the site, severity, exposure and uncertainty of weather, soil conditions, any accommodations they may require, and in general, shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.
- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 – Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Departmental Representative before carrying out such site inspection.
- 1.3 Interpretation of Documents
- .1 Supplementary to the Order of Precedence article of the General Conditions of the contract, the Division 01 sections take precedence over the technical specification sections in other divisions of the Specification Manual.
- 1.4 Terms
- .1 Unless specifically stated otherwise, the term “Engineer” where used in the specifications and on the drawings, shall mean the “Departmental Representative” as defined in the General Conditions of the contract.
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- 1.5 Setting Out Work .1 Carry out all layout required to complete the work.
- .2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .3 Provide devices needed to layout and construct work.
- .4 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.
- .5 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.
- 1.6 Measurement for Payment .1 Notify Departmental Representative sufficiently in advance of operations to permit required measurements for payment.
- 1.7 Maintenance of Work During Construction .1 Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that the roadway or structures are continuously kept in a condition satisfactory to Departmental Representative.
- 1.8 Codes and Standards .1 Perform work in accordance with the following codes and legislative requirements, including all amendments up to tender closing date.
- .1 National Parks Act.
 - .2 Government of NL Department of Transportation and Works Traffic Control Manual (TCM)
 - .3 Environment Act of the Province of NL.
 - .4 Canadian Environmental Protection Act.
 - .5 Transportation Dangerous Goods Act.
 - .6 Canadian Fisheries Act.
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- .7 Canadian Highway Bridge Design Code, latest edition.
 - .8 NL Occupational Health and Safety Act and Regulations.
 - .9 Canadian Navigable Waters Protection Act.
 - .10 Any other Federal, Provincial, Municipal and Local Code, Standard, Regulation, Guideline, By-law or Ordinance having jurisdiction.
 - .11 Basic Impact Analysis
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- .2 In any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .3 Materials and workmanship must meet or exceed requirements of applicable standards of Canadian Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM), and other standards organizations.
 - .4 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.
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- 1.9 Work Within Park Boundaries
 - .1 The project is within a National Park and it is essential that lands remain as undisturbed as possible. Use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Strictly adhere to contract limits and take every precaution to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.
 - .1 If any damage occurs during construction, bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.
 - .2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may have repairs completed by others at the Contractor's expense.
 - .3 Ensure that contracted work meets the standards outlined in the contract specification and drawings.
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.4 Ensure that no damage will be done to any existing underground telephone cables.

.5 All sources of aggregate and asphalt cement must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work.

.6 Follow the Provincial requirements regarding the following:

.1 Pit and Quarry Guidelines.

.2 Environmental Construction Practice Specifications.

.7 Make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.10 Documents
Required

.1 Maintain at each job site, one (1) copy each of the following:

.1 Contract drawings;

.2 Specifications;

.3 Addenda;

.4 Reviewed shop drawings;

.5 List of outstanding shop drawings;

.6 Change orders;

.7 Other modifications to contract;

.8 Field test reports;

.9 Manufacturer's installation and application instructions;

.10 Copy of approved work schedule;

.11 Site-specific Health and Safety Plan and other safety related documents;

.12 Permits and Regulatory Approvals and requirements;

.13 Other documents as stipulated elsewhere in the contract documents.

1.11 Site
Conditions

.1 The Contractor will be responsible to visit the bridge structure and review existing site conditions.

1.12 Departmental

- Representative .1 Departmental Representative will be assigned after contract award.
- 1.13 Construction Schedule .1 The construction schedule shall be from September 10, 2017 to October 31, 2017. Trout River Bridge can be closed to all traffic during this time.
- .3 The jacking of the bridge structure and replacement of existing pile caps must be completed under the full bridge closure and shall be completed by October 31, 2017.
- .6 The Contractor is to consider the above restrictions when planning and scheduling the work.
- 1.14 Sanitary Services .1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Departmental Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes and authorities.
- 1.15 Implementation .1 This contract shall be planned and implemented by the Contractor, such that all work is carried out and completed by the project end date. All measures necessary to meet this deadline, including cold weather concreting, shall be considered when bidding for this project.
- 1.16 Site of Work .1 Work will be carried out at the bridge site in Gros Morne National Park in the location as shown on the accompanying drawings.
- 1.17 Abbreviations .1 Abbreviations of standard specifications have been used in this specification and on the drawings. These are CGSB – Canadian Government Specifications Board; CSA – Canadian Standards Association; ASTM – American Society for Testing and Materials.
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- .2 Where these abbreviations and standards are used in this project, latest edition in effect on date of bid call, will be considered applicable.
- 1.18 Site Operations
- .1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials, etc. Exercise care so as not to obstruct or damage public or private property in area. Do not interfere with normal day-to-day operations in progress at site. Make arrangements for space and access.
- .2 Remove snow and ice as required to maintain safe access in a manner that does not damage existing structures or interfere with the operations of others.
- 1.19 Contractor's Use of Site
- .1 Use of Site: For execution of work within roadway right-of-way and those areas as specified by the Departmental Representative.
- .2 The Departmental Representative will specify the areas for work and storage.
- 1.20 Project Meetings
- .1 Arrange project meetings and assume responsibility for setting times.
- .2 Project meetings will take place on site of work unless so directed by Departmental Representative.
- .3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at meetings.
- .4 Have a responsible member of firm present at all project meetings.
- .5 After receiving the Contractor's schedule, traffic control plan, health and safety hazard assessment, and environmental protection plan, prior to start of construction, a meeting involving Contractor, Departmental
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Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work health and safety, methods of construction, environment protection methods and traffic control.

- .6 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
- .7 No work will begin until the pre-construction meeting is held, and all submittals have been approved.
- .8 Following the pre-construction meeting and approval of submittals, carry out the work to meet the time restraints and to have the project completed on time.

1.21 Cutting, Fitting
and Patching

- .1 Execute cutting, including excavation, fitting and patching required to make work fit properly.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services.
- .3 Do not cut, bore, or sleeve load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

1.22 Existing
Services

- .1 Carry out work at times directed by governing authorities, with minimum of disturbance to site operations, pedestrian and vehicular traffic.
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- .2 Before commencing work, establish locations and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide adequate bridging over trenches which cross walkways or roads to permit normal traffic.
- .5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service.
- .7 Record locations of maintained, rerouted and abandoned service lines.
- .8 Maintain existing signs at all times. When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area. The work is considered to be incidental and no separate payment will be made to maintain or remove signs.
- .10 Removal of approach guiderail to complete construction activities to be coordinated with Parks Canada. Approach guiderail or other temporary barriers must be in place while bridge is in service.
- .11 Asphalt removal will be required for construction of new abutments. Reinstate asphalt where required when bridge is open to traffic.

1.23 Additional Drawings

- .1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have
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same meaning and intent as if they were included with plans referred to in contract documents.

1.24 Relics, Antiques
And Wildlife
Habitat

- .1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain in her Majesty's property.

1.25 National
Park Act

- .1 For projects within boundaries of National Park, perform work in accordance with National Parks Act.

1.26 Measurement
of Quantities

- .1 Linear:
 - .1 Items which are measured by meter or kilometer are to be measured along centerline on installation unless otherwise shown on drawings.
 - .2 Areas:
 - .1 Horizontal Surfaces – Longitudinal and transverse measurements for areas to be measured horizontally.
 - .2 Vertical Surfaces – Longitudinal and transverse measurements for areas to be measured horizontally and vertically, respectively.
 - .3 Mass:
 - .1 Term "tonne" shall mean 1,000 kg.
 - .2 Materials which are specified for measurement by mass shall be weighed on scales approved by and at
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locations designated by Departmental Representative. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale house.

.4 Time:

- .1 Unless otherwise provided for elsewhere or by written authority of Departmental Representative, hourly rental of equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to register hours of operation. Devices which only measure hours of running of motor will not be accepted.

1.27 Permits

- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other authorities.
- .2 Provide appropriate notifications of project to Municipal and Provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.
- .5 Submit to Departmental Representative, copy of quarry permit, if applicable, prior to start of quarry operations.
- .6 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.
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- 1.28 Equipment
Rental Rates
- .1 Upon written request, supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Rental rates shall conform to the latest version of the Government of NL Department of Transportation and Works Highway Specification Book – Division 10.
- 1.29 Protection
- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair and replace all materials or equipment damaged in transit or storage to the satisfaction of Department Representative and at no cost to Crown.
- .3 Take adequate precautions to protect existing structures when operating tracked equipment.
- .4 Exercise care so as not to obstruct or damage public or private property in the area.
- .5 At completion of work, restore areas to original condition. Repair damage to ground and property. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Submittals
- .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
 - .1 Work Schedule as specified herein.
 - .2 Health and Safety Plan as specified in Section 01 35 29.
 - .3 Environmental Protection Plan as specified in Section 01 35 43.
- 1.2 Work Schedule
- .1 Provide Departmental Representative, in writing and within 5 working days after contract award, a detailed construction schedule and traffic control plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work in the Unit Price Table.
 - .2 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
 - .3 Work schedule content to include, as a minimum, the following:
 - .1 Provide one coordinated work schedule, including schedule milestones for the bridge.
 - .2 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones.
 - .3 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
 - .4 Generally, Bar Charts derived from commercially available computerized project management systems are preferred, but not mandatory.
 - .4 Work schedule must take into consideration and reflect the work phasing.
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- .5 Schedule work in cooperation with the Departmental Representative.
- .6 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .7 Ensure that all sub-trades and sub-contractors are made aware of the work restraints and operational restrictions specified.
- .8 Schedule Updates:
 - .1 Submit when requested by Departmental Representative.
 - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
 - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
- .9 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .10 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 Project
Meetings

- .1 Schedule and administer project meetings, for entire duration of work as deemed necessary to progress of work or particular situation.
 - .2 Prepare agenda for meetings.
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- .3 Notify participants by email 4 days in advance of an unscheduled meeting date.
 - .1 Ensure attendance of all sub-contractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.
- .4 Hold meetings at project site or where approved by Departmental Representative.
- .5 Preside at meetings and record minutes.
 - .1 Indicate significant proceedings and decisions. Identify action items by parties.
 - .2 Distribute to participants by email or by facsimile within 3 calendar days after each meeting.
 - .3 Make revisions as directed by Departmental Representative.

***** END OF SECTION *****

PART 1 – GENERAL

1.1 General Requirements

- .1 In the case of conflict between the instructions for measurement and payment contained in this section with that of any other section, the requirement of this section shall apply.
 - .2 The Form of Tender includes one lump sum priced item and several unit priced items.
 - .3 The total tendered price shall be the sum of the lump sum item plus the amounts calculated from the unit price items based on the approximate quantities identified for each of the unit price items.
 - .4 The Contractor, in submitting their tender for the project, understand that they will only be entitled to payment under the unit price items when prior written authorization has been received from the Departmental Representative for utilization and then only to the extent of the work authorized by the Departmental Representative.
 - .5 Additional instructions for measurement and/or payment for items of the work may be contained in specific sections of the Technical specifications. In the case of a conflict between the instructions for measurement for payment contained in this section with that of any other section, the requirement of this section shall apply.
 - .6 The numbers for the unit price items herein corresponds to the numbers of the items in the Form of Tender.
 - .7 The submitted tender prices will be inclusive of all costs for the complete supply and installation of all materials, labour and equipment required to complete the work. No separate payment will be made for any testing, inspections and approvals required by the Contractor.
 - .8 Tender prices for unit price items including aggregate materials or asphalt pavement shall be inclusive of the costs for supply, placement and compaction.
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- 1.2 Lump Sum Item
- .1 No separate measurement for payment shall be made for any work completed under this item.
 - .2 The work of the lump sum item shall include, but not necessarily be limited to, the following:
 - .1 Protection of all cultural resources.
 - .2 All environmental protection, including erosion controls, sedimentation controls, de-watering and dust control.
 - .3 All construction facilities.
 - .4 Cleaning of work site, including removal of waste, debris and recyclable materials.
 - .5 Testing, inspections and permits from all regulatory agencies and groups required to complete work.
 - .6 Traffic control devices and measures, including flag persons, signs, mobile traffic signals, detour signs, lights, barriers and pavement markings, to maintain minimum one lane, two-way traffic at all times.
 - .7 Removal of all surplus materials from the site at completion of work.
 - .8 Preparation and submission of all close-out submittals, maintenance manuals and as-built drawings.
 - .9 Restoration of all areas disturbed by construction activities to equivalent original condition or better.
 - .10 All requirements (including submittals) to implement and maintain Section 01 35 28 – Health and Safety Regulations.
 - .11 All submittal requirements as per Section 01 78 00 – Close-Out Submittals.
 - .12 All requirements to implement and maintain items per the General Instructions - Section 01 10 10.
 - .3 All other works which are required for completion of the project, exclusive of those covered by the unit priced items.
 - .4 50% of the total bid price for this item shall be paid with the first progress payment once the Work has begun. The remaining 50% of the total bid price for this item shall be paid with the final progress payment for the Work.
- 1.3 Unit Price Items
- .1 Removal and disposal of timber structures
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Unit of Measure: Lump Sum (LS)

Description of Measurement:

.1 This item includes: removal and disposal of existing timber structures at each abutment as noted on the plans. No additional costs shall be incurred by Parks Canada for disposal.

.2 Remove Existing Traffic Barriers

Unit of Measure: Lump Sum (LS)

Description of Measurement:

.1 This item includes: removal and disposal of existing traffic barriers at north and south sides of structure.

.3 Temporary Jacking of Bridge

Unit of Measure: Lump Sum (LS)

Description of Measurement:

.1 This item includes the temporary lifting of the bridge to facilitate the replacement of the timber pile caps. Engineering design and associated temporary structures required to facilitate this work is included in this item.

.4 Timber Crib Retaining Walls

Unit of Measure: Meters Cubed (m³)

Description of Measurement:

.1 This item includes: the supply and install of timber crib retaining walls at both abutments. Anchorages and connections are incidental to this work.

.5 Cast-in-Place Reinforced Concrete Pile Caps & Cap Beam

Unit of Measure: Meters Cubed (m³)

.1 Volume of consolidated concrete installed in completed structures, as measured from drawings. Waste materials are not included.

.2 This item includes: furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, reinforcing steel, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, and all other items required to complete the work.

.3 Supply, installation and securing of reinforcing steel is incidental to this work and is included in this item.

.6 Baseplate Modification

Unit of Measure: Lump Sum (LS)

.1 This item includes, but is not limited to: modification of existing baseplates as detailed on the drawings including supply and installation of new anchors.

.7 Common Excavation

Unit of Measure: Lump Sum (LS)

.1 This item includes: excavation to lines and elevations indicated, and disposal of surplus or unsuitable material off site.

.2 This item also includes the areas of common excavation and embankment work associated with construction of the new timber cribs. Common excavation covers the excavation and stockpiling of existing fill where possible and hauling away from site where necessary.

.8 Type 2 Fill

Unit of Measure: Meters Cubed (m³)

.1 This item includes: supply, placement, and compaction of the Type 2 fill as indicated on the drawings.

.9 Type 3 Fill

Unit of Measure: Meters Cubed (m³)

.1 This item includes: supply, placement, and compaction of the Type 3 fill as indicated on the drawings.

.10 Type 4 Fill

Unit of Measure: Lump Sum (LS)

.1 This item includes: supply, placement, and compaction of the Type 4 fill as indicated on the drawings.

.11 Asphalt Cutting, Removal, & Disposal

Unit of Measure: Lump Sum (LS)

.1 This item includes: the cutting, removal and disposal of the existing asphalt approaches as shown on the drawings.

.12 Hot Mix Asphaltic Concrete Paving

Unit of Measure: Meters Squared (m²)

.1 This item includes: supply, placement and compaction of asphaltic concrete, including asphalt binder, and granular base course as indicated. Asphalt tack coat is considered incidental to this work.

.13 Galvanized Steel Barriers and Metal Railing for Structures – Bridge Railing

Unit of Measure: Linear Meters (lm)

.1 Measure new steel bridge railing by the linear meters of installed and accepted railing, including galvanizing, nuts, bolts, washers, anchors, anchor plates, grouting, railing, posts, base plates, epoxy grout, and all other items necessary to complete the work and as detailed on the drawings. Transition plates shall be incidental to the work under this item.

.14 Approach Signage

Unit of Measure: Lump Sum (LS)

.1 This item includes the supply and installation of four hazard signs; one each of the four bridge corners.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 General Requirements
- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with Work affected by submittal until review is complete.
 - .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
 - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are coordinated.
 - .8 Contractor's responsibility for errors, deviations or omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed
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non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.

- .10 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.
 - .11 Keep one reviewed copy of each submission on site.
- 1.2 Shop Drawings And Product Data
- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Province of NL, Canada.
 - .3 Shop Drawing Submittal Schedule:
 - .1 Submit, within 10 working days of contract award, in format acceptable to Departmental Representative, a submittal schedule listing all shop drawings to be submitted for project as specified in various sections of the specifications.
 - .2 Schedule to indicate proposed submission date for each item, status of review and anticipated product delivery date to site. Track all submissions for entire project.
 - .3 As work progresses, revise schedule identifying items which have been reviewed and finalized and indicating those outstanding.
 - .4 Update schedule at stipulated dates or project time intervals predetermined and agreed upon with Departmental Representative at commencement of work.
 - .4 Shop Drawing Quantities: submit sufficient copies required by the General Contractor and sub-contractors, plus 3 copies which will be retained by Departmental Representative.
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- .5 Shop Drawings Format:
- .1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.
 - .2 Product data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.
 - .3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.
- .6 Shop Drawings Content:
- .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.
- .7 Allow 5 days for Departmental Representative's review of each submission.
- .8 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .9 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .10 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a
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financial holdback to the Contract.

- .11 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.

 - .12 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.

 - .13 After Departmental Representative's review, distribute copies.

 - .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure
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indicated above, must be performed before fabrication and installation of Work may proceed.

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

1.3 Samples

- .1 Submit for review samples as specified in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples Departmental Representative's office or to other address as directed. Do not drop off samples at construction site, except for pre-approved circumstances previously approved by Departmental Representative.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of
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workmanship and material against which installed Work will be verified.

- 1.4 Schedules, Permits & Certificates
- .1 Upon acceptance of bid, submit to Departmental Representative, copy of Work Schedule and various other schedules, permits, certification documents and project management plans as specified in other sections of the specifications.
 - .2 Submit copy of permits, notices, compliance certificates from Regulatory Agencies having jurisdiction and as applicable to the work.
 - .3 Submission of above documents to be in accordance with Submittal General Requirements procedures specified in this section.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 - Submittal Procedures
 - .2 Section 02 41 19 - Selective Demolition
 - .3 Section 03 30 00 - Cast-in-Place Concrete
- 1.2 Definitions
- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
 - .2 Competent Person: means a person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work, and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
 - .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
 - .4 PPE: personal protective equipment.
 - .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.
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- 1.3 Submittals
- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within 10 work days of notification of Bid Acceptance. Provide three (3) copies.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
 - .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
 - .5 Submit revisions and updates made to the Plan during the course of Work.
 - .3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.
 - .4 Submit Building Permit, compliance certificates and other permits obtained.
 - .5 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.
 - .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .7 Submit copies of incident reports.
 - .8 Submit WHMIS MSDS - Material Safety Data Sheets.
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- 1.4 Compliance Requirements
- .1 Comply with Occupational Health and Safety Act for Province of NL, and Occupational Health and Safety Regulations made pursuant to the Act.
 - .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
 - .1 The Canada Labour Code can be viewed at: [www.http://laws.justice.gc.ca/en/L-2/](http://laws.justice.gc.ca/en/L-2/)
 - .2 COSH can be viewed at: [www.http://laws.justice.gc.ca/eng/SOR-86-304/ ne.html](http://laws.justice.gc.ca/eng/SOR-86-304/ne.html)
 - .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada, Ottawa, Ontario, K1A 0S9 Tel: (819)956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F).
 - .3 Observe construction safety measures of:
 - .1 Part 8 of National Building Code
 - .2 Municipal by-laws and ordinances
 - .4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
 - .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
 - .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.
- 1.5 Responsibility
- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to site to extent that they may be affected by conduct of Work.
 - .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.
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- 1.6 Site Control and Access
- .1 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.
 - .2 Isolate Work site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
 - .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
 - .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
 - .5 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.)
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- 1.7 Protection
- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
 - .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.
- 1.8 Filing of Notice
- .1 File Notice of Project with pertinent Provincial health and safety authorities prior to beginning of Work.
 - .1 Departmental Representative will assist in locating address if needed.
- 1.9 Permits
- .1 Post permits, licenses and compliance certificates, specified in section 01 10 10 - General Instructions, at Work Site.
 - .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.
- 1.10 Hazard Assessment
- .1 Perform site specific health and safety hazard assessment of the work and its site.
 - .2 Carry out initial assessment prior to commencement of work with further assessments as needed during progress of work, (including when new trades and sub-contractors arrive on site).
 - .3 Record results and address in Health and Safety Plan.
 - .4 Keep documentation on site for entire duration of the work.
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- 1.11 Project/Site Conditions
- .1 Following are potential health, environmental and safety hazards at the site for which work may involve contact with:
 - .1 Known latent site and environmental conditions:
 - .1 Buried and overhead utilities;
 - .2 Steep embankments, tripping and slip hazards;
 - .3 Running water, river hazards;
 - .4 Highway traffic and road hazards;
 - .5 Equipment hazards including noise, pinch points, visibility, moving equipment/vehicles, etc;
 - .6 Slope stability for support of equipment and shoring;
 - .7 Wildlife hazards;
 - .8 Working at heights, fall protection;
 - .9 Working with hazardous chemicals, VOCs;
 - .10 Remote site;
 - .11 Work overhead, falling objects;
 - .12 Stacking of material;
 - .13 Particulates, air quality;
 - .14 Temperature, exposure;
 - .15 Spray, blown debris.
 - .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 MSDS data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.
- 1.12 Meetings
- .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work
 - .2 Designated Health & Safety Site Representative
 - .3 Subcontractors
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- .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.
- 1.13 Health and Safety Plan
- .1 Prior to commencement of work, develop written Health and Safety Plan specific to the work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
 - .2 Health and Safety Plan shall include the following components:
 - .1 List of health risks and safety hazards identified by hazard assessment.
 - .2 Control measures used to mitigate risks and hazards identified.
 - .3 On-site Contingency and Emergency Response Plan as specified below.
 - .4 On-Site Communication Plan as specified below.
 - .5 Name of Contractor's designated Health & 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.
 - .3 On-Site Contingency and Emergency Response Plan shall include:
 - .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
 - .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, locations 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:
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- .1 General Contractor and sub-contractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - .5 Harmonize Plan with National Park's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.
 - .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and sub-contractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with National Park Authorities which have a risk of endangering health and safety of National Park users.
 - .5 Address all activities of the work including those of sub-contractors.
 - .6 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 sub-contractor arrive at work site.
 - .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
 - .8 Post copy of the Plan, and updates, prominently on Work Site.
- 1.14 Safety Supervision
- .1 Employ Health and Safety Site Representative responsible for daily supervision of health and safety of the work.
 - .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the work.
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- .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work
 - .3 Be on Work Site at all times during execution of the Work.
 - .4 All supervisory personnel assigned to the Work shall also be competent persons.
 - .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum (bi-weekly) basis. Record deficiencies and remedial action taken.
 - .6 Cooperate with Facility's Occupational Health and Safety Representative should be one designated by Departmental Representative.
 - .7 Keep inspection reports and supervision related documentation on site.
- 1.15 Training
- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
 - .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
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- 1.16 Minimum Site Safety Rules .1 Notwithstanding requirement to abide by Federal and Provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
- .1 Wear appropriate PPE pertinent to the Work or assigned footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
- 1.17 Correction Of Non-Compliance .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.
- 1.18 Incident Reporting .1 Investigate and report the following incidents to Departmental Representative:
- .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
 - .2 Medical aid injuries.
 - .3 Property damage.
 - .4 Interruptions to Facility operations.
- .2 Submit report in writing.
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- 1.19 Hazardous Products .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .2 Keep MSDS data sheets for all products delivered to the site.
- .1 Post on site.
- .2 Submit copy to Departmental Representative.
- 1.20 Blasting .1 Blasting or other use of explosives is not permitted.
- 1.21 Confined Spaces .1 Abide by Occupational Health and Safety Regulations regarding work in confined spaces.
- 1.22 Site Records .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
- .2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.
- 1.23 Posting of Documents .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.
- .2 Post other documents as specified herein, including:
- .1 Site specific Health and Safety Plan.
- .2 WHMIS data sheets.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Precedence .1 For Federal Government projects, Division 1 sections take precedence over technical specification sections in other divisions of this Project Manual.
- 1.2 Related Sections .1 Section 01 74 21 – Construction/Demolition, Waste Management and Disposal
- 1.3 Fires .1 Fires and burning of rubbish on site not permitted.
- 1.4 Disposal of Wastes
- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of hazardous waste or volatile materials such as mineral spirits, paint thinner, oil or fuel into waterways, storm or sanitary sewers.
- .3 Dispose of construction waste materials and demolition debris, resulting from work, at approved construction and debris disposal site. Carry out such disposal in strict accordance with provincial and municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.
- .4 Establish methods and undertake construction practices which will minimize waste and optimize use of construction materials. Separate at source all construction waste materials, demolition debris and product packaging and delivery containers into various recycling abilities of various materials and avoid disposal of debris at landfill site(s) in a “mixed state.” Where recycling firms specializing in recycling of specific materials exist, transport such materials to the recycling facility and avoid disposal at landfill sites.
- .5 Communicate with landfill operator prior to commencement of work, to determine what specific construction, demolition and renovation waste materials have been banned from disposal at the landfill and at transfer stations.
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- 1.5 Drainage
- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
 - .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
 - .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
 - .4 Pumped water must meet applicable federal, provincial and municipal standards.
 - .5 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.
- 1.6 Site Clearing
 and Plant
 Protection
- .1 Protect trees and plants on site and adjacent properties where indicated.
 - .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 meters.
 - .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
 - .4 Minimize stripping of topsoil and vegetation.
 - .5 Restrict vegetation removal to areas indicated or designated by Department Representative.
 - .6 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.
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- .7 Whenever possible, organic debris removed during grading operations should be stored for use during site restoration. Such stockpiles should be located well away from any stream or water body and should be covered with coarse material or tarps to minimize wind and water erosion.
- 1.7 Permits .1 Adhere to all guidelines and instructions stated on permits.
- 1.8 Work Adjacent to Waterways
- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial and federal environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not refuel any type of equipment within 100 meters of a waterbody. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.
- .8 Temporary diversion ditches, approved by the Departmental Representative are to be plastic lined.
- .9 Do not blast under water or within 100 meters of indicated spawning beds.
- .10 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.
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- .11 Do not pump or drain water containing suspended materials into waterways. Water containing suspended materials shall be pumped into vegetation a minimum of 30 meters away from watercourses.
- 1.9 Pollution Control
- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 For each site, cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.
- 1.10 General Requirements
- .1 Work under this contract is to be carried out in a National Park, and environmental protection must be given a high priority by all staff involved with the work.
- .2 An Environmental Briefing will be held prior to work commencing at each site, which will outline environmental factors to be considered during the work. It is mandatory that all current staff of the Contractor attend this meeting with the Departmental Representative and Environmental Protection Officer (EPO).
- 1.11 Site Set-Up and Use
- .1 All site activities related to construction are to be confined within the defined project boundaries for each site.
- .2 Equip each work site with appropriate and properly maintained sanitary facilities.
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- .3 Collect and remove garbage daily from each work site. All material must be removed, transported and disposed of in accordance with existing Provincial, Municipal and Park's Solid Waste Disposal Guidelines and/or Regulations.
- .4 Littering is prohibited.
- .5 Temporary storage, parking areas and turn-around facilities for contractor related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.

1.12 Environmental Protection Plan

- .1 Submit a plan showing all pollution control measures that will be used to fulfill the requirements of the Environmental Protection section. This plan will be reviewed by the Departmental Representative and the Environmental Protection Officer prior to commencement of any work. Any deviation from this Plan will require further approval by the Departmental Representative. The Protection Plan shall be submitted prior to the pre-construction meeting.
- .2 The Environmental Plan will outline how the Contractor will address the environmental protection requirements, including removal and installation of culverts, and ensure pollution created by the construction is controlled. It will show sufficient detail on products to be used and physical placement on site to determine effectiveness of these items.
- .3 The Plan must cover all activities within the limits of all construction, laydown and traffic diversion areas.

1.13 Environmental Performance

- .1 Follow the Canadian Environmental Protection Act.
 - .2 Ensure that all necessary permits related to Environmental Protection have been obtained and that necessary documentation is available on site.
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- 1.14 Vehicular Movements .1 Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas and rights-of-way).
- 1.15 Storage and Handling of Fuels and Dangerous Fluids
- .1 Locate fuel storage facility outside Park and a minimum of 100 meters from any waterbody in an area approved by Departmental Representative and construct impermeable dykes so that any spillage is contained. Fueling of vehicles or equipment will not be permitted within 100 meters of any waterbody. Maintenance of vehicles and equipment will be permitted only in designated areas as directed by the Departmental Representative.
- .2 Exercise care in handling of fuels or dangerous materials to minimize potential for spills. Report immediately any spills to Departmental Representative. Contractor is responsible for responding immediately to any spill to minimize environmental damage and for clean-up, repair or rehabilitation resulting from any spills to the satisfaction of the Departmental Representative.
- .3 Supply and maintain on site emergency response material to contain spills and minimize environmental damage (ie., absorbent material), to the approval of Departmental Representative. Disposal of all contaminated material shall be off site at an approved facility.
- .4 Dangerous goods, whose release into the environment could cause adverse effect, should be stored and handled in a manner which gives due regard for workers and public safety, and for the protection of the environment.
- .5 No material toxic to fish or any aquatic life shall be permitted to enter any stream, river, or lake. This shall include, but not be limited to, lubricants, fuels, testing fluids, insecticides, detergents, herbicides, cement, lime or concrete.
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- .6 The management of fuels, lubricants and chemicals must meet with the requirements of the Prince Edward Island Department of Environment and all other appropriate provincial and federal regulations.
- .7 Fuel storage containers must be accompanied by impermeable structures that would provide containment of 125% of the container capacity in the event of a leak or spill.
- .8 All refueling and lubricating operations should employ protection measures such as drip pans, to reduce the potential for escape of petroleum products to the environment.
- .9 The Departmental Representative and the Park's Environmental Protection Officer (EPO) must be immediately contacted after a spill of fuel or lubricant, and after any amount of other chemical products has escaped.
- .10 Storage of any fuel has to occur only in previously approved locations, and with Park consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven (7) days prior to the start of the work. The Contractor is expected to be prepared to effect the containment and clean-up of all spills related to the work.
- .11 Storage of hazardous material, including explosives, shall not be permitted, except for quantities which shall normally be expected to be utilized in a day of work, and which are not permitted to stockpile.
- .12 Emulsion storage tanker and transfer of emulsion from tanker to spray vehicle are not permitted.
- 1.16 Erosion and
Sediment Control
- .1 Appropriate preventative controls should be in place at all times during construction to prevent undue erosion and sedimentation. The Contractor is required to provide to the Departmental Representative for approval, ten (10) working days before start-up, an Erosion and Sedimentation Control Plan, as part of the Environmental Protection Plan. The Plan shall incorporate all necessary
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silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative.

- .2 The Contractor shall install and maintain all sedimentation and erosion control features for the duration of the project, in accordance with the approved Plan. The Contractor shall remove all sedimentation and erosion control upon completion of the work and when requested by the Departmental Representative.
- .3 Sediment fences and erosion control structures shall be constructed in roadside ditches or at culvert inlets prior to any excavation as directed by Departmental Representative.
- .4 To minimize runoff, work on slopes which may affect waterbody will be curtained during periods of heavy rainfall, as directed by the Departmental Representative.
- .5 Prior to carrying out work, check long-range weather forecast to ensure that there is adequate time before forecast of heavy rain storms to stabilize the work. Provide details of stabilization plan to Departmental Representative for review.
- .6 Maintain a stockpile of appropriate erosion and environmental protection materials (ie., silt fences, straw bales, wood chips, clean rock fill and aggregate base course) on each site at all times.
- .7 Install additional erosion control measures as required by site conditions to prevent sediment from entering drainage courses.
- .8 Inspect erosion and sediment control measures on a daily basis and maintain as necessary.

1.17 Fisheries
Regulations

- .1 Obtain proper permits or authorization from Federal Department of Fisheries and Oceans and maintain a copy of said permit on site. Regulations stipulated in the Permit will be strictly enforced.
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- 1.18 Relics and Antiquities
- .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site or in structures to be demolished, shall remain property of Canada. Protect such articles and request direction from Departmental Representative.
 - .2 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction and await his written instructions before proceeding with work in this area.
- 1.19 Treated Wood
- .1 Workers shall be made aware of the possible health risks associated with exposure to CCA or creosote treated timber as well as the recommended safe practices for handling such materials.
 - .2 Disposal of treated wood wastes, including sawdust, must be outside of the site and in accordance with all applicable provincial and municipal regulations. Similar attention must be given to disposal of any replaced guiderail posts which have been treated with creosote, which must also be removed from the Park for disposal.
- 1.20 Environmental Incident or Emergency
- .1 In the event of an environmental incident or emergency such as:
 - Chemical spill or petroleum spill
 - Poisonous or caustic gas emission
 - Hazardous material spill
 - Sewage spill
 - Contaminated water into waterwaysthe Contractor or their employees shall immediately:
 - .1 Notify the Contractor's job superintendent.
 - .2 Call the local emergency services and give type of emergency.
 - .3 Notify the Departmental Representative and the Park's Environmental Protection Officer.
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- .2 Submit to Departmental Representative a copy of the Environmental/Spill Response Plan for approval.
- 1.21 Site Commissioning
- .1 Unless prior permission from the Departmental Representative is obtained, all contractor equipment, facilities and materials must be removed from the Park at the finish of each work phase, or if work is suspended due to weather or other circumstances, upon the suspension of work activities.
- .2 Work site must be returned to a neat and tidy condition upon site abandonment.
- 1.22 Site Clearing
- .1 Timber and vegetation shall not be cleared unless approved by Departmental Representative.
- .2 Vegetation and topsoil shall not be removed to obtain fill for road construction purposes.
- .3 All cleared trees and timber shall become the property of the Contractor, and are to be disposed of outside the Park boundaries.
- .4 All cut shrub vegetation and underbrush shall be chipped and evenly dispersed on site or dragged from sight into the adjacent forest edge. No burning of any vegetation or debris will be permitted in the Park boundaries.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 03 20 00 - Concrete Reinforcing
 - .2 Section 03 30 00 - Cast-in-Place Concrete
- 1.2 Inspection
- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than the construction site, allow access to such Work whenever it is in progress.
 - .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
 - .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
 - .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- 1.3 Independent Inspection Agencies
- .1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
 - .2 Provide equipment required for executing inspection and testing by appointed agencies.
 - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
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- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for re-testing and re-inspection.
- 1.4 Access To Work
- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.
- 1.5 Procedures
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- 1.6 Rejected Work
- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
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- 1.7 Reports .1 Submit 3 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to manufacturer or fabricator of material being inspected or tested.
- 1.8 Mill Tests .1 Submit mill test certificates as required of specification Sections.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 - EXECUTION

- 3.1 Not Used .1 Not Used.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Installation and Removal
- .1 Provide temporary utilities controls in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
- 1.2 Dewatering
- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
- 1.3 Power
- .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
 - .2 Supply and install all temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.
- 1.4 Water Supply
- .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.
- 1.5 Temporary Heating and Ventilation
- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
 - .2 Construction heaters used inside hoarding must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
 - .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of work;
 - .2 Protect work and products against dampness and cold;
 - .3 Prevent moisture condensation on surfaces;
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials;
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- .5 Provide adequate ventilation to meet health regulations for safe working environment.
 - .4 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gasses in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
 - .5 Pay costs for maintaining temporary heat.
 - .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards;
 - .2 Enforce safe practices;
 - .3 Prevent abuse of services;
 - .4 Prevent damage to finishes;
 - .5 Vent direct-fired combustion units to outside.
 - .7 Be responsible for damage to work due to failure in providing adequate heat and protection during construction.
- 1.6 Construction Signs and Notices
- .1 Contractor or sub-contractor advertisement signboards are not permitted on site.
 - .2 Only notices of safety or instructions are permitted on site.
 - .3 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321-96 (R2001).
-

- .4 Maintenance and Disposal of Site Signs:
 - .1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Installation and Removal
- .1 For each site, prepare site plan indicating proposed location and dimensions of area to be fenced and used by contractor, avenues of ingress/egress to fenced area and details of fence installation.
 - .2 Identify areas which have to be graveled to prevent tracking of mud.
 - .3 Indicate use of supplemental or other staging area.
 - .4 Provide construction facilities in order to execute work expeditiously.
 - .5 Remove from site all such work after use.
- 1.2 Contractor's Site Office
- .1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.
- 1.3 Site Storage/ Loading
- .1 Confine work and operations of employees by contract documents. Do not unreasonably encumber premises with products.
 - .2 Do not load or permit to load any part of work with weight or force that will endanger work.
- 1.4 Construction Parking
- .1 Parking will be permitted on site provided it does not disrupt performance of work.
 - .2 Provide and maintain adequate access to each project site.
 - .3 If authorized to use existing roads for access to project site, maintain such roads for duration of contract and make good damage resulting from Contractor's use of roads.
- 1.5 Equipment, Tool
-

- and Materials
Storage
- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
 - .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.
- 1.6 Sanitary Facilities
- .1 Provide sanitary facilities for workforce 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.
- 1.7 Construction Signs and Notices
- .1 Contractor or sub-contractor advertisement signboards are not permitted on site.
 - .2 Only notices of safety or instructions are permitted on site.
 - .3 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321-96 (R2001).
 - .4 Maintenance and Disposal of Site Signs:
 - .1 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project or earlier if directed by Departmental Representative.
- 1.8 Protection and Maintenance of Traffic
- .1 Bridge will be closed to all traffic during the construction period.

*** END OF SECTION ***

PART 1 – GENERAL

- 1.1 Description
- .1 This section is to provide traffic control as stipulated in the Department of Transportation & Works Traffic Control Manual (TAC).
 - .2 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work. Traffic Control Plan to be submitted prior to the pre-construction meeting.
 - .4 The Departmental Representative reserves the right to direct the Contractor to reduce either the number or length of traffic control work areas during peak traffic volumes or when cumulative delays exceed the specified maximum.
- 1.2 Related Sections
- .1 Section 01 10 00 – General Instructions
 - .2 Section 01 35 29 – Health and Safety Requirements
 - .3 Section 01 56 00 – Temporary Barriers and Enclosures
- 1.3 Protection of Public Traffic
- .1 Comply with requirements of Acts, Regulations and By-laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out work or haul materials or equipment.
 - .2 When working on travelled way:
 - .1 Place equipment in position to present minimum of interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions will permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .3 Do not close any lanes of roadway without approval of Departmental Representative. Before re-routing traffic, erect suitable signs and devices in accordance with instructions contained in the TCM. Provide sufficient crushed gravel to ensure a smooth riding surface during work.
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- .4 Keep travelled way well graded, free of potholes and of sufficient width that required number of lanes of traffic may pass.
- .5 When directed by Departmental Representative, provide well graded detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.
- .6 Provide and maintain reasonable road access and egress to property fronting along or in vicinity of work under contract unless approved otherwise by Departmental Representative.
- .7 All flagpersons and traffic control personnel shall successfully completed a traffic control training course. Proof of training for all persons shall be available on site at all times.

1.4 Informational and
Warning Devices

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which may require road user response.
 - .2 All traffic signs are to be bilingual or symbolic and shall be Level 1 reflectivity.
 - .3 Supply and erect signs, declinators, barricades and miscellaneous warning devices as specified in the TCM.
 - .4 Place signs and other devices in locations recommended in the TCM.
 - .5 The Contractor shall provide an accredited Sign Supervisor, who has successfully completed the Temporary Workplace Traffic Control Training Course, to be on site at all times when active construction is taking place. The accredited Traffic Control Sign Supervisor will be responsible to supervise the placement and dismantling of all temporary condition signs and devices that indicate to the road user that highway construction activity exist and also to ensure
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that proper traffic control procedures are carried out in accordance with the TCM. The accredited Sign Supervisor is considered part of the contractors supervision and administration staff and compensation for the provision of this individual is considered incidental to the work.

- .6 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.
- .7 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.5 Control of
Public Traffic

- .1 Provide traffic control personnel who have a valid provincial license, are trained in accordance with and properly equipped as specified in the TCM, in the following situations:
 - .1 When public traffic is required to pass working vehicles or equipment which may block all or part of travelled roadway;
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use;
 - .3 When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning;
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down;
 - .5 For emergency protection when other traffic control devices are not readily available;
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
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- .2 All traffic control personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic control zone.
 - .3 All construction vehicles shall operate in accordance with and are subject to traffic control restrictions and operations in place on the project.
 - .4 In addition to traffic control during the normal hours of work, the Contractor shall have a responsible person on site at all times to monitor that the traffic signage is working properly (including nights, weekends and holidays).
- 1.6 Traffic Management Plan Requirement
 - .1 Contractor to provide a Traffic Control Plan prior to construction.
- 1.7 Operational Requirements
 - .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified herein, and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic may be restricted as follows:
 - .1 In accordance with the TCM;
 - .2 Individual traffic control zone delay shall not exceed 10 minutes.

***** END OF SECTION *****

PART 1 - GENERAL

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|-----|--|----|---|
| 1.1 | <u>Installation
and Removal</u> | .1 | Provide temporary controls in order to execute Work expeditiously. |
| | | .2 | Remove from site all such work after use. |
| | | | |
| 1.2 | <u>Guard Rails and
Barricades</u> | .1 | Provide secure, rigid guard rails and barricades around deep excavations. |
| | | .2 | Provide concrete jersey barriers as required to provide a secure and safe workplace. |
| | | | |
| 1.3 | <u>Access to Site</u> | .1 | Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work. |
| | | | |
| 1.4 | <u>Public Traffic
Flow</u> | .1 | Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public and harbour users. |
| | | | |
| 1.5 | <u>Fire Routes</u> | .1 | Maintain access to property including overhead clearances for use by emergency response vehicles. |
| | | | |
| 1.6 | <u>Protection for
Off-Site and Public
Property</u> | .1 | Protect surrounding private and public property from damage during performance of Work. |
| | | .2 | Be responsible for damage incurred. |
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- 1.7 Waste Management and Disposal .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not Used

PART 3 - EXECUTION

- 3.1 Not Used .1 Not Used

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 References
- .1 Conform to these reference standards, in whole or in part, as specifically requested in specifications.
 - .2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
 - .3 Cost for such testing will be borne by Departmental Representative in event of conformance with contract documents or by Contractor in event of non-conformance.
- 1.2 Quality
- .1 Products, materials, equipment and articles incorporated in the work shall be new, not damaged or defective, and of best quality for purpose intended. If interested, furnish evidence as to type, source and quality of products provided.
 - .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
 - .3 Defective products, whenever identified prior to completion of work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of contract documents.
 - .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the site.
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- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
- 1.3 Availability
- .1 Immediately upon signing contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 In the event of failure to notify Departmental Representative at commencement of work, and should it subsequently appear that work may be delayed for such reason, Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in contract price or contract time.
- 1.4 Storage, Handling and Protection
- .1 Handle and store products in such manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
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- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch up damaged factory-finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
- 1.5 Manufacturer's Instructions
- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in contract price or contract time.
- 1.6 Quality of Work
- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves the right to require dismissal from site, workers deemed incompetent or careless.
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- .3 Decisions as to standard or fitness of quality of work in cases of dispute rest solely with Departmental Representative, whose decision is final.
- 1.7 Coordination
- .1 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- 1.8 Remedial Work
- .1 Perform remedial work required to repair or replace parts or portions of work identified as defective or unacceptable. Coordinate adjacent affected work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of work.
- 1.9 Fastenings
- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use galvanized steel fasteners and anchors for securing exterior work, unless other material is specifically requested in affected specification section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.
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- 1.10 Protection of Work in Progress .1 Prevent overloading of parts of structure. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.
- 1.11 Existing Utilities .1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum disturbance of work, and/or traffic flow.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Existing Services .1 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- 1.2 Location of Equipment and Fixtures
- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.
- 1.3 Records
- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of site works, prepare a certified survey showing dimensions, locations, angles and elevations of work.
- .3 Record locations of maintained, re-routed and abandoned service lines.
- 1.4 Submittals .1 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
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1.5 Measurement
for Payment

- .1 No separate measurement for payment shall be made for items under this section. Include costs for Examination and Preparation in the lump sum portion of work on the Bid and Acceptance Form.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 77 00 - Closeout Procedures
- 1.2 General .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Sort volatile waste in covered metal containers, and remove from premises at end of each working day.
- 1.3 Project Cleanliness .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Provide on-site containers for collection of waste materials and debris.
- .4 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .6 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
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- 1.4 Final Cleaning
- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
 - .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
 - .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
 - .4 Remove waste products and debris including that caused by Owner or other Contractors.
 - .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
 - .6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
 - .7 Remove dirt and other disfiguration from exterior surfaces.
 - .8 Sweep and wash clean paved areas.
 - .9 Reinstate any areas damaged by work.
- 1.5 Waste Management and Disposal
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management And Disposal.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Related Requirements
- .1 Section 01 35 43 – Environmental Procedures
 - .2 Section 03 30 00 – Cast-in-Place Concrete
- 1.2 Waste Management Plan
- .1 Prior to commencement of work, prepare Waste Management Work Plan.
 - .2 Work Plan to include:
 - .1 Waste audit;
 - .2 Waste reduction practices;
 - .3 Material source separation process;
 - .4 Procedures for sending recyclables to recycling facilities;
 - .5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site;
 - .6 Training and supervising workforce on waste management at site;
 - .7 Contaminated soil removal and disposal.
 - .3 Work Plan to incorporate waste management requirements specified herein and in other sections of the specifications.
 - .4 Develop Work Plan in collaboration with all sub-contractors to ensure all waste management issues and opportunities are addressed.
 - .5 Submit copy of Work Plan to Departmental Representative for review and approval.
 - .1 Make revisions to Plan as directed by Departmental Representative.
 - .6 Implement and manage all aspects of Waste Management Work Plan for duration of work.
 - .7 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.
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- 1.3 Waste Audit .1 At project start-up, conduct waste audit of:
- .1 Site conditions identifying salvageable and non-salvageable items and waste resulting from demolition and removal work.
 - .2 Projected waste resulting from product packaging and from material left over after installation work.
- 1.4 Waste Reduction .1 Based on waste audit, develop waste reduction program.
- .2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.
 - .3 Identify materials and equipment to be:
 - .1 Protected and turned over to Departmental Representative when indicated;
 - .2 Salvaged for resale by Contractor;
 - .3 Sent to recycling facility;
 - .4 Sent to waste processing/landfill site for their recycling effort;
 - .5 Disposed of in approved landfill site.
 - .4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
 - .1 Use of a central cutting area to allow for easy access to off-cuts;
 - .2 Use of off-cuts for blocking and bridging elsewhere;
 - .3 Use of effective and strategically placed facilities on each site for storage and staging of leftover or partially cut materials (such as gypsum board, plywood, ceiling tiles, insulation, etc.) to allow for easy incorporation into work whenever possible avoiding unnecessary waste.
- 1.5 Material Source Separation Process .1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at each site.
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- .2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
 - .1 Use suitable containers for individual collection of items based on intended purpose.
 - .2 Locate to facilitate deposit, but without hindering traffic or other site operations.
 - .3 Clearly mark containers and stockpiles as to purpose and use.
 - .3 Perform demolition and removal of existing structure components and equipment following a systematic deconstruction process.
 - .1 Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
 - .1 Reinstallation into the work where indicated;
 - .2 Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site;
 - .3 Sending as many items as possible to locally available recycling facility;
 - .4 Segregating remaining waste and debris into various individual waste categories for disposal in a “non-mixed state” as recommended by waste processing/landfill sites.
 - .4 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
 - .5 Send leftover material resulting from installation work for recycling whenever possible.
 - .6 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course work are properly isolated, stored on site and disposed in accordance with applicable laws and regulations from authorities having jurisdiction.
 - .7 Isolate and store existing materials and equipment identified for re-incorporation into the work. Protect against damage.
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- 1.6 Worker Training and Supervision
- .1 Provide adequate training to workforce, through meetings and demonstrations, to emphasize purpose and worker responsibilities in carrying out the Waste Management Plan.
 - .2 Waste Management Coordinator: designate full-time person on site, experienced in waste management and having knowledge of the purpose and content of Waste Management Plan to:
 - .1 Oversee and supervise waste management during work;
 - .2 Provide instructions and directions to all workers and sub-contractors on waste reduction, source separation and disposal practices.
 - .3 Post a copy of the Plan in a prominent location on each site for review by workers.
- 1.7 Certification of Material Diversion
- .1 Submit to Departmental Representative, copies of certified weigh bills from authorized waste processing sites and sale receipts from recycling/reuse facilities confirming receipt of construction materials and quantity of waste diverted from landfill.
 - .2 Submit data at pre-determined project milestones as determined by Departmental Representative.
 - .3 Compare actual quantities diverted from landfill with projections made during waste audit.
- 1.8 Disposal Requirements
- .1 Burying or burning of rubbish and waste materials is prohibited.
 - .2 Disposal of waste, volatile materials, mineral spirits, oil, paint, paint thinner or unused preservative material into waterways, storm, or sanitary sewers is prohibited.
 - .3 Do not dispose of preservative treated wood through incineration.
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- .4 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .5 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .6 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .7 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with Provincial and Municipal regulations.
- .8 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.
- .9 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .10 Sale of salvaged items by Contractor to other parties not permitted on site.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 78 00 - Closeout Submittals.
- 1.2 Inspection and Declaration .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.
.1 Notify 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 Departmental Representative during all interim and final inspections of the Work.
.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 that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
.1 Project record as-built documents.
.4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.
- 1.3 Cleaning .1 In accordance with Section 01 74 11 - Cleaning.
.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
-

PART 2 - PRODUCTS

2.1 Not Used .1 Not Used.

PART 3 - EXECUTION

3.1 Not Used .1 Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 01 29 00 – Project Particulars and Measurement
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 01 55 26 - Traffic Regulations
- .4 Section 01 74 21 – Construction / Demolition Waste Management and Disposal
- 1.2 Description .1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed.
- .2 Demolition and removal will consist of, but not necessarily be limited to, the following:
- .1 Remove all or portions of aluminum bridge railings and posts where indicated.
- .2 Remove portions of timber abutments as indicated on the drawings to facilitate the new work.
- .3 Remove all or portions of existing approach guiderail and posts where indicated.
- .4 Remove existing guiderail attachments.
- .5 Remove existing asphalt.
- .6 Remove excess fill materials.
- 1.3 Measurement and Payment Procedures .1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.
- .2 Any demolition and removal items not identified in Section 01 29 00 – Payment Procedures, shall be considered incidental to other payment items.
-

- 1.4 Protection .1 Protect existing objects designated to remain. In event of damage, immediately replace or make repairs to approval of, and at no additional cost to, Departmental Representative.

PART 3 - EXECUTION

- 3.1 Execution .1 Inspect site and verify with Departmental Representative objects designated for removal.

- 3.2 Removal .1 Remove in their entirety all materials and objects specified for removal.
- .2 Do not disturb adjacent work designated to remain in place.
- .3 Remove materials and asphalt to limits indicated on drawings for placement of new asphalt and concrete as indicated on plans.

- 3.3 Safety Code .1 Do demolition work in safe manner and according to applicable laws and regulations from authorities having jurisdiction.
- .2 Blasting is not permitted.

- 3.4 Disposal of Material .1 The Owner maintains the right of first refusal (at no cost) to demolished material except those designated for reuse.
- .2 Upon refusal of demolished materials by the Owner, such materials become the property of the Contractor. Remove such materials from site and dispose in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
-

- 3.5 Restoration
- .1 Upon completion of work, remove debris, trim surfaces and leave work site in clean condition.
 - .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.
- 3.6 Temporary Jacking
- .1 The bridge is to be temporarily lifted off of its supports and rigidly during construction until the new pile caps reach 7 day compressive strength.
 - .2 Jacking equipment, methods and procedures are to be prepared by a professional engineer registered in Newfoundland & Labrador and submitted to the Departmental representative for approval.
 - .3 All jacks, hydraulic pumps, hoses, valves, and other lifting equipment are to be adequately sized and in good working condition ready and able to commence the proposed lifting operation. Jacks are to be installed true and plumb.
 - .4 Measures to be in place to prevent any hydraulic oil used in the jacking procedures from entering into waterway in the event of a rupture or a spill.
 - .5 Hydraulic jacking equipment shall be fitted with safety locks, nuts or other mechanical devices designed to hold the load in the event of equipment failure or unanticipated loss of hydraulic pressure.
 - .6 Lifting operations shall be accomplished in a slow and gradual manner to avoid any shock or impulse loading to the structure.
 - .7 Minimum design load per abutment is 21 Tonnes (unfactored)

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 – Submittal Procedures
 - .2 Section 01 74 21 – Construction/Demolition Management and Disposal
 - .3 Section 03 20 00 – Concrete Reinforcing
 - .4 Section 03 30 00 – Cast-in-Place Concrete
- 1.2 Measurement and Payment Procedures
- .1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.
- 1.3 References
- .1 Canadian Standards Association (CSA):
 - .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-O86-14, Engineering Design in Wood.
 - .3 CSA O121-08(R2013), Douglas Fir Plywood.
 - .4 CSA O151-09(R2014), Canadian Softwood Plywood.
 - .5 CSA O153-13, Poplar Plywood.
 - .6 CAN/CSA-O325-07(R2012), Construction Sheathing.
 - .7 CSA O437 Series-93(R2011), Standards for OSB and Waferboard.
 - .8 CAN/CSA-S269.1-1975 (R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-M92(R2013), Concrete Formwork, National Standard of Canada.
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- 1.4 Action and Informational
Submittals
- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures. Comply with CAN/CSA-S269.3 for formwork drawings.
 - .4 Indicate formwork design data: permissible rate of concrete placement and temperature of concrete in forms.
 - .5 Indicate sequence of erection and removal of formwork/falsework as directed by formwork Engineer.
- 1.5 Delivery, Storage and
Handling
- .1 Store and manage hazardous materials in accordance with jurisdictional requirements.
 - .2 Deliver, handle and store formwork materials to prevent weathering, warping or damage detrimental to the strength of the materials or to the surface to be formed.
 - .3 Ensure that formwork surfaces which will be in contact with concrete are not contaminated by foreign material. Handle and erect the fabricated formwork so as to prevent damage.
 - .4 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/ Demolition, Waste Management and Disposal.
 - .2 Place materials defined as hazardous or toxic waste in designated containers.
 - .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
 - .4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
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PART 2 – PRODUCTS

2.1 Materials

.1 Formwork Materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA O121, CAN/CSA-O86.

.2 Formwork shall be constructed from lumber devoid of warped defects in order to achieve a face alignment free of distortion. This shall apply to all panel forms including prefabricated boards, plywood and steel panels.

.3 Formwork on exposed concrete surfaces shall be new or like new to achieve a quality aesthetically pleasing finish.

.2 Form Ties:

.1 For concrete not designated “Architectural”, use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface.

.3 Form Release Agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms. Form release agents must be compatible with waterproofing systems where applicable.

.4 Falsework Materials: to CSA S269.1.

.5 Sealant: to Section 07 92 00 – Concrete Joint Sealant.

PART 3 – EXECUTION

3.1 Fabrication and Erection

.1 Verify lines, levels and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

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- .3 Do not place shores and mud sills on frozen ground.
 - .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
 - .5 Fabricate and erect formwork in accordance with CAN/CSA S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.
 - .6 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
 - .7 Use 25 mm chamfer strips on external corners and/or 25mm fillets at interior corners, joints, unless specified otherwise.
 - .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
 - .9 Construct forms for architectural concrete as indicated.
 - .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
 - .10 Built in anchors, sleeves, and other inserts required to accommodate work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
 - .2 Anchors and inserts cast into the concrete shall either be isolated from dissimilar metals by either a 30mm clear spacing or denso tape barrier on the formwork anchors/inserts.
 - .11 Clean formwork in accordance with CSA A23.1/A23.2 before placing concrete.
- 3.2 Removal and Reshoring
- .1 Notify Departmental Representative prior to form removal.
 - .2 Form removal times are dependent on proper curing in accordance with CAN/CSA A23.1 and CAN/CSA S269.3.
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Provide written evidence of concrete strength to the Departmental Representative 24 hours prior to form removal to show the suitable strength has been achieved. Contractor shall pay for the concrete cylinder strength tests to demonstrate concrete strength prior to form removal.

- .3 Leave formwork in place for the following minimum periods of time after placing concrete:
 - .1 Two (2) days for walls.
 - .2 Two (2) days for pilecaps.
- .4 Remove formwork when concrete has reached 70% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring. No vehicle loading or backfilling of abutments shall take place until concrete reaches design strength, unless otherwise approved in writing by Departmental Representative.
- .5 If formwork is used to aid curing, it shall not be removed until seven (7) days after the concrete placement.
- .6 Reuse formwork and falsework subject to requirements of CSA A23.1/A23.2.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 – Submittal Procedures
 - .2 Section 01 45 00 – Quality Control
 - .3 Section 03 10 00 – Concrete Forming and Accessories
 - .4 Section 03 30 00 – Cast-in-Place Concrete
- 1.2 Measurement and Payment Procedures
- .1 Payment for this item shall be included in the contract unit price, per cubic meter, for Cast-in-Place Concrete.
- 1.3 References
- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
 - .1 ACI 315-99, Details and Detailing of Concrete Reinforcement.
 - .2 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
 - .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A143/A 143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA-A23.3-14, Design of Concrete Structures.
 - .3 CAN/CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement, A National Standard of Canada.
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- .4 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles, A National Standard of Canada.
- .6 CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .7 CSA S6-14, Canadian Highway Bridge Design Code.
- .4 Reinforcing Steel Institute of Canada (RSIC)
- .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
- 1.4 Action and Informational Submittals
- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI 315, except as noted herein. Shop drawings are to be submitted at least four (4) weeks prior to commencing fabrication for review and approval. The Contractor retains responsibility for correctly detailing reinforcement, but the shop drawings must be approved for conformity with the design. Fabrication shall not proceed until the final approval of shop drawings.
- .3 Submit shop drawings, including placing of reinforcement, and indicate:
- .1 Bar bending details (Reference Table 3.3.1, Minimum Bend Diameter for Reinforcing Steel (400W)).
- .2 Lists.
- .3 Quantities of reinforcement.
- .4 Sizes, spacings, locations of reinforcement and mechanical splices as specified, if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
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- .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CSA-S6-14, unless otherwise indicated.
 - .1 Provide Class B tension lap splices unless otherwise indicated.
- 1.5 Quality Assurance
 - .1 Submit in accordance with Section 01 45 00 – Quality Control, and as described in Part 2.3 – Source Quality Control.
 - .1 Mill Test Report: Provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum four (4) weeks prior to beginning reinforcing work.
 - .2 Upon request, submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

PART 2 – PRODUCTS

- 2.1 Materials
 - .1 Substitute different size bars only if permitted in writing by Departmental Representative.
 - .2 Reinforcing Steel: billet steel, black, grade 400W (weldable), deformed bars to CAN/CSA G30.18, unless indicated otherwise.
 - .3 Cold-drawn Annealed Steel Wire Ties: to ASTM A497/A497M. All tie-wires, chairs and bar supports and other material used for the installation of galvanized reinforcing bars shall be covered, either with powdered epoxy resin, or acceptable material, at all contact points and within 50mm of exposed faces, or be comprised of an acceptable non-metallic material to avoid galvanic reaction with galvanized repair/damage to galvanized coating.
 - .5 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
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- .6 Anchor Bolts and Pilaster Cap Dowels: to ASTM A307 (or better). Anchor bolts and pilaster cap dowels to be galvanized as per this specification.

2.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2, ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, except as noted herein (see Table 3.3.1).
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source
Quality Control

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

PART 3 – EXECUTION

3.1 Preparation

- .1 All steel reinforcing bars shall have the necessary net sectional area, and shall be cut to the exact lengths, and bent cold to the exact forms and dimensions shown on the approved plans, or otherwise required, before galvanizing or being placed in position. Bending shall be accurately
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done, in a bending machine and no welding or heating or any bars shall be allowed, except with written approval from the Departmental Representative. All stirrups and hoops shall accurately fit the rods, and all bends shall be taken out of bars to be used as straight members.

- 3.2 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, apply slow and steady pressure.
 - .3 Replace bars which develop cracks or splits.
- 3.3 Placing Reinforcement
- .1 Place reinforcement steel as indicated on placing drawings.
 - .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
 - .3 Ensure cover to reinforcement is maintained during concrete pour.
 - .4 All reinforcing bars shall be placed and held rigidly in the exact positions in the forms as shown on the approved plans, or otherwise required, and there shall be no displacement of the same by the placing and tamping of the concrete. Adjusting or moving the bars, while the concrete is being placed shall not be permitted, unless specified on the plans. Concrete protection required for reinforcing steel shall be in accordance with the contract documents or as directed by the Departmental Representative. All bars shall be tied and properly braced to prevent displacement. No concrete shall be placed until the reinforcement, after being cleaned and placed in position, has been examined and approved by the Departmental Representative. The minimum bend diameter shall conform to Table 3.3.1 below. Bending of galvanized reinforcing steel will not be permitted after coating.
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- .5 To avoid contact between dissimilar metals, galvanized reinforcing shall either be separated from black steel (uncoated steel; ie., steel girder top flange studs) with a clear space of at least 30mm, otherwise the galvanized reinforcing shall be locally wrapped with denso tape to provide the required separation.

Table 3.3.1
Minimum Bend Diameter for Reinforcing Steel (400W)

<u>Bar Size (mm)</u>	<u>Bend Diameter (mm)</u>
10	70
15	90
20	150
25	200
30	250
35	300
45	450
55	600

- 3.4 Field Touch-Up .1 Touch up damaged and cut ends of galvanized reinforcing steel with zinc rich paint that is a compatible finish to provide continuous coating. Cold galvanizing touch-up procedure and product shall meet with the approval of the Departmental Representative.

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Related Work
- .1 Section 03 10 00 – Concrete Forming and Accessories
 - .2 Section 03 20 00 – Concrete Reinforcing
- 1.2 Measurement and Payment Procedures
- .1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.
- 1.3 References
- .1 ACI-211.1-91, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - .2 ASTM C260-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .3 ASTM C457-10a, Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete.
 - .4 ASTM C494-10a, Standard Specification for Chemical Admixtures for Concrete.
 - .5 ASTM C1202-10, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
 - .6 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - .7 CAN/CGSB 51.34-M86 AMEND, Vapour Barrier, Polyethylene Sheet for use in Building Construction.
 - .8 Canadian Standards Association (CSA International):
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- .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.
- .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
- .3 CSA A3000-08, Cementitious Materials Compendium.

1.3 Abbreviations and Acrynyms

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb – where b denotes blended).
 - .1 Type GU or GUb – General use cement.
 - .2 Type MS or MSb – Moderate sulphate-resistant cement.
 - .3 Type MH or MHb – Moderate heat of hydration cement.
 - .4 Type HE or HEb – High early-strength cement.
 - .5 Type LH or LHb – Low heat of hydration cement.
 - .6 Type HS or HSb – High sulphate-resistant cement.

1.4 Submittals

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit copies of WHMIS MSDS, Material Safety Data Sheets.

1.5 Quality Assurance

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
 - .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
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- .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on the following items:
 - .1 Falsework erection;
 - .2 Hot weather concrete;
 - .3 Cold weather concrete;
 - .4 Curing;
 - .5 Finishes;
 - .6 Formwork removal;
 - .7 Joints.
 - .4 Health and Safety Requirements: Do construction occupational health and safety requirements in accordance with Section 01 35 29 – Health and Safety Requirements.
- 1.6 Delivery, Storage and Handling
- .1 Delivery and Acceptance Requirements:
 - .1 Concrete Hauling Time: deliver to site of work and discharge within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
 - .2 Concrete Delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

PART 2 – PRODUCTS

- 2.1 Materials
 - .1 Cement: to CSA A3000, Type GU.
 - .2 Water: to CSA A23.1.
 - .3 Aggregates: to CSA A23.1/A23.2.
 - .4 Admixtures:
 - .1 Air Entraining Admixture: to ASTM C260.

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- .2 Chemical Admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
 - .5 Shrinkage Compensating Grout: MasterEmaco 928 non-shrink grout or approved equivalent.
 - .1 Compressive Strength: 50 MPa at 28 days.
 - .6 Chemical Adhesive Anchoring System: Hilti RE500 Chemical Adhesive Anchoring System or approved equivalent.
 - .7 Curing Compound: to CSA A23.1/A23.2 white, Type 1 – chlorinated rubber.
 - .8 Pre-Moulded Joint Fillers:
 - .1 Bituminous Impregnated Fiber Board: to ASTM D1751.
 - .2 Sponge Rubber: to ASTM D1752, Type I, firm grade.
 - .9 Dampproofing:
 - .1 Emulsified asphalt, mineral colloid type, unfilled.
 - .10 Polyethylene Film: 0.15mm thickness to CAN/CGSB 51.34.
- 2.2 Mixes
- .1 Mixture proportions shall be selected on the basis of a 75 year design life and all concrete in the structure shall have a minimum compressive strength of 35 MPa in 28 days. The Contractor shall perform all tests required to demonstrate the long-term performance and durability of the materials and concrete mixtures.
 - .2 Performance Method for specifying Concrete: to meet Departmental Representative performance criteria to CAN/CSA A23.1/A23.2 and CSA S6.
 - .3 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative #1. High Performance Concrete in pile caps shall be proportioned using Portland cement, Type SF silica fume, fine and coarse aggregates, air entraining, water reducing, and/or set regarding
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admixtures. Concrete mixtures shall be designed to meet the following:

- .1 Minimum Compressive Strength at 28 days: 35 MPa.
- .2 Design life of 75 years.
- .3 Class of Exposure: F1.
- .4 Chemical Admixtures: type as approved and in accordance with ASTM C494.
- .5 Normal Size of Coarse Aggregate: 20mm.
- .6 Maximum Water to Cement Ratio: 0.35.
- .7 Cementitious Content: minimum 420 kg/m³, maximum 480 kg/m³.
- .8 Air Content: 6 +/- 1% (7 +/- 1% with superplasticizer).
- .9 Maximum Slump before Superplasticizer: 60 mm.
- .10 Slumps after Superplasticizer: 180 +/- 30 mm.
- .11 Maximum spacing factor of hardened concrete not to exceed 230 Φm.
- .12 Chloride Ion Permeability @ 56 days: <1000 coulombs.
- .13 Maximum Concrete Temperature (from delivery equipment):
 - .1 Thickness >2 meters: 18°C.
 - .2 Thickness <2 meters: 25°C.
- .14 Maximum Concrete Temperature (in situ): 70°C.
- .15 Maximum Temperature Gradient: 20°C/meter.
- .16 Superplasticizer shall be used in all concrete.

PART 3 – EXECUTION

- 3.1 Preparation
 - .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 48 hours minimum notice prior to placing of concrete.
 - .2 Place concrete reinforcing in accordance with Section 03 20 00 – Concrete Reinforcing.
 - .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilities placing with minimum of re-handling and without damage to existing structure or work.
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- .4 Pumping of concrete will not be permitted, and is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete, obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .8 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .9 Do not place load upon new concrete until authorized by Departmental Representative.
- .10 Apply bonding agent to all existing concrete surfaces in accordance with manufacturer's instructions prior to the placement of new concrete.

3.2 Installation/ Application

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
 - .2 Anchor Bolts:
 - .1 Install anchor bolts in preformed holes or holes drilled after concrete has set.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with epoxy grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
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- .3 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .4 Finishing and Curing:
- .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces.
- .5 Ensure finish elevations of pile caps and cap beam match the existing elevation of the bearing seats and deck beams such that the bridge maintains its original position.
- 3.6 Surface Tolerance
- .1 Concrete tolerance to CSA A23.1.
- 3.7 Field Quality Control
- .1 Site Tests: conduct tests as follows in accordance with Section 01 45 00 – Quality Control and submit report as described in PART 1 – ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours
 - .2 Slump
 - .3 Air content
 - .4 Compressive strength at 7, 28 and 56 days.
 - .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
 - .3 Owner will pay for costs of tests
 - .4 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders
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on job site under same conditions as concrete which they represent.

- .5 Inspection or testing by Owner will not augment or replace Contractor quality control, nor relieve Contractor of his contractual responsibility.

3.8 Cleaning

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Steelwork Includes .1 Anchors, Anchor Bolts and Spacers.
.2 Base Plates.
.3 Barrier Cover/Armour Plates.
.4 Miscellaneous Steel Components.
- 1.2 Related Sections .1 Section 01 29 00 - Payment Procedures
.2 Section 01 33 00 - Submittal Procedures
.3 Section 01 15 43 - Environmental Procedures
- 1.3 Measurement and Payment Procedures .1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.
- 1.4 References .1 CSA International:
.1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
.2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CAN/CSA S6-06, Canadian Highway Bridge Design Code.
.4 CSA S16-09, Design of Steel Structures.
.5 CSA W59, Welded Steel Construction.
- 1.5 Action and Informational Submittals .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
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- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements, and Section 01 35 43 - Environmental Procedures.

 - .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by a Professional Engineer registered or licensed within the Province of NL.
 - .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
 - .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

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

 - .2 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection of joints and bicycle railings.
 - .2 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than three (3) tonnes.
 - .3 Protect unpainted weathering steel, before erection, with waterproof covering.
 - .4 Ensure that no portion of steel comes into contact with ground.

 - 1.7 Quality Assurance
 - .1 Pre-construction Testing:
 - .1 Provide suitable facilities and cooperate with the Departmental Representative in carrying out inspection and tests required.
-

PART 2 - PRODUCTS

- 2.1 Bearing Sole, Masonry and Bevelled Plates
- .1 Structural Steel Plates: to CSA G40.21, Grade 300W galvanized.
 - .2 Hot Dip Galvanizing: to CSA G164, Table 1, minimum zinc coating of 600 g/m².
 - .3 Field touch-up of galvanizing at field weld locations to be minimum two coats of brush applied zinc rich epoxy.
 - .4 Welding: to CSA W59.
- 2.2 Bearing Anchor Rods
- .1 Anchor Rods: to ASTM F1554 Grade 105 galvanized.
 - .2 Hot Dip Galvanizing: to CSA G164, Table 1, minimum zinc coating of 600 g/m².
- 2.3 Connection Brackets
- .1 All steel connections brackets shall be supplied, fabricated and installed in accordance with the design drawings.
 - .2 Structural Steel HSS: to CSA G40.21, Grade 350W Class C galvanized.
 - .3 Structural Steel Plates: to CSA G40.21, Grade 300W galvanized.
 - .4 High Strength Bolts, Nuts and Washers: to ASTM A325M galvanized.
 - .5 Anchor Bolts: to ASTM F1554 Grade 55 galvanized.
 - .6 Hot-Dip Galvanizing: to CSA G164, Table 1, minimum zinc coating of 600 g/m².
 - .7 Welding: to CSA W59.
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- 2.4 Miscellaneous Steel Work .1 All other miscellaneous steel work shall be supplied, fabricated and installed in accordance with applicable CSA International Provisions.
- 2.5 Source Quality Control .1 Steel Producer Qualifications: certified in accordance with CSA G40.21/G40.21.

PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 Preparation .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
.2 Prepare areas for field welding in accordance with CSA W59.
- 3.3 Cleaning .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave work area clean at end of each day.
.2 Final Cleaning: upon completion, remove foreign materials, tools and equipment in accordance with Section 01 74 11 - Cleaning.

*** END OF SECTION ***

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 33 00 - Submittal Procedures
- 1.2 Reference Standards .1 ASTM A307-14, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .2 CAN/CSA-080 Series 2008 (R2012), Wood Preservation (including CSA preliminary standard O80.31-M1989).
- .3 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .4 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .5 Copper naphthenate containing 2% copper for Brush or Spray Treatment for Field Cuts.
- .6 CSA 086-14, Engineering Design in Wood (Limit States Design).
- .7 NLGA Standard grading rules for Canadian Lumber 1980 edition or most recent at time of tendering.
- .8 ASTM D4637-15, EPDM Sheet used in Single-Ply Roof Membrane.
- .9 ASTM B111-1974 (R2001) Wire Nails, Spikes and Staples.
- .10 CAN/CSA-G164-M92 (or latest edition) – Hot Dip Galvanizing of Irregularly Shaped Articles.
- 1.3 Submittals .1 At least two (2) weeks prior to finalizing timber order, submit drawings, clearly indicating installation details.
- .2 Submit methodology for field treatment.
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- .3 Provide submissions in accordance with Section 01 33 00.
- 1.4 Measurement for Payment
- .1 Supply and Installation of Timber Cribs:
.1 Supply and installation of wales shall be measured for payment by the cubic meter (m3). Installation of bolts and hardware shall be measured but considered incidental to the work.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Softwood Timber: Graded and stamped to National Lumber Grading Authority (NLGA) No. 1 Structural, Eastern Hemlock, Western Hemlock or Douglas Fir species only will be used.
- .2 Hardwood Timber: Sound merchantable grade yellow birch, hard maple, red or white oak conforming to grading rules approved by the National Hardwood Lumber Association.
- .3 Timber Treatment:
.1 Preservative treatment to CAN/CSA-080 Series-08 for Marine Construction Coastal Waters. Where assay retentions are not indicated, they are to be taken as 1.5 times the indicated gauge retention.
.2 Make arrangements for testing of timber by:
.1 Plant Inspection: Provide treatment plant identification, date of treatment, list of various pieces in the charge, charge number, plant assay testing results, concentration and type of preservative used, duration of treatment, gauge retention, species of wood; and make arrangements with the treatment plant to locate bundles, move bundles, break open bundles and carry out other measures to facilitate the inspection.
.2 Filling and submitting a pre-printed form, agreed to by the Departmental Representative, containing the above
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information.

.3 Comply with AWPAs M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWPAs M2.

.4 Treat all field cuts with two (2) coats of clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

.5 Remove chemical deposits on treated wood to receive applied finish.

.4 Miscellaneous Hardware: Hardware must meet the following specifications:

.1 Machine bolts, lag bolts, drift bolts, anchor bolts, nuts, round plate washers: to ASTM A307.

.2 Spikes: to CSA B111.

.3 Hot dip galvanized hardware, bolts, nuts, washers and spikes to CSA G164, with minimum zinc coating of 600 g/m².

.4 All hardware will be galvanized unless otherwise shown on plans.

PART 3 - EXECUTION

3.1 General

.1 Supply and install dimension timbers to details shown on drawings or as specified. Treated timber to be supplied in pre-cut lengths to suit. Install lag bolts in sound existing timber.

.2 Boreholes for drift bolts to be 1.5mm smaller in diameter than bolt and for full length of bolt. Boreholes for machine bolts to be same diameter as bolts. Boreholes for lag bolts to be same diameter as shank for unthreaded portion and 0.70 times the shank diameter for the threaded portion. Threaded portion of lag bolts will be installed using a wrench, not by driving.

.3 All countersunk holes to be recessed 25 mm and shall receive two coats of Copper naphthenate, allowing

sufficient time between applications to permit total absorption. The cost of supply and application of Copper naphthenate will not be measured for payment, but will be considered incidental to the work.

3.2 Handling Timber

- .1 Timber will be protected during handling, shipping, off loading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.
- .2 Tops of vertical untreated timber to be field treated with minimum two liberal coats of Copper naphthenate.

3.3 Handling Treated Timber

- .1 Handle treated material to avoid damage causing alteration in original treatment.
 - .2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using Copper naphthenate, as specified herein, regardless of plant treatment type. Fill all unused bored holes and any other holes with tight fitting treated wooden plugs prior to any exposure to water containing marine borers.
 - .3 Provide methodology pertaining to heating and application. Apply to dry surfaces wherever possible.
 - .4 Treat boreholes using a pressurized container with an extension rod to produce a fine spray in the holes with one application. Alternately, a cylindrical brush may be used.
 - .5 Treat field cuts and any abrasions with minimum of two (2) liberal applications of approved preservative, using either spray or brush.
 - .6 In addition, field cuts and underwater damaged areas
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will receive a coating of plastic compound, capped with lead flashing secured with galvanized roofing nails. Plastic compound not to be water soluble and is subject to approval.

- .7 Environmental Concern: Ensure no spillage or excess application of field preservative. Provide workmen with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or to the environment.
- .8 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

-- END OF SECTION --

PART 1 - GENERAL

- 1.1 References
- .1 CSA International:
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA O121-[08], Douglas Fir Plywood.
 - .3 CSA O141-[05(R2009)], Softwood Lumber.
 - .4 CSA O151-[09], Canadian Softwood Plywood.
 - .5 CAN/CSA-O325.0-[07], Construction Sheathing.
 - .6 CAN/CSA-Z809-[08], Sustainable Forest Management.
 - .2 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
 - .3 Green Seal Environmental Council (FSC):
 - .1 GS-11-[11], Paints and Coatings.
 - .4 National Lumber Grades Authority (NLGA):
 - .1 Standard Grading Rules for Canadian Lumber [2010].
 - .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards.
 - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
 - .6 Sustainable Forestry Initiative (SFI):
 - .1 SFI-[2010-2014] Standard.
- 1.2 Action and Informational Submittals
- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.
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- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.
 - .2 Wood Certification: submit [vendor's] [manufacturer's] Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of [paints and coatings] used in building, comply with VOC and chemical component limits or restriction requirements.
 - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins and laminate adhesives used in building, stating that they contain no urea-formaldehyde.

 - 1.3 Maintenance Materials Submittals .1 Extra Stock Materials:
 - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use [19] mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate.

 - 1.4 Quality Assurance .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
 - .2 Plywood Identification: by grade mark in accordance with applicable CSA standards.
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- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan Waste Reduction Workplan related to work of this section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

PART 2 - PRODUCTS

- 2.1 Materials
 - .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Furring, blocking, nailing strips, grounds, rough bucks, [cants,] curbs, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
 - .3 Panel Materials:
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .1 Urea-formaldehyde free.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .1 Urea-formaldehyde free.
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- .3 Plywood, OSB and wood based composite panels:
to CAN/CSA-O325.
 - .1 Urea-formaldehyde free.
- .4 Wood Preservative:
 - .1 Surface-applied wood preservative: clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
 - .2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.
 - .3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.

2.2 Accessories

- .1 Fasteners: to CAN/CSA-G164, for exterior work pressure-preservative treated lumber.
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, [explosive actuated fastening devices], recommended for purpose by manufacturer.

PART 3 - EXECUTION

3.1 Examination

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

3.2 Preparation

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.3 Installation

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
 - .2 Install furring and blocking as required to space-out and support other work as required.
 - .3 Align and plumb faces of furring and blocking to tolerance of [1:600].
 - .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
 - .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
 - .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
 - .7 Install sleepers as indicated.
 - .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.
 - .9 Frame, anchor, fasten, tie and brace members to provide
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necessary strength and rigidity.

- .10 Countersink bolts where necessary to provide clearance for other work.

3.4 Cleaning

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

***** END OF SECTION *****

PART 1 – GENERAL

- 1.1 Related Work .1 Section 31 23 10 – Excavating, Trenching and Backfilling
- 1.2 Source Approval
- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling.
- .2 If, in the opinion of the Departmental Representative, aggregate from the proposed source do not meet, or cannot reasonable be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements.
- .3 Should a change of aggregate source be proposed during work, advise Departmental Representative 1 week in advance of proposed change to allow sampling and testing.
- .4 Acceptance of an aggregate 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 Sampling
- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Allow continual sampling by Departmental Representative during production.
- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
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- .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 Measurement
For Payment

- .1 No measurement for payment will be made under this section.

PART 2 – PRODUCTS

2.1 Materials

- .1 Aggregate Quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
.1 Greatest dimension to exceed three times least dimension.
- .3 Fine aggregate satisfying requirements of applicable section to be one, or a blend of the following:
.1 Natural sand
.2 Manufactured sand
.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of the following:
.1 Crushed rock.
.2 Gravel and crushed gravel composed of naturally formed particles of stone.
.3 Light weight aggregate, including slag and expanded shale.
.4 Light weight aggregate, including slag and expanded shale.
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PART 3 – EXECUTION

3.1 Development of Aggregate Source

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

3.2 Stripping of Topsoil

- .1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Departmental Representative.
- .2 Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2 meters.

3.3 Processing

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.
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- .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.
 - .4 When operating in stratified deposits, use excavation equipment and methods that will produce uniform, homogeneous aggregate.
 - 3.4 Handling
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
 - 3.5 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground, but do not incorporate bottom 300mm of pile into work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 meters for coarse aggregate and base coarse aggregate.
 - .2 Maximum 1.5 meters for fine aggregate and sub-base aggregate.
 - .3 Maximum 1.5 meters for other aggregate.
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- .8 Uniformly spot dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 Do not cone piles or spill material over edges of piles.
 - .10 Do not use conveying stackers.
 - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.
- 3.6 Aggregate Stockpile Clean Up
- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
 - .2 Leave any unused aggregates in neat compact stockpiles as directed by the Departmental Representative.
- 3.7 Source Abandonment
- .1 For temporary or permanent abandonment of aggregate source, rehabilitate source to condition meeting requirements of the Guidelines.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.2 Measurement and Payment Procedures .1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.
- 1.3 References .1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- 1.4 Definitions .1 Excavation classes: one class of excavation will be recognized, common excavation.
.1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- 1.6 Waste Management and Disposal .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
.2 Place materials defined as hazardous or toxic in designated containers.
.3 Ensure emptied containers are sealed and stored safely.

PART 2 - PRODUCTS

- 2.1 Materials .1 Type 1 Fill (Granular A):
.1 crushed stone or gravel.
.2 Gradations to within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
.3 Gradations to:
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<u>Sieve Designation</u>	<u>% Passing</u>
19mm	100
9.5mm	50-80
4.75mm	35-60
1.2mm	15-35
0.300mm	5-20
0.075mm	2-8

- .2 Type 2 Fill (Rock Borrow):
- .1 blasted or crushed rock consisting of durable crushed stones, having 100% by mass pass through a 150mm x 150mm screen, and a maximum 10% by mass pass through a maximum 100mm x 100mm screen. Rock to consist of angular fragments obtained by breaking and crushing solid or natural rock, reasonably free from thin, flat elongated or other objectionable pieces and fines or as otherwise approved by the Departmental Representative.

- .3 Type 3 Fill (Granular 'B' Sub Base):
- .1 Crushed, pit run or screened stone, gravel or sand.
- .2 Gradations to within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
- .3 Gradations to:

<u>Sieve Designation</u>	<u>% Passing</u>
50mm	100
25.4mm	50-100
4.75mm	20-55
1.2mm	10-35
0.300mm	5-20
0.075mm	2-8

- .4 Type 4 Fill (Backfill):
- .1 Crushed, pit run or screened stone, gravel or sand.
- .2 Must be free from organic or deleterious material
- .3 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>% Passing</u>
75mm	100
4.75mm	22-85
0.425mm	5-30
0.075mm	2-10

PART 3 - EXECUTION

- 3.1 Site Preparation .1 Remove obstructions, ice and snow from surfaces to be excavated within limits indicated.
- 3.2 Excavation .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Dispose of surplus and unsuitable excavated material off site.
- .5 Obtain Departmental Representative's approval of completed excavation.
- .6 Install geotextiles in accordance with Section 31 32 19.01 - Geotextiles.
- 3.3 Fill Types & Compaction .1 Use fill types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 corrected maximum dry density.
- .1 Base Course under timber cribs: use Type 3 fill. Compact to 98%
- .2 Timber crib cells: use Type 2 fill. Compact to 95%
- .3 Backfill behind timber crib: use Type 4 fill. Compact to 98%

- 3.4 Restoration
- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by the Engineer.
 - .2 Clean and reinstate areas affected by work as directed by Departmental Representative.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Not Used .1 Not used.

PART 2 - PRODUCTS

2.1 Not Used .1 Not used.

PART 3 – EXECUTION

3.1 Preparation .1 Prior to commencing removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt concrete pavement to be removed.

3.2 Removal .1 Remove existing asphalt pavement to lines and grades as indicated. Saw-cut asphalt where new asphalt meets existing asphalt.

.2 Prior to paving operations commencing a transverse butt joint must be constructed. If a transverse vertical cut is milled in the existing pavement at the limit of the work area, the Contractor shall immediately construct with hot mix asphalt concrete a temporary smooth 1.5 meter long taper. The temporary taper must be removed prior to paving of the milled area.

.3 Lanes shall be completed to the same location at the end of the day's cold milling operation where it is intended to have both lanes milled.

.4 All residue left by the cold planing process shall be removed immediately from the road. Mechanical sweeping shall be performed at the end of each day's operations. Low points in the asphalt as a result of cold planing operations where water ponding may occur, shall have the shoulder milled for draining rainfall. Any guiderail contaminated as a result of cold planing or

sweeping operations shall be cleaned to the satisfaction of the Departmental Representative. Any milled material that is lost over the shoulder shall be immediately retrieved and disposed of in an approved manner.

- .5 The Contractor shall dispose of residue at an approved waste disposal area provided by the Contractor at his own expense.
- .6 The Contractor shall continuously maintain the worksite free of pot holes and standing water and in a condition providing for a safe and efficient flow of traffic, from the time of removal, until such time as the new asphalt concrete is placed. Hot mix asphalt concrete shall be placed in the pot holes; cold mix or RAP are acceptable only as a temporary repair. Areas cold milled must be paved within 7 days of the cold milling operation. Signage indicating the driving condition of the milled surface shall be posted. (ie., construction signs TC-47 and TC-49). Milled and aged asphalt concrete surfaces shall be treated with bituminous tack coat in accordance with Section 32 12 13.16 prior to the placing of asphalt concrete.
- .7 Use equipment and methods of removal and hauling which do not tear, gouge, break or otherwise damage or disturb underlying pavement.
- .8 Prevent contamination of removed asphalt concrete pavement and granular base by topsoil, underlying gravel or other materials.
- .9 Provide for suppression of dust generated by removal process.
- .10 Compact underlying material.
- .11 In areas where localized pavement removal is carried out within the traffic lane ensure traffic is restricted from area until the surface is restored.

3.4 Spreading

- .1 Graders shall be used which are capable of spreading the
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- Equipment milled asphalt true to line, grade and crown (2%) as specified and as directed by the Departmental Representative.
- .2 The milled material shall be placed in uniform layers such that the thickness of the compacted layer does not exceed 150 mm.
- 3.5 Rollers
- .1 All rollers used for placement of the milled material shall be of the types specifically designed for asphalt compaction and shall be in good condition and capable of reversing without backlash. They should be operated at all times by competent operations.
- .2 All rollers shall be weighted in the presence of the Departmental Representative and ballasted, if required, immediately before commencing work and whenever subsequently required by the Departmental Representative.
- .3 Sufficient passes should be made with rollers to stabilize and compact the milled asphalt to the satisfaction of the Departmental Representative. The milled material must be compacted immediately after placing.
- 3.6 Tolerance
- .1 Compacted surface shall be within plus or minus 5 mm of elevations established by the Departmental Representative, but not uniformly high or uniformly low.
- 3.7 Traffic Control
- .1 Maintain traffic as indicated in Section 01 10 10, General Instructions.

***** END OF SECTION *****

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 77 00 - Closeout Procedures
- 1.2 References .1 ASTM D2419-09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- .2 ASTM D3203-11, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- .3 ASTM D1159-07 (R2012), Test Method for Resistance to Plastic Flow Bituminous Mixtures Using Marshall Apparatus.
- .4 Newfoundland & Labrador Department of Transportation & Works Specifications Book.
- 1.3 Supply of Materials .1 Notify Departmental Representative of proposed date for use of materials; order and schedule shipments to coincide with construction schedule.
- 1.4 Source Sampling .1 At least 4 weeks prior to commencing work inform Departmental Representative of proposed source of aggregates and provide access for sampling. A copy of the location letter shall be forwarded to the Superintendent, Gros Morne National Park.
- 1.5 Material Certification .1 At least 4 weeks prior to commencing work submit viscosity-temperature chart for asphalt cement to be supplied showing Kinematic Viscosity in centistokes, temperature range 105 to 175 °C.
- .2 Submit manufacturer's test data and certification that asphalt cement meets requirements of this section
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- 1.6 Submission of Mix Design .1 Submit asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to commencing work.
- 1.7 Delivery and Storage .1 Deliver and stockpile aggregates in accordance with Section 31 05 17 – Aggregates: General. Stockpile minimum 50% of total amount of aggregate required before commencing asphalt mixing operation.
- .2 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.
- .3 Stockpile fine aggregate separately from coarse aggregate.
- .4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.
- .5 Furnish copies of freight and weigh bills for asphalt cement as shipments are received. Departmental Representative reserves right to check weights as material is received.

PART 2 - PRODUCTS

- 2.1 Materials .1 Asphalt cement: to PG 58-28 in accordance with ASTM D6373.
- .2 Aggregate material to following requirements:
- .1 Crushed rock consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, and other deleterious materials.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on a semi-log grading chart.

Surface Course

Sieve Designation

% Passing

19mm

100

12.5mm	93-100
9.5mm	75-92
4.75mm	55-75
2.00mm	22-42
0.425mm	10-25
0.150mm	5-12
0.075mm	2-5

Asphalt Base Course

<u>Sieve Designation</u>	<u>% Passing</u>
22mm	100
19mm	90-100
12.5mm	75-90
9.5mm	63-84
4.75mm	35-55
2.00mm	22-42
0.425mm	10-25
0.150mm	5-12
0.075mm	2-6

.3 Coarse aggregate is aggregate retained on 4.75mm sieve and fine aggregate is aggregate passing 4.75mm when tested to ASTM C136.

.4 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75mm sieve and stockpile separately from coarse aggregate.

.5 Coarse aggregate stockpile shall contain no more than 15% passing 4.75mm sieve.

.6 Fine aggregate stockpile shall contain no more than 15% retained on 4.75mm sieve.

.7 Petrographic Number: CSA A23.2-15A Max:135

.8 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.9 Sand equivalent: ASTM D2419 Min:50

.10 Magnesium Sulphate Soundness: ASTM C88.
Max % loss by mass: Coarse Aggregate, surface course: 12. Coarse aggregate, lower course: 12. Fine aggregate, surface course: 16. Fine aggregate, lower course: 16.

.11 Los Angeles abrasion; Gradation B. to ASTM

C131 Max % loss by mass: Coarse aggregate, surface course: 35.

.12 Absorption: ASTM C127, Max % loss by mass: Coarse aggregate, surface course: 1.75 Coarse aggregate, lower course: 2.00

.13 Loss by washing: to ASTM C117. Max % passing 0.075mm sieve: Coarse aggregate, surface course: 1.75 Coarse aggregate, lower course: 2.0.

.14 Flat and elongated particles with length to thickness ratio greater than 4: Max % by mass: Coarse aggregate, surface course: 20 Coarse aggregate, lower course: 20.

.15 Crushed fragments at least 90% of particles by mass within each of following sieve designation ranges to have at least 2 freshly fractured faces. Material to be divided into ranges using methods of ASTM C136.

<u>Passing</u>	<u>Retained on</u>
25.0mm to	12.5mm
12.5mm to	4.75mm

.16 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.17 Micro- Deval abrasion, to ASTM D6928, Coarse aggregate: Max 20%

.18 Micro-Deval abrasion to CSA A23.2-23A, fine aggregate; max 20%

.19 Fine aggregate angularity, to ASTM C1252, Min 45%

.3 Mineral Filler:

.1 Finely ground particles of limestone, hydrated lime, Portland Cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.

.3 Mineral filler to be dry and free flowing when added to aggregate.

- 2.2 Mix Design
- .1 Job mix formula to be provided by Contractor and designed and certified by a Professional Engineer. Job mix formula to be approved by Departmental Representative.
 - .2 Design mix: by Marshall method to requirements below and as directed by Departmental Representative.
 - .1 Compaction blows on each face of test specimens: 75
 - .2 Mix physical requirements:
 - .1 Property: roads
 - .2 Marshall Stability at 60C: 8000N
 - .3 Flow Value mm: 2 to 4
 - .4 Air Voids in Mixture, %: 3-5
 - .5 Voids in Mineral Aggregate, %min: 15
 - .6 Index of Retained Stability %
 - .7 Minimum: 75
 - .3 Measure physical requirements as follows:
 - .1 Marshall load and flow value: to ASTM D6927.
 - .2 Air voids: to ASTM D3203.
 - .4 Do not change job-mix without prior approval of Departmental Representative. Should change in material source be proposed, new job mix formula to be reviewed by Departmental Representative
 - .5 Return plant dust collected during processing to mix in quantities acceptable to Departmental Representative
 - .6 Asphalt content: 5.5-6.25% based on total weight.

PART 3 - EXECUTION

- 3.1 Plant and Mixing Requirements
- .1 Batch and continuous mixing plants:
 - .1 To ASTM D995
 - .2 Heat asphalt cement and aggregate to mixing temperature directed by Departmental Representative. Do not heat asphalt cement above 160°C
 - .3 Before mixing, dry aggregates to a moisture content not greater than 0.5% by mass or to a lesser moisture content if required to meet mix design requirements.
 - .4 Make available current asphalt cement viscosity data at plant. With information relative to viscosity of
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asphalt being used, Departmental Representative will direct temperature of completed mix at plant and at paver after considering hauling and placing conditions.

.5 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders.

.6 Feed cold aggregates to plant in proportions that will ensure continuous operations.

.7 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job mix requirements.

.8 Store hot screened aggregates in a manner to minimize segregation and temperature loss.

.9 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.10 Maintain temperature of materials within plus or minus 5oC of specified mix temperature during mixing.

.11 Mixing time:

.1 In batch plants, both dry and wet mixing times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain a thoroughly blended mix but not less than 30s or more than 75s.

.2 In continuous mixing plants, mixing time as directed by Departmental Representative but not less than 45s.

.3 Do not alter mixing time unless directed by Departmental Representative.

.2 Dryer drum mixing plant:

.1 Feed aggregates to burner end of dryer drum by means of a multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.2 Meter total flow of aggregate by an electronic weigh belt system with an indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate and asphalt entering mixer remain constant.

.3 Provide for easy calibration of weighing systems for aggregates without having material enter mixer.

.4 Calibrate individual feed bin conveyors to ensure mix proportions are achieved.

.5 Make provision for conveniently sampling the full flow of materials from the cold feed.

- .6 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate from cold feed prior to enter drum.
- .7 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.
- .8 Accomplish heating and mixing of asphalt mix in an approved parallel flow dryer-mixer in which aggregate and asphalt enter drum at burner end and travel parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with a printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each day.
- .9 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 1%.
- .3 Temporary storage of Hot Mix:
- .1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation.
- .2 Do not store asphalt mix in storage bins in excess of 3 hours.
- .4 While producing asphalt mix for this project, do not produce mix for other users unless separate storage and pumping facilities are provided for materials supplied to this project.
- .5 Mixing tolerances:
- .1 Permissible variation in aggregate gradation from job mix (percent of total mass):
- | | |
|--------------------------|-----|
| 4.75 mm sieve and larger | 5.0 |
| 2.00 mm sieve | 4.0 |
| 0.425 mm sieve | 2.5 |
| 0.075 mm sieve | 1.0 |
- .2 Permissible variation of asphalt cement from job mix, 0.30%.
- .3 Permissible variation of mix temperature at discharge from plant, 10°C.
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- 3.2 Equipment
- .1 Pavers: mechanical (grade controlled) self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
 - .2 Rollers, general: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
 - .3 Haul Trucks: of adequate 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 weight 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 truck box.
 - .4 Trucks which cannot be weighed in a single operation on scale supplied will not be accepted.
 - .4 Hand Tools:
 - .1 Lutes or rakes with covered teeth for spreading operations.
 - .2 Provide tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.
 - .3 Straight edges, 4.5 m in length, to test finished surface.
- 3.3 Preparation
- .1 Reshape granular roadbed to Departmental Representative's approval.
 - .2 Prior to laying mix, clean surfaces of loose and foreign material.
 - .3 Saw cut adjacent asphalt prior to placing new asphaltic pavement.
 - .4 Tack coat existing asphalt edges prior to placing new asphalt mix.
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- 3.4 Transportation Of Mix
- .1 Transport mix to job site in vehicles cleaned of foreign material in good mechanical working order, tight gates and with tarps.
 - .2 Paint or spray truck beds with limewater, soap or detergent solution, or non-petroleum based commercial product at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted.
 - .3 Schedule delivery of material for placing in daylight, unless Departmental Representative approves artificial light.
 - .4 Deposit mix from surge or storage silo into trucks in multiple drops and use methods necessary to prevent segregation.
 - .5 Deliver material to paver at a uniform rate and in an amount within capacity of paving and compacting equipment.
 - .6 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at a temperature within range directed, but not less than 130°C.
- 3.5 Placing
- .1 Obtain Departmental Representative's approval of base prior to placing asphalt.
 - .2 Place asphalt concrete to thicknesses, grades and lines indicated or directed by Departmental Representative.
 - .3 Placing conditions:
 - .1 Place asphalt mixtures only when air temperature is above 5°C.
 - .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
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- .4 A material transfer device shall be used for the placement of all asphalt mix on the project. Prior to use, the material transfer device shall be approved by the Departmental Representative.
- .4 Place asphalt concrete in compacted lifts of thickness as noted on the plans.
- .1 In areas of sub-excavation, the asphalt shall be placed in two lifts of 62.5 mm thickness each.
- .5 Spread and strike off mixture with self-propelled mechanical finisher:
- .1 Construct longitudinal joints and edges true to line markings. Lines for paver to follow will be established by the Departmental Representative parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
- .2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
- .3 If 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. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
- .6 Do not throw surplus material on freshly screeded surfaces.
- .6 When hand spreading is used:
- .1 Approved wood or steel forms, rigidly supported to assure correct grade and cross section, may be used. Use measuring blocks and intermediate strips to aid in obtaining required cross section.
- .2 Distribute material uniformly. Do not broadcast material.
- .3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered
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rakes. Reject material that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straight edges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt. Avoid high temperatures which may burn material. Do not use tools at a higher temperature than temperature of mix being placed.

3.6 Compacting

.1 Roll asphalt continuously to a density not less than 93% of the mix maximum theoretical density.

.2 General:

.1 Provide minimum three (3) rollers and as many additional rollers as necessary to achieve specified pavement density. One roller must be pneumatic-tired type.

.2 Start rolling operations as soon as placed mix can bear weight of roller without undue displacement of material or cracking of surface.

.3 Operate rollers slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel-wheeled rollers and 8 km/hr for pneumatic-tired rollers.

.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel.

.5 Overlap successive passes of roller by at least one half width of roller and vary pass lengths.

.6 Keep wheels of roller slightly moistened with water to prevent pick-up of material, but do not over-water.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism.

.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.

.10 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll

when joint between lanes is rolled.

.11 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.

.3 Breakdown rolling:

.1 Commence breakdown rolling immediately following rolling of transverse and 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 Second rolling:

.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.

.2 Rolling shall be continuous after initial rolling until mix placed has been thoroughly compacted.

.5 Finish rolling:

.1 Accomplish finish rolling with two-axle or three-axle tandem steel wheel rollers 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.

3.7 Joints

.1 General:

.1 Trim vertical face by saw cutting 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 cutback asphalt or preheat joint face with approved heater, prior to placing of fresh mix.

.3 Overlap previously laid strip with spreader by 100mm.

- .4 Remove surplus material from surface of previously laid strip. Do not dispose on surface of freshly laid strip.
 - .5 Construct joints between asphalt concrete pavement and Portland Cement concrete pavement as directed by Departmental Representative.
 - .6 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
 - .2 Transverse Joints:
 - .1 Construct and thoroughly compact transverse joints to provide a smooth riding surface.
 - .2 Stagger joint locations 2 m.
 - .3 Offset transverse joint in succeeding lifts by at least 600 mm.
 - .3 Longitudinal Joints:
 - .1 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with a lute or rake.
 - .2 Roll longitudinal joints directly behind paving operation.
 - .3 When rolling with static roller, shift roller over onto previously placed lane in order than 100 to 150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.
 - .4 When rolling with static or vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.
 - .5 Offset longitudinal joints in succeeding lifts by at least 150 mm.
 - .4 The use of feather joints shall not be permitted.
- 3.8 Finish Tolerances
- .1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.
 - .2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with a 4.5 m straight edge placed in any direction.
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- 3.9 Defective Work
- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.
 - .2 Repair areas showing checking, rippling or segregation.
 - .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.
- 3.10 Hours of Work
- .1 Unless specifically authorized otherwise by the Departmental Representative, all spreading of asphalt mix shall stop at least ½ hour before sunset and the paver shall be off the road by sunset.
- 3.11 Pollution Control/
Site Clean-Up
- .1 Control emissions from equipment and plant to Provincial emission requirements.
 - .2 Copies of the Contractor's current Provincial Asphalt Plant Approval Permit must be provided to PWGSC and the EPO.
 - .3 Excess asphaltic concrete material must be disposed of at approved locations. No material will be deposited outside the lines and grades indicated for asphalt paving, except as approved by the Departmental Representative.
 - .4 The EPO on behalf of Provincial Department of Environment and Conservation will be monitoring the Contractor's operation, including site clean-up.

*** END OF SECTION ***

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 29 00 – Project Particulars and Measurement.
- 1.2 Source Sampling .1 At least 4 weeks prior to commencing work, inform Departmental Representative of proposed sources of guiderail and components, and provide access for sampling.

PART 2 - PRODUCTS

- 2.1 Materials .1 Steel W-beam guiderail:
.1 Steel guiderail and terminal sections: to AASHTO M180, Class B, Type 1 zinc coated.
.2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to CSA G164.
- .2 Timber post and offset block:
.1 Well seasoned, straight and sound, free from loose knots or other defects, dressed four sides.
.2 Acceptable species of wood: Jack Pine or Eastern Hemlock.
.3 Treat posts and blocks to CSA O80 commodity standard O80.14-M, pressure preserved wood for highway construction table 1 and its references. Standard minimum retention of CCA preservative 6.4 kg/m³.
.4 Reflector strips shall be resilient, highly reflective delineator 50 mm x 300 mm on metal backing.

PART 3 – EXECUTION

- 3.1 Erection .1 Install posts plumb at locations and to depths indicated or directed by Departmental Representative.
- .2 When excavation is required, auger post holes and compact bottom to provide firm foundation. Set post plumb and square in hole, backfill in 150 mm layers and compact each layer before placing succeeding layer.
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- .3 Cut off tops of posts to elevations indicated.
 - .4 Treat cut tops with two coats of same type of wood preservative used to pressure treat posts.
 - .5 Erect steel W-beam components to details indicated. Lap joints in direction of traffic. Tighten nuts to 100 N.m torque. Maximum protrusion of bolt 6 mm beyond nut.
 - .6 Once the W-beam guiderail is properly installed, new reflective strips shall be placed immediately under the guiderail on every third post on curves and on each end post, and every fifth post on tangent or straight run.
 - .1 White reflector shall be placed facing the approaching traffic in the immediately adjacent driving lane and yellow reflector on the opposite side of the same post facing traffic in the other direction.
- 3.2 Touch-Up
- .1 Clean damaged surfaces with brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas in accordance with manufacturer's instructions.

***** END OF SECTION *****
