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DRAWINGS:**BEAVER RIVER BRIDGE – TRANS CANADA HIGHWAY KM 9.7**

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LOOP BROOK BRIDGE – TRANS CANADA HIGHWAY KM 29.3

1080-01-101	COVER SHEET, DRAWING LIST AND LOCATION MAP
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COUGAR BROOK BRIDGE – TRANS CANADA HIGHWAY KM 31.2

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REFERENCE DRAWINGS:**BEAVER RIVER BRIDGE – TRANS CANADA HIGHWAY KM 9.7**

1958 ORIGINAL DESIGN DRAWINGS, BEAVER RIVER BRIDGE
T.C.H. MI. 6.07, GLACIER NATIONAL PARK

1 OF 7	GENERAL LAYOUT
2 OF 7	ABUTMENTS – CONCRETE DETAILS
3 OF 7	ABUTMENTS – REINFORCING DETAILS
4 OF 7	PIER & REINFORCING SCHEDULE

5 OF 7	DECK – CONCRETE & REINFORCING DETAILS
6 OF 7	DECK – STEEL LAYOUT
7 OF 7	STANDARD HANDRAIL DETAIL

1994 BEAVER RIVER BRIDGE REHABILITATION PROJECT NO. 669097
 T.C.H. KM 9.8, GLACIER NATIONAL PARK:

-	COVER SHEET
1 OF 9	AS CONSTRUCTED EXISTING BRIDGE, PLAN & ELEVATION, GENERAL NOTES, SECTIONS & LOCATION PLAN
2 OF 9	AS CONSTRUCTED REHABILITATED BRIDGE PLAN, ELEVATION & DECK SECTION
4 OF 9	AS CONSTRUCTED DETAILS AND SECTIONS: CAST-IN-PLACE BARRIERS & APPROACH RECONSTRUCTION
5 OF 9	AS CONSTRUCTED DECK JOINT DETAILS
6 OF 9	AS CONSTRUCTED GIRDER JACKING DETAILS & CRACK REPAIR DETAILS
7 OF 9	AS CONSTRUCTED DRAINAGE DETAILS
8 OF 9	AS CONSTRUCTED GROUT PAD AND BEARING DETAILS
9 OF 9	AS CONSTRUCTED GROUT PAD & CONCRETE REPAIR DETAILS

LOOP BROOK BRIDGE – TRANS CANADA HIGHWAY KM 29.3

1958 ORIGINAL DESIGN DRAWINGS, LOOP CREEK BRIDGE MILE 18.3
 GLACIER NATIONAL PARK:

1 OF 4	PLAN & ELEVATION
2 OF 4	FRAME - REINFORCING
3 OF 4	WINGWALL, CURB & PYLON DETAILS, STEEL SCHEDULE
4 OF 4	STANDARD HANDRAIL DETAIL

COUGAR BROOK BRIDGE – TRANS CANADA HIGHWAY KM 31.2

1958 ORIGINAL DESIGN DRAWINGS, COUGAR CREEK BRIDGE T.C.H. MI. 19.45,
 GLACIER NATIONAL PARK:

1 OF 3	GENERAL LAYOUT
2 OF 3	CONCRETE & REINFORCEMENT DETAILS
3 OF 3	STANDARD HANDRAIL DETAIL

REFERENCE MATERIAL:

Parks Canada National Best Management Practices – Roadway, Highway, Parkway and
 Related Infrastructure

Direction for Permitted Users Conducting Water-related Activities in MRGNP

Parks Canada Preapproved Routine Impact Assessment (PRIA): MRG PRIA 01.00 Vegetation Removal

Standard CMS Translations (Jul 2018)

Construction Signage Translation (Jul 2018)

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises rehabilitation of three bridge structures located on the Trans-Canada Highway (TCH) in Glacier National Park, British Columbia. Kilometres noted are as measured from the Glacier National Park east boundary.
 - .1 Beaver River Bridge – TCH km 9.7, Glacier National Park.
 - .2 Loop Brook Bridge – TCH km 29.3, Glacier National Park.
 - .3 Cougar Brook Bridge – TCH km 31.2, Glacier National Park.
- .2 Preparation of an Environmental Protection Plan for the Work.
 - .1 An "Environmental Protection Plan" (EPP) is to be prepared and followed by the successful Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures, to ensure that any adverse effects are minimal. The Contractor's EPP must be approved by the Departmental Representative on behalf of Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada's Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the plan and contract specifications. The EPP will form part of this contract.
- .3 Without limiting the scope of work, the work for this Contract generally comprises the following:
 - .1 Mobilization and site preparation, including supply and installation of temporary construction facilities required for the Work.
 - .2 Project management and coordination
 - .3 Traffic management during construction
 - .4 Installation and maintenance of temporary barriers.
 - .5 Quality control and quality assurance of all construction activities.
 - .6 Health and Safety management during construction
 - .7 Environmental management during construction
 - .8 Source appropriate site(s) outside of the Park for disposal of waste materials.
 - .9 Bridge Rehabilitation works, including but not limited to:
 - .1 Removal and disposal of deck joints and barrier joint cover plates (Beaver River Bridge).
 - .2 Localized concrete barrier removal at deck joints (Beaver River Bridge).
 - .3 Localized deck concrete removal at pier and abutments for placing new deck joints (Beaver River Bridge).

- .4 Supply and installation of new deck joints (Beaver River Bridge).
- .5 Supply and placement of new localized cast-in-place concrete barriers at deck joints (Beaver River Bridge).
- .6 Supply and installation of new barrier cover plates at deck joints (Beaver River Bridge).
- .7 Local repair of concrete overlay and approach asphalt at abutment deck joints (Beaver River Bridge).
- .8 Design, supply and installation of new animal pathway and gabion retaining wall at west abutment (Beaver River Bridge).
- .9 Coordinate temporary relocation of existing utilities (Loop Brook Bridge, Cougar Brook Bridge).
- .10 Removal and disposal of existing asphalt wearing surface (Loop Brook Bridge, Cougar Brook Bridge).
- .11 Removal and disposal of concrete curbs, concrete pylons and steel railings (Loop Brook Bridge, Cougar Brook Bridge).
- .12 Remove temporary concrete barrier on south curb (Loop Brook Bridge).
- .13 Cold milling of concrete deck and concrete removal at top of wing walls (Loop Brook Bridge, Cougar Brook Bridge).
- .14 Removal of deck drains (Loop Brook Bridge, Cougar Brook Bridge).
- .15 Supply and construction of new reinforced concrete overlay and wing wall tops (Loop Brook Bridge, Cougar Brook Bridge).
- .16 Supply and construction of new cast-in-place concrete barriers (Loop Brook Bridge, Cougar Brook Bridge).
- .17 Local repair of deck soffit (Loop Brook Bridge) as authorized by Departmental Representative.
- .18 Partial depth concrete deck repairs when authorized by Departmental Representative (Beaver River Bridge, Loop Brook Bridge, Cougar Brook Bridge).
- .19 Supply and installation of new drip stops at deck soffit (Loop Brook Bridge, Cougar Brook Bridge).
- .20 Cold milling of approach asphalt (Loop Brook Bridge, Cougar Brook Bridge).
- .21 Supply and placement of approach asphalt (Loop Brook Bridge, Cougar Brook Bridge).
- .22 Supply and installation of new modified precast barriers, including custom precast barriers (Loop Brook Bridge, Cougar Brook Bridge).
- .23 Coordinate relocation of existing utilities in new barriers upon completion of construction (Loop Brook Bridge, Cougar Brook Bridge).
- .24 Installation of new spillways (drainage flumes) (Loop Brook Bridge, Cougar Brook Bridge).
- .25 Supply and installation of new steel bicycle railings and connection brackets (all bridges).

.26 Application of permanent lane markings (Loop Brook Bridge, Cougar Brook Bridge).

.10 Miscellaneous additional work as directed by the Departmental Representative.

.11 Demobilization.

1.3 CONTRACT METHOD

.1 Contract Work under combined price contract.

1.4 WORK BY OTHERS

.1 Where it is necessary that work is to proceed in areas of the project common to both the Contractor and other forces, the Contractor shall cooperate with the other forces and the Owner in reviewing their construction schedules, sharing his work space, and shall coordinate his operations with the other Contractors including traffic management and construction staging.

.2 The Contractor is advised that the following work in the vicinity has been or will be contracted by Parks Canada:

.1 Concrete Barrier Replacement (TCH km 0.0 to 43.7 various locations);

.2 East Gate Landslide Mitigation (TCH km 3.0 to km 4.0);

.3 Beaver Valley Ponding Phase 2 (TCH km 3.5 to km 8.2);

.4 Beaver Hill Rock Scaling and Debris Removal (TCH km 8.3 to 9.1);

.5 Snowshed Lighting and Snowshed Column Repairs (TCH km 16.8 to km 19.9)
and,

.6 Rogers Pass Visitor Washrooms (TCH km 22.9).

.3 Other contractors may be working in the National Parks. The Contractor shall coordinate their operations with others. No claims for any delays or inconvenience will be entertained.

1.5 WORK SEQUENCE

.1 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.

.2 Schedule work progress to allow Departmental Representative unrestricted usage to inspect all phases of the Work.

.3 Required stages:

.1 Animal Pathway work at Beaver River Bridge may be completed independently of the bridge rehabilitation work.

.1 Restrictions regarding scheduling of Animal Pathway Work provided in Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

.2 Bridge works (excluding the Animal Pathway work at Beaver River Bridge):

- .1 At each location, the work shall be completed in three stages. One lane of traffic in each direction (eastbound and westbound) must be provided at each location at all times.
 - .1 Within each construction zone, deck soffit repairs (Loop Brook Bridge) to be completed prior to cold milling of concrete deck. See additional restrictions in Section 01 35 33 – Special Procedures for Bridge Rehabilitation.
- .2 At each location, the work shall be completed in entirety (all three stages) in a single construction season. Partial completion over a Winter Shut down is not permitted.
- .3 Substantial Completion: 2021 October 01.
- .4 Final Completion: 2021 October 30.
- .4 Maintain fire access / control.
- .5 Work shall be carried out in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.6 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Public usage.
- .2 Co-ordinate use of premises under direction of the Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 The Contractor and any Subcontractors must obtain a business licence from the Parks Canada Administration Office, prior to commencement of the contract.
- .5 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained at the Parks Canada Administration Office in Revelstoke.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.7 OWNER FURNISHED ITEMS

- .1 There are no owner supplied materials for this project.
- .2 All materials required to complete the Work are to be supplied by the Contractor. Unless specifically noted otherwise in the specifications, supply of materials required to complete the Work will not be measured but considered incidental to the Work.

1.8 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.9 CONSTRUCTION SIGNAGE

- .1 No signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
- .3 Use approved translation list for all signage.
- .4 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 the Departmental Representative.
- .5 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts installed in the shoulder areas at locations accepted by the Departmental Representative.
- .6 Signage shall be coordinated with other Contractors.
- .7 The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.

1.10 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Environmental Protection Plan.
 - .2 Contract Drawings.
 - .3 Specifications.
 - .4 Addenda.
 - .5 Reviewed Shop Drawings.
 - .6 List of Outstanding Shop Drawings.
 - .7 Change Orders.
 - .8 Other Modifications to Contract.
 - .9 Copy of Traffic Management Plan.
 - .10 Safety Plan.
 - .11 WHMIS and associated SDS.
 - .12 Labour conditions and wage schedules.
 - .13 Applicable current editions of municipal regulations and bylaws.
 - .14 Field Test Reports.
 - .15 Copy of Approved Work Schedule.

- .16 Health and Safety Plan and Other Safety Related Documents.
- .17 Restricted Activity Permits.
- .18 Other documents as specified.

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 MEASUREMENT PROCEDURES**

- .1 The cost to the Contractor to meet the requirements described in this section shall be considered incidental to the Work and no additional payment will be made.

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps, ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- .2 Lane closures and other disruptions to traffic shall be performed in accordance with Section 01 55 26 – Special Procedures for Traffic Control, and must be done in coordination with the Departmental Representative.

1.3 USE OF SITE AND FACILITIES

- .1 The Work Sites shall be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
 - .1 Prior to construction start, Contractor to complete pre-construction surveys (bat-roost, Coeur d'Alene salamander, and Western toad), in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Prior to commencement of work at Beaver River Bridge for Animal Pathway, the following is to be submitted by the Contractor for review by Parks Canada for compliance with the Department of Fish and Oceans (DFO) approvals.
 - .1 Environmental Protection Plan (EPP) with site specific erosion and sediment control plan.
 - .2 In-stream works plan for all works within the high water mark (regardless of whether the work is conducted in the dry or in water).
 - .3 Contractor to be aware that deviating the design from the requirements defined in the Contract documents may require further review by DFO. This may result in the portion of the work below the high water mark at Beaver River Bridge for Animal Pathway being delayed. No claims for any delays or inconvenience related to DFO review will be entertained.
 - .3 Cougar Brook Bridge - Demobilize from site if at any time, the relevant area is declared to be at risk of being impacted by an avalanche.
 - .1 Although no guarantee is provided as to when this may occur, in the past it has been after mid-October.
 - .2 Remobilize to site only when the relevant area is declared to not be at risk of being impacted by an avalanche.

- .2 While the Work Sites are under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Sites and of the Work, and for the security of the work of Other Contractors located on the Work Sites.
- .3 The Contractor shall keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of source. Remove snow as necessary for the performance and inspection of the Work.
- .4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .5 Provide for all traffic. Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .6 The Contractor will not be permitted to establish a worker's accommodation camp inside any National Park.
- .7 Office/tool trailer may be set up near the bridge site at a location approved by the Departmental Representative.
- .8 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .9 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.
- .10 The work must be performed during daylight hours as follows, unless authorized in writing by the Departmental Representative:
 - .1 From 6:00 to 20:00, seven days per week, except as noted following.
 - .1 No work is permitted on long weekends (those with a statutory holiday either the Friday preceding or Monday following), from 20:00 Thursday to 06:00 Tuesday.
 - .2 For the Canada Day Holiday in 2021, no work is permitted from 20:00 2021 June 30 to 06:00 2021 July 5.
 - .2 Approval must be sought if work is required on any long weekend and will only be considered if all work is off the Highway and will not disrupt the traffic flow. Any exemption request shall be submitted in writing and be made at least one week in advance. Approval of exemption request is not guaranteed and shall not be relied upon. No claims for any delays or inconvenience due to denial of exemption request will be entertained.
- .11 Rip-rap placement for the animal pathway at Beaver River Bridge is only permitted within the fish least risk window as defined in Section 01 35 43 – Environmental Procedures, or alternatively, and only if approved by the Departmental Representative, when the water level of Beaver River has dropped low enough so that the rip-rap can be placed in fully dry conditions, and work is completed in accordance with Section 01 35 43 – Environmental Procedures. Approval is not guaranteed and shall not be relied upon. No claims for delays or inconvenience due to denial will be entertained.

- .12 The timber Trail Bridge adjacent to Loop Brook Bridge may be closed to the public during construction, however the Loop Brook Trail head parking lot is to remain open to the public in accordance with Section 01 55 26 – Traffic Control and Section 01 35 43 – Environmental Procedures.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING STRUCTURES

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

1.5 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .2 All components of the Work, except as noted following, shall be conducted without equipment or construction materials (including any temporary works) entering into any creeks, waterways, wetlands or other bodies of water.
 - .1 Installation of the Animal Pathway at Beaver River Bridge requires some work within the high water mark. Refer to Section 01 35 43 – Environmental Procedures for required environmental mitigations for this work.
- .3 Refer to Section 01 35 43 – Environmental Procedures for details.
- .4 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .5 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.6 EXISTING SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 The locations of Utilities, if any, shown or not shown on the Drawings, are subject to verification by the Contractor.
- .3 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the work, using hand labour as required.
- .4 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .5 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work.
 - .1 The Contractor shall advise Utilities of intended Works within 14 days of Contract Award and obtain written approval for the intended methods of

preserving the Utilities during Construction from all affected Utility Owners a minimum three (3) weeks prior to affecting any Utility.

- .2 The Contractor shall be responsible for coordinating work and schedule to accommodate any blackout periods or other restrictions related to the Utilities. No claims for any delays or inconvenience will be entertained.
- .3 The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities at the Construction Progress meetings.
- .6 The Contractor shall immediately report any damages to Utilities to the Departmental Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.7 SURVEY OF EXISTING PROPERTY CONDITIONS

- .1 Submission of a tender is deemed to be confirmation that the Contractor has inspected the site and is completely familiar with all conditions or restrictions affecting execution and completion of the work.
- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts and landscaped areas.
- .3 The Departmental Representative may, but shall not be obligated to survey and record the condition of the Work Sites and of properties on or adjoining the Work Sites prior to the commencement of construction by the Contractor. If requested, the Departmental Representative will provide a copy of the survey records to the Contractor for reference.
- .4 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.
- .5 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractor's responsibility to exercise proper care to prevent damage to all properties within or adjacent to the Work Sites, whether all such properties are covered by the survey or not.

1.8 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafeBC, the Provincial OH&S Act and Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall comply with the Canada Labour Code, Canada Occupational Safety and Health Regulations.

- .3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.
- .4 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

1.9 USE OF PUBLIC AREAS

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.
- .2 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. Asphalt, granular, embankment and excavation materials may be hauled on existing highway but shall be by standard highway trucks not exceeding legal highway load limits.
- .3 All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .4 All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spill of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.
- .5 All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .6 Hauling units are not to exceed legal highway load limits.

1.10 USE OF PITS AND QUARRIES

- .1 When the Contractor is operating in a PCA pit or quarry, the Contractor shall utilize the pit or quarry in accordance with the Departmental Representative's authorization. Under no circumstances will waste of useable material be permitted, and excavations shall be continued to depths below water level if suitable material is available.
- .2 No separate payment will be made for clearing, grubbing, disposal or relocation of stockpiles, debris or contaminated materials, or for any other costs of site preparation, pit development, or access, or for any delay or other cost arising from the use of pits by others, and all costs thereof shall be covered in the prices for the Items under which payment is provided for the applicable materials.

1.11 SUPERVISORY PERSONNEL

- .1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.

The following personnel shall be included in the list:

- .1 Project Superintendent;
 - .2 Deputy Project Superintendent;
 - .3 Health and Safety Coordinator;
 - .4 Environmental Representative;
 - .5 Traffic Control Representative;
 - .6 Quality Control Representative.
- .2 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
- .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
- .4 Health and Safety Coordinator must:
- .1 Have considerable site-related working experience specific to activities associated with roadway and bridge construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily, and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.
- .5 Environmental Representative must:
- .1 Be responsible for completing the Environmental Protection Plan and ensuring personnel adhere to contract requirements as related to environmental activities.
- .6 Traffic Control Representative must:
- .1 Be responsible for development, implementation and execution of the Traffic Management Plan.
- .7 Quality Control Representative must:
- .1 Be responsible for development, implementation and execution of the Quality Management Plan.

1.12 MEETINGS

- .1 Hold meetings in accordance with Section 01 31 19 – Project Meetings.
- .2 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.

- .3 The Departmental Representative will schedule an initial meeting to be held on site after award notification. This meeting shall be attended by senior representatives of Parks Canada, the Departmental Representative, Contractor, major subcontractors and field inspectors.
- .4 Progress and status meetings will be held on a weekly basis or more frequently as directed by the Departmental Representative.
- .5 Cost of attending the above meetings shall be considered incidental to the Unit Price items and no additional payment will be made.

1.13 WASTE DISPOSAL

- .1 Refer to Section 01 35 43 - Environmental Procedures.
- .2 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside the National Parks unless specified otherwise in other sections of these Specifications.
- .3 Deposits of any construction debris into any waterway are strictly forbidden.
- .4 Cost for waste disposal described above shall be considered incidental to the Contract Items and no additional payment will be made.

1.14 WORK STOPPAGE

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

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Prime Cost Sum.
- .2 Measurement Procedures.

1.2 PRIME COST SUM

- .1 Include in Contract Price a Prime Cost Sum of \$235,000.
- .2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 The Contract Price, and not Prime Cost Sum, includes Contractor's head office overhead and profit in connection with such prime cost sum.
- .4 Prime Cost Sum provided for in the lump sum arrangement table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 Expenditures must be substantiated with verified invoices and/or approved daily extra work reports, if requested by the Departmental Representative.
- .7 Prime Cost sum items may include but are not limited to:
 - .1 Additional partial depth concrete patch repairs as directed by the Departmental Representative.
 - .2 Supply and placement of new reinforcing bars required to supplement corroded reinforcing bars as directed by the Departmental Representative.
 - .3 Additional asphalt milling in excess of thickness indicated as approved by Departmental Representative.
 - .4 Removal and re-installation of existing signs or the installation of additional signage as directed by the Departmental Representative.
 - .5 Additional supply and installation of asphalt concrete pavement.
 - .6 Additional pavement removal.
 - .7 Crack filling, pot hole patching and other related minor asphalt repairs.
 - .8 Additional clearing and grubbing.
 - .9 Additional supply and installation of lane markings.
 - .10 Additional supply and installation of rip-rap.
 - .11 Additional removal and disposal of existing precast concrete barrier.
 - .12 Additional supply and installation of precast concrete barrier.
 - .13 Topsoil testing or supply and application of soil amendments, as directed by the Departmental Representative.

- .14 Relocation of buried services associated with the Animal Pathway at the Beaver River Bridge.
- .15 Additional repairs or removals as directed by the Departmental Representative.
- .16 Miscellaneous work as directed by the Departmental Representative.
- .8 Once a Prime Cost Sum item has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

1.3 MEASUREMENT PROCEDURES

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current British Columbia Road Builders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
- .2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.
- .3 Equipment paid on standby will be paid on 50% of the relevant rate less operator rates to a maximum of 10 hrs per day.
- .4 When based on actual costs for additional works under Prime Cost Sum, payment will be made based on supplied invoices and other work records.
- .5 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- .6 A claim for additional payment will not be considered submitted until all required documentation has been received by the Departmental Representative.
- .7 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials, and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
- .8 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
 - .1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative's sole discretion.
- .9 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waive any portion of the Contract regardless of any wording to the contrary.

- .10 Unless otherwise provided for in the Contract, payment on a time and materials basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.
- .11 Reimbursement for Living Out Allowance (LOA), as agreed upon by the Departmental Representative, shall be pro-rated based on the portion of the standard 10-hour work day spent on extra work items up to a maximum of 10 hours. LOA reimbursement will only be considered for extra works completed under Force Account rates and payment for LOA will not exceed the agreed upon daily rate.

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 DESCRIPTION**

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under “**Lump Sum Price Item 1 – Mobilization / Demobilization**”.
 - .2 50% of the Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
 - .3 Only one mobilization and demobilization will be paid for the entire project. Equipment, trailers, material, etc. must be demobilized and removed from the Park for winter shutdown. No additional mobilization and demobilization will be paid due to the winter shutdown.
- .2 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .3 Payment of only 10% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 10% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

Project: 1080-01

Bridge Rehabilitation
Beaver River Bridge km 9.7,
Loop Brook Bridge km 29.3 and
Cougar Brook Bridge km 31.2
Glacier National Park

Section 01 25 20
MOBILIZATION AND
DEMOBILIZATION

Parks Canada

Page 2

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants, affected parties not in attendance and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum of five (5) days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .6 Quality Management Plan in accordance with Section 01 45 00 – Quality Control.

- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Close out procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum of five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meetings.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Review Environmental issues.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revision to construction schedule.
 - .9 Progress schedule, during succeeding work period.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Review proposed changes for affect on construction schedule and on completion date.
 - .13 Review site safety and security issues.
 - .14 Review Traffic control and Emergency Response Protocol issues.
 - .15 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1.1 DEFINITIONS

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

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Ensure all of the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Plan to complete Work in accordance with prescribed milestones and time frame.
- .4 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.
- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .6 Include an allowance in Schedule for Work performed under Prime Cost Sum.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule – see Section 01 11 00 – Summary of Work.
 - .1 Completion of each stage of construction for each structure.
 - .2 Substantial Completion for each structure.
 - .3 Final Completion for each structure.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 10 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Submittals.
 - .1 Project Schedule
 - .2 Contractor Chain of Command
 - .3 List of Subcontractors and suppliers
 - .4 Work Plan
 - .5 Construction Staging
 - .6 Survey Plan
 - .7 Environmental Protection Plan, review and implementation.
 - .8 Traffic Management Plan, review and implementation.

- .9 Health and Safety Plan, review and implementation.
- .10 Quality Management Plan, review and implementation.
- .11 Site Access
- .12 Emergency Response Protocol
- .13 Site Specific Health and Safety Plan
- .14 Shop Drawings
- .15 Concrete / asphalt mix designs.
- .16 Gabion retaining wall and installation design drawings.
- .5 Mobilization.
- .6 Clearing and Grubbing
- .7 Bridge rehabilitation works (as applicable for each structure):
 - .1 Temporary relocation of utilities.
 - .2 Supply and fabrication of components (including but not limited to deck joints, barrier cover plates, bicycle railings, and precast barriers).
 - .3 Removal and disposal of existing wearing surfaces, deck joints, curbs, concrete pylons, bridge railings, and concrete barriers.
 - .4 Deck profile survey and submittal.
 - .5 Cold milling of concrete deck.
 - .6 Concrete removal at top of wing walls.
 - .7 Partial depth deck repairs of delaminated or de-bonded concrete.
 - .8 Concrete deck soffit repairs.
 - .9 Construction of cast-in-place deck overlay.
 - .10 Construction of cast-in-place barriers.
 - .11 Installation of new deck joints.
 - .12 Installation of steel bicycle railings.
 - .13 Installation of drip stops at deck soffit.
 - .14 Milling, supply and placement of asphalt pavement on approaches.
 - .15 Installation of new precast barriers.
 - .16 Relocation of utilities in new cast-in-place barriers.
 - .17 Installation of drainage spillages.
 - .18 Construction of gabion retaining wall and animal pathway.
 - .19 Application of lane markings.
- .8 Demobilization.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on biweekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline (tracking GANTT), presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

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 78 00 – Closeout Submittals.

1.2 REFERENCE STANDARDS

- .1 Not used.

1.3 ADMINISTRATIVE

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

1.4 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 drawings stamped and signed by professional engineer registered or licensed in the Province of British Columbia, Canada.
- .3 The term "asphalt mix design" means engineering design for proportioning materials in asphalt concrete pavement including all supporting test results and materials properties.

Asphalt mix design to be performed by a qualified test laboratory licensed to practice in British Columbia.

- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow fourteen (14) days for Departmental Representative's review of each submission.
- .6 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.
- .7 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.
- .8 Submit letter of certification with all mix designs.
- .9 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.
- .10 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.
- .11 After Departmental Representative's review, distribute copies.
- .12 Submit electronic copy of shop drawings and/or concrete mix designs for each requirement requested in specification Sections and as Departmental Representative may reasonable request.
- .13 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .14 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .15 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .16 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .17 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be

returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .22 The review of shop drawings by the Departmental Representative 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.

1.5 SAMPLES

- .1 Not used.

1.6 MOCK-UPS

- .1 Not used.

1.7 CERTIFICATES AND TRANSCRIPTS

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

1.8 REQUIRED CONTRACT SUBMITTALS

- .1 General
- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
- .2 Pre-Mobilization Submittals
- .1 Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorizations of the programs shall not relieve the contractor for the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

- .1 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project in accordance with Section 01 32 16.07 Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
- .3 List of Sub-Contractors and Suppliers.
- .4 Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.
 - .1 Include work staging plan, including any temporary works required to permit staging of work, including but not limited to temporary access platforms and debris containment for deck soffit repair (Loop Brook Bridge).
 - .2 Include written procedure for removal of concrete curbs, existing wearing surface, and wing wall tops, in accordance with Section 02 41 16 – Structure Demolition.
 - .3 Include plan for isolation systems for construction of animal pathway (Beaver River Bridge).
- .5 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
- .6 Traffic Management Plan, in accordance with the requirements of Section 01 55 26 –Traffic Control.
- .7 Environmental Protection Plans (EPP) which shall meet the requirements of Section 01 35 43 – Environmental Procedures.
- .8 Site Access Plan which shall include but not be limited to, engineering Drawings and procedures for accessing all areas of the Work. This shall include access scaffolding, fixed and suspended work platforms, temporary railings, etc.
- .9 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada.
- .10 Health and Safety Plan – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.
- .11 Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.

- .4 Site specific hazard assessment.
- .5 General safety rules for project.
- .6 Job specific safe work procedures.
- .7 Inspection policy and procedures.
- .8 Incident reporting and investigation policy and procedures.
- .9 Occupational Health and Safety meetings.
- .10 Occupational Health and Safety communications and record keeping procedures.
- .11 Results of safety and health risk or hazard analysis for site tasks and operation.
- .12 Submit copies of Safety Data Sheets (SDS).
- .13 Medical Surveillance: where prescribed by legislation, regulation, or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.
- .14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .2 Submit a copy of the filed Notice of Project with Provincial authorities.
- .3 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .3 Construction Phase Submittals
 - .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-to-day basis.
 - .2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
 - .3 Traffic Accommodation logs.
 - .4 Detailed design drawings for design of gabion retaining wall at Beaver River Bridge, including installation procedure and any temporary support structures. Design to be stamped and signed by a professional engineer registered or licensed in the Province of British Columbia, Canada.

- .5 Shop drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum twenty-one days (three weeks) prior to fabrication.
 - .6 Concrete Mix Designs and supporting data.
 - .7 Mill certificates.
 - .8 Hydraulic Seeding: Seed Mix, Certificate, and applicable area of coverage per tank load of slurry.
 - .9 Deck surveys.
 - .10 Product data sheets.
 - .11 Progress Photographs:
 - .1 Formats:
 - .1 Electronic: .jpg files
 - .2 Quality: minimum five (5) mega pixels, full-colour, and not scanned.
 - .2 Identification: spreadsheet listing name and number of project, description of each photograph with the corresponding file name and date taken.
 - .3 Viewpoints: four (4) viewpoints determined by the Departmental Representative.
 - .4 Detail Documentation: photographs documenting key details of the construction and as requested by the Departmental Representative.
 - .5 Submission Frequency: prior to commencement of work and weekly thereafter with progress statement, or as directed by the Departmental Representative.
 - .6 Submit two (2) copies of CD with all electronic pictures and the associated identification as part of the closeout package.
 - .12 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.
 - .13 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .14 Submit copies of incident and accident reports.
- .4 Project Completion Submittals
- .1 Record Drawings – The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
 - .2 Quality Control/Quality Assurance Records – The Contractor shall submit a bound and itemized set of project quality control and quality assurance records.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia
 - .1 Workers Compensation Act, RSBC 1996 - Updated 2012.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job specific safe work procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety meetings.
 - .9 Occupational Health and Safety communications and record keeping procedures.
 - .10 Results of site specific safety hazard assessment.
 - .11 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and the authority having jurisdiction weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS SDS - Safety Data Sheets.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within fourteen (14) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within seven (7) days after receipt of comments from Departmental Representative.

- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with National Parks Act.

1.7 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

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

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Workers Compensation Act, B.C. Reg.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

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

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have considerable site-related working experience specific to activities associated with bridge construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

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

1.13 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.15 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.16 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 02 41 16 - Structure Demolition.
- .4 Section 03 10 00 - Concrete Forming and Accessories.
- .5 Section 03 20 00 - Concrete Reinforcing.
- .6 Section 03 30 00 - Cast-In-Place Concrete.
- .7 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
- .8 Section 05 12 33 – Structural Steel for Bridges.

1.2 SECTION INCLUDES

- .1 Work requirements for deck soffit repair at Loop Brook Bridge. See RELATED REQUIREMENTS for work requirements for remainder of works.

1.3 MEASUREMENT PROCEDURES

- .1 Measure partial depth soffit repairs in square metres.
 - .1 Unit Price to include all costs to complete repair, including but not limited to costs for schedule impact due to staging of repairs, access, scaffolding, concrete removal, supply and installation of steel hairpins, supply and placement of repair mortar and primer, and testing as specified. Payment shall be made under "**Unit Price Item – Partial Depth Soffit Repairs (Loop Brook Bridge)**".

1.4 ACTION AND INFORMATION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop drawings:
 - .1 Submit for review and approval drawings, diagrams or details showing sequence of work and supporting structures and underpinning at least two (2) weeks prior to commencement of Work.
- .3 Submit shop drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.

Part 2 Products

- .1 Repair material for deck soffit: as indicated.

Part 3 Execution**3.1 GENERAL REQUIREMENTS**

- .1 Do not damage reinforcing steel indicated to remain.
 - .1 Replace reinforcing steel which is structurally compromised during the removal process with reinforcing steel of equal size and spacing, as determined by the Departmental Representative, at no extra cost.
- .2 Field identify and address all Utilities prior to the start of construction in accordance with Section 01 14 00 – Work Restrictions.
- .3 Contain, collect and dispose of all debris outside the Park in accordance with Section 01 35 43 – Environmental Procedures.
- .4 Unless otherwise specifically stated in this section:
 - .1 Complete structure demolition in accordance with Section 02 41 16 – Structure Demolition.
 - .2 Supply and place formwork in accordance with Section 03 10 00 – Concrete Forming and Accessories.
 - .3 Supply and place reinforcing steel in accordance with Section 03 20 00 – Concrete Reinforcing.
 - .4 Supply and place concrete in accordance with Section 03 30 00 – Cast-in-Place Concrete.
 - .5 Supply and place concrete for the bridge deck in accordance with Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
- .5 All steel components shall be supplied, fabricated, and installed in accordance with Section 05 12 33 – Structural Steel for Bridges.

3.2 DECK SOFFIT PATCH REPAIRS (LOOP BROOK BRIDGE)

- .1 Provide access scaffolding or other means suitable for close proximity inspection of the deck soffit and arrange for inspection with the Departmental Representative to mark all areas for repair.
- .2 Prepare and submit shop drawings in accordance with Section 1.3:
 - .1 Prepare shop drawings in accordance with repair procedure outlined on the Design Drawings.
 - .2 Include all areas marked for repair by Departmental Representative.
 - .3 Indicate detailed sequence of repairs. Include description of removal sequences, equipment, tools, containment measures, surface preparation and application of repair mortar and curing procedure.
 - .4 Prepare shop drawings for scaffolding required to access deck soffit.

- .3 Work shall be conducted in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.
- .4 Provide scaffolding in accordance with Section 01 52 00 – Construction Facilities.
- .5 All components of the Work shall be conducted without equipment or construction materials (including but not limited to access scaffolding) entering into the water course below the bridge.
- .6 Deck soffit repairs to be completed in staging/sequencing procedure as indicated on the design drawings.
 - .1 Within each construction zone, deck soffit repairs to be completed prior to cold milling of concrete deck.
 - .2 No heavy equipment is allowed in the construction zone during deck soffit repairs. Removal of asphalt wearing surface, curb and railing, to be completed either prior to commencement or after completion of deck soffit repairs.
- .7 All saw cuts shall be made straight and in accordance with the drawings or as directed by the Departmental Representative. Edges of repair areas shall be oriented parallel and perpendicular to CL of the bridge.
- .8 Remove delaminated or deteriorated concrete to sound concrete.
 - .1 Remove all concrete to allow a 25 mm space around all exposed reinforcing bars within partial depth soffit repair, or as directed by Departmental Representative.
 - .2 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.
- .9 Do not damage existing reinforcing during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
 - .2 Supply and place additional rebar where greater than 20% section loss has occurred to the existing reinforcement.
- .10 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place.
 - .1 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.
 - .2 Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
- .11 Remove, contain, collect and dispose of all concrete and other materials identified for removal to prevent debris from falling into waterways in accordance with Section 01 35 43 – Environmental Procedures.

- .12 Contain all water, blast material from surface preparation and concrete debris during all stages of construction in accordance with Section 01 35 43 - Environmental Procedures. Prevent detritus from falling onto the adjacent trail bridge or into the water course below.
- .13 Soffit repair mortar: as indicated on the design drawings.
 - .1 Prepare concrete surface and reinforcing steel in accordance with manufacturer's specifications and to the satisfaction of the Departmental Representative.
 - .2 Prime concrete surface and reinforcing steel in accordance with manufacturer's specifications and to the satisfaction of the Departmental Representative.
- .14 Mix and apply repair mortar in accordance with manufacturer's specifications.
 - .1 Apply mortar in multiple lifts according manufacturer's specifications and to the satisfaction of the Departmental Representative.
 - .2 Surface finish according Section 03 30 00 – Cast-in-Place Concrete and according manufacturer's specifications.
 - .3 Finished soffit repair concrete to be flush with surrounding soffit concrete.
- .15 Curing in accordance with manufacturer's specifications and as directed by Departmental Representative.
 - .1 Protect newly applied material from direct sunlight, wind, rain and frost.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

1.2 MEASUREMENT PROCEDURES

- .1 The cost to the Contractor to meet the environmental and aesthetic protection requirements described in this section shall be considered incidental to the Work and no additional payment will be made.

1.3 GENERAL

- .1 All Contractor operations shall be performed in such a manner that no detritus material from the various operations shall enter Beaver River, Loop Brook, Cougar Brook, or any other waterway, ditches, or wetlands within the National Parks.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.
- .3 In addition to the requirements outlined in the project specifications, the Contractor shall adhere to the following documents (provided as reference documents). Where there is a discrepancy or inconsistency between the project specifications and the following documents, the most rigorous with regard to environmental stewardship shall be following:
 - .1 Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure (BMP's);
 - .2 Parks Canada Preapproved Routine Impact Assessment (PRIA): MRG PRIA 01.00 Vegetation Removal, all sections; and,
 - .3 Direction for Permitted Users Conducting Water-Related activities in MRGNP (MRGNP Decontamination Procedure).

1.4 NATIONAL PARK REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules, and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-Contractors shall obtain a business license from Parks Canada Administration Office in Revelstoke, prior to commencement of the contract.
- .3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office in Revelstoke.

1.5 IMPACT ASSESSMENT ACT (2019)

- .1 Execution of the work is subject to the provisions within the Impact Assessment Act (IAA) 2019 and subsequent amendments.

- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP) minimum two weeks prior to commencing construction activities or delivery of materials to site, which will include topics in the following sub sections. The Environmental Protection Plan shall be certified by a Qualified Environmental Professional (QEP).
- .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.
- .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonable timely manner of any actual or potential environmental incidents or failure of protection measures, and immediately of any violations of environmental approvals, permits, authorizations, or EPP measures.

1.6 RELICS AND ANTIQUITIES

- .1 The *Accidental Finds Protocol* shall be followed in the event that items are found when archaeologists or cultural resource managers are not present on-site during construction activities.
 - .1 *Accidental Finds Protocol:* There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). **If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Departmental Representative to discuss any protective measures that might be needed.**
- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.
- .3 Provide 48 hours notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

1.7 WILDLIFE

- .1 Avoid or terminate activities on site that attract or disturb wildlife.
- .2 Pets are not allowed on the work site, or in any administrative or laydown areas.
- .3 All personnel will be instructed by Parks Canada's ESO in procedures to follow in the event of wildlife appearance near or intrusion onto the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk, or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The general presence of wildlife observed near the construction site, any carcasses, or unusual wildlife observations shall be reported to the ESO and the Departmental Representative.
- .4 Listed wildlife species at risk with potential to occur in the project area, based on evidence and historical observations, include:

- .1 Grizzly bear (*Ursus arctos*) – mitigations to include, but not be limited to, BMP Clauses 2.3, 2.4, and 7.9.
 - .2 Little brown myotis (*Myotis lucifugus*) and Northern myotis (*Myotis septentrionalis*) – mitigations to include, but not be limited to, BMP Clauses 7.6, 7.9, and 9.2. See additional structure specific requirements for protection of bats following.
 - .3 Woodland caribou (*Rangifer tarandus caribou*) – mitigations to include, but not be limited to, BMP Clauses 2.3 and 7.9.
 - .4 Wolverine (*Gulo gulo*) – mitigations to include, but not be limited to, BMP Clauses 2.3, 2.7, and 7.9.
 - .5 Black swift (*Cypseloides*) – mitigations to include, but not be limited to, BMP Clause 7.2.
 - .6 Barn Swallow (*Hirundo rustica*) – See structure specific requirements for protection of birds following.
 - .7 Coeur d'Alene salamander (*Plethodon idahoensis*) and Western toad (*Anaxyrus boreas*) – mitigations to include, but not be limited to, BMP Clauses 7.3, 9.2, and 9.3. Additionally, Contractor to contract QEP to complete a pre-construction survey at each structure. If noted amphibians observed, notify Departmental Representative for further direction.
- .5 Structure specific requirements for protection of bats:
- .1 Beaver River Bridge: Two weeks prior to construction start, Contractor to contract QEP to complete a bat roost survey of the project footprint for each structure. If bats are observed notify Departmental Representative for further direction and defer tree clearing to between October 15 to March 31.
- .6 Structure specific requirements for protection of birds:
- .1 Beaver River Bridge:
 - .1 Bird nesting within 5m of the deck joints shall be prevented.
 - .2 Contractor to conduct inspections at least daily, and if partially constructed nests are observed, these shall be removed immediately before they become active. Results of the daily inspections shall be documented and provided to the ESO.
 - .3 If active nests, roosts, or dens of species protected by SARA or the Migratory Birds Convention Act are identified, immediately notify the Departmental Representative and the ESO to determine appropriate mitigation measures. No active nests to be removed and work activities will be stopped and site shut down at the discretion of the ESO until nestlings have fledged. No claims for any delays or inconvenience related to the discovery of functional bird nest(s) will be entertained.
 - .1 A nest is considered an active nest if it can function as a nest, i.e. it is able to support a resting bird, eggs or chicks. If the constructed materials look 50% complete or more, or if there is any evidence of nest use (e.g. supporting a resting bird or eggs), it is considered an active nest.

- .2 Loop Brook Bridge and Cougar Brook Bridge:
 - .1 Bird nesting shall be prevented on the existing bridges and any falseworks or temporary works in accordance with the BMP.
 - .2 Contractor to conduct inspections at least daily, and if partially constructed nests are observed, these shall be removed immediately before they become active. Results of the daily inspections shall be documented and provided to the ESO.
 - .3 If active nests, roosts, or dens of species protected by SARA or the Migratory Birds Convention Act are identified, immediately notify the Departmental Representative and the ESO to determine appropriate mitigation measures. No active nests to be removed and work activities will be stopped and site shut down at the discretion of the ESO until nestlings have fledged. No claims for any delays or inconvenience related to the discovery of functional bird nest(s) will be entertained.
 - .1 A nest is considered an active nest if it can function as a nest, i.e. it is able to support a resting bird, eggs or chicks. If the constructed materials look 50% complete or more, or if there is any evidence of nest use (e.g. supporting a resting bird or eggs), it is considered an active nest.
- .7 Additional requirements related to protection of birds related to vegetation removal are provided elsewhere in these specifications.

1.8 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 dispersal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 The Contractor's EPP will detail how the dewatering will be undertaken, with special attention to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting, and settlement pond reclamation.

1.9 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic fire fighting equipment – e.g. three shovels, two pulaskis, and two 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff.
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.

- .3 Care shall be taken while smoking on the construction site to ensure that accidental ignition of any flammable material is prevented. Fires or burning of waste materials are not permitted.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contracting the Glacier National Parks Fire Management Office or Fire Duty Officer. Fire prevention care is to commensurate with the fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Fires or burning of waste materials is not permitted.

1.10 SITE ACCESS AND PARKING

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access off/on the Trans-Canada Highway in the vicinity of the project – see specifications and drawings; access within the work limits, including day-to-day entry/egress, and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of worker's private vehicles.
- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A construction office is anticipated for the bridge contract. The construction office may be located on the construction right-of-way, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer, the Departmental Representative, and ESO trailer and toilets. Special measures are required to ensure that conflict with bears that are known to frequent the whole construction area does not arise. These include, but may not be limited to:
 - .1 Food, products, lunches, waste food products, or any other materials attractive to bears brought to this office location or to the bridge sites shall be secured within the trailers or by other specified means. Waste shall be secured in the trailers and removed daily from the office location.
 - .2 In the event of quick or persistent attraction of bears to the office location, the site may require electric fencing, or removal to an alternate location, at the direction of the Departmental Representative.
- .5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.
- .6 A workers accommodation camp will not be permitted.

- .7 Materials lay-down shall be on the construction right-of-way, or in unusual circumstances – e.g. over-size components, at an alternate location to be determined by the Departmental Representative in consultation with ESO.
 - .1 Beaver River Bridge: Contractor may use an existing cleared area adjacent to the eastbound lane east of the bridge behind the concrete barrier.
 - .2 Loop Brook Bridge and Cougar Brook Bridge: Contingent on two weeks advance notice from the contractor requesting usage, half of the parking lot for Loop Brook Trail head may be made available to the contractor. The referenced parking lot is adjacent to the eastbound lane east of Loop Brook Bridge and approximately 2 km east of Cougar Brook Bridge. Alternatively, and only from May through September, a portion at the west end of a chain up pullout approximately 500 m east of Cougar Brook Bridge (1.5 km west of Loop Brook Bridge) may be used while providing clear vehicular and pedestrian access to the privy.

1.11 CONTRACTOR'S OPERATIONS

- .1 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond those work limits without the written permission of the Departmental Representative.
- .2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.
- .3 Provide sufficient sanitary facilities and maintain in a clean condition.
- .4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .5 When in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic facilities beyond the staked or designated work area, the Contractor shall be responsible at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of Parks Canada.
- .6 Failure to comply with or observe environmental protection requirements as identified in these specifications may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

1.12 WORK AROUND AND OVER WATER

- .1 The construction project shall take place outside of the wetted perimeter of any waterways. Some of the construction will require working over rivers and creeks and close to the river bank. In these instances, the Contractor is to describe the measures in the EPP, to be employed to ensure fugitive materials, and especially deleterious substances do not enter the streams or any other body of water – e.g. material produced by concrete curing.

- .2 Works to be carried out with strict adherence to clauses 2.7, 2.8, and 2.15-2.24 of the BMP's and the Department of Fisheries and Oceans (DFO) Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2019).
- .3 Sediment control measures shall be to the satisfaction of the ESO.
- .4 Fuel management requirements are explained in the Equipment Fuelling, and Spill Containment sub section.
- .5 Do not operate construction equipment in waterways.
- .6 To prevent the spread of aquatic invasive species, all gear and equipment arriving onsite which may be used instream/touching water must be cleaned and decontaminated according to the protocol outlined in the MRGNP Decontamination Procedure. Proof of decontamination will be required prior to commencement of works. Decontamination will include all Personal Protective Equipment (boots, gloves, etc.), nets, and heavy equipment. Proof may be supplied in the form of photos or other means which provide documentation.
 - .1 Didymo (*didymosphenia geminata*) was confirmed at Cougar Brook and the EPP will need to address site specific prevention and spread of this species.
- .7 The fish least risk window is August 20 to August 31 for Beaver River Bridge.
 - .1 Rip-rap placement for the animal pathway at Beaver River Bridge is only permitted within the fish least risk window defined preceding, or alternatively, and only if approved by the Departmental Representative, when the water level of Beaver River has dropped low enough so that the rip-rap can be placed in fully dry conditions.
 - .1 Install an isolation system to isolate the area at time of rip-rap placement to prevent siltation, debris, or any deleterious material from entering the creek.
 - .1 Isolation system required for all work below high water, regardless of the time of construction or whether or not within the wetted perimeter at time of construction.
 - .2 Granular berms, hay or straw bales, or other systems which will place fill, deleterious material, or weed seeds into the creek are not permitted.
 - .2 Isolation systems shall locally isolate the work areas. Encroachment into the waterway to be minimal. No equipment permitted in the waterway for rip-rap placement.
- .8 Should works be required to be performed below the high water mark:
 - .1 Avoid killing fish by means other than fishing.
 - .2 Dewater gradually to reduce the potential for stranding fish.
 - .3 Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered area.

1.13 POLLUTION CONTROL

- .1 Maintain all temporary erosion and pollution control features for this project.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent blasting and other extraneous materials from contaminating air beyond application area by providing suitable, temporary enclosures or mats to the satisfaction of the Departmental Representative and the ESO.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and on-site work.
- .5 Schedule work to avoid wet, windy and rainy periods (and heed weather advisories).
- .6 Regularly inspect and maintain the erosion and sediment control measures and structures during all phases of the project.
- .7 Use biodegradable sediment control materials whenever possible.
- .8 Remove all exposed non-biodegradable sediment control materials once site has been stabilized.
- .9 Use methods to prevent substrate compaction (e.g., swamp mats, pads).
- .10 Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action.

1.14 START-UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site shall attend a briefing prior to commencing any work, regarding their individual and collective responsibilities lasting approximately 1 hour, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Employees of other service and materials providers who attend the site – e.g. concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

1.15 HAZARDOUS PRODUCTS AND MATERIALS

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to waterproofing agents, grout, concrete finishing agents, hot poured rubber membrane materials, blasting agents, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements, and disposal of empty containers, surplus product or waste generated in the

application of these products shall be presented in the EPP. Hazardous products shall be secured in secondary containment and stored no closer than 100 m from any waterway.

1.16 SPILL CONTAINMENT PLAN

- .1 A spill response plan shall be presented in the EPP. Elements to be addressed shall include, but not necessarily limited to:
 - .1 Emergency spill response kit capable of dealing with the largest possible spill shall be maintained in good working order on the construction site.
 - .2 Staff shall be informed of the location of the response kit, and be trained in its use.
 - .3 Hazardous materials are to be stored and used in minimal required quantities in accordance with all applicable federal and provincial legislation.
 - .4 All spills are to be immediately contained with the source of spill arrested, to prevent their further migration into the watercourse and immediately reported to the Departmental Representative and cleanup initiated. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment.
 - .5 Ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.
 - .6 Clean-up and appropriately dispose of the sediment-laden water and deleterious substances.

1.17 EQUIPMENT FUELLING AND MAINTENANCE

- .1 Equipment used on the project shall be fuelled with E10 gasoline and low sulphur diesel fuels.
- .2 A fuel delivery, storage, and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
 - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 metres away from rivers, creeks or any other body of water.
 - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
 - .3 Fuelling personnel shall maintain immediate attention to and presence at the fuelling operation.
 - .4 Fuelling sites will be identified by the Departmental Representative and the ESO. Any fuelling closer than 100 m to rivers, creeks or any other body of water will require the authorization and oversight of the ESO or the Departmental Representative.
 - .5 Lubricant changes and minor repairs shall be conducted at a location identified by the Departmental Representative in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from the National Parks to recycling or certified disposal sites.

- .6 Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order and free of fluid leaks. Drip trays shall be stationed below equipment lubricant reservoirs at 1.5 times the capacity when not in service.
- .7 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.

1.18 WASTE MATERIAL STORAGE AND REMOVAL

- .1 The Contractor shall prepare a Construction and Waste management plan as part of the EPP. The Plan shall include the following basic principle:
 - .1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:
 - .1 Describe the management of waste.
 - .2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.
 - .3 A concerted effort to reduce, reuse and recycle materials is expected.
 - .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
 - .5 Provide containers to deposit recyclable materials.
 - .6 Transport all recyclable materials to an approved recycling facility off site.
 - .7 Waste materials are to be disposed of at a certified construction waste landfill outside the National Parks. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in the National Parks.
 - .8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.
 - .9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.
- .3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .6 Provide bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel and make arrangement for collection on a daily basis or when directed by the Departmental Representative.

- .7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.
- .8 Do not dispose of or allow to disperse waste or volatile materials such as mineral spirits, oil and paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.
- .9 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

1.19 VEGETATION REMOVAL AND PROTECTION OF THE WORK LIMITS

- .1 Follow additional mitigation measures provided in PRIA's and in Section 1.21 of this specification section.
- .2 The EPP shall detail how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur.
- .3 As detailed in earlier in these specifications, bat roost surveys must be completed and current for all vegetation removal Works when Work is to occur outside of the least risk window.
- .4 Brushing and clearing to be permitted only within the Project area for the animal pathway at Beaver River bridge and laydown area at Beaver River bridge.
- .5 Vegetation removal (brushing and clearing) is only permitted during the migratory bird least risk window.
 - .1 Migratory bird least risk window is from September 1 – March 31 in Glacier National Park.
 - .2 A Restricted Activity Permit (RAP) must be obtained prior to any vegetation removal.
 - .3 Clearing, grubbing and or/vegetation removal will only be permitted outside of the migratory least risk window upon written approval by the Departmental Representative.
 - .4 If vegetation removal is proposed outside of the migratory bird least risk window, a migratory bird nesting survey must be completed by a qualified biologist and a mitigation plan would be required to avoid the inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs (incidental take), supporting compliance with the Migratory Birds Convention Act and provincial acts and regulations.
 - .5 If an active nest is found, the vegetated area will be left intact with a suitable sized setback of shrubs/trees around it. The size of the protected, no-disturbance setback is species dependent and will be determined by a QEP and/or ESO. The setback area will remain undisturbed until the young have fledged and left the area.
- .6 Vegetation removal using heavy machinery is not permitted.
- .7 Store all equipment either on the road or on previously disturbed or hardened surfaces to minimize vegetation disturbance.

- .8 Minimize the amount of vegetation cleared or disturbed. Visibly delineate the area to be cleared to avoid unnecessary vegetation removal. Clearly mark area with highly visible materials such as flagging tape to inform equipment operators of the area they are to work in. Equipment operators to ensure no mechanical damage is caused to trees and other vegetation outside the designated clearing area.
 - .1 Any vegetation damaged outside the designated clearing area to be replaced in size and kind two-fold.
- .9 Dispose of vegetation debris in accordance with Section 1.21 of this specification section.
- .10 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.
- .11 Minimize migration of invasive species to or from the Project site. EPP to include a Weed Management Plan that integrates with the BMP's and PRIA's.
 - .1 Prior to entry onto new segments of the Project area, clean (blow down/scrape down) all equipment that came into contact with soil at previous segments (i.e. clearing, grading, decompaction, or restoration equipment) to approval of the ESO.
 - .1 All equipment to be inspected by the ESO prior to being used onsite.
 - .2 Construction staff and others to scrape mud off their boots and brush seeds and dirt from their clothing before leaving the Project site.
 - .3 Construction equipment to be cleaned prior to moving to any new construction site.
 - .4 The following regulated invasive species have been observed within the Project Footprints.
 - .1 Bull thistle (*Cirsium Vulgare*).
 - .2 Canada thistle (*Cirsium arvense*).
 - .3 Common tansy (*Tanacetum vulgare*).
 - .4 Flagellate hawkweed (*Hieracium flagellare* ssp. *flagellare*).
 - .5 Orange-red king devil (*Hieracium aurantiacum*).
 - .6 Oxeye daisy (*Leucanthemum vulgare*).
 - .7 Perennial sow-thistle (*Sonchus arvensis* ssp. *arvensis*).
 - .8 Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*).
 - .9 Tufted vetch (*Vicia cracca* ssp. *cracca*).
 - .10 White sweet-clover (*Melilotus albus*).
- .12 Disturbance to vegetation in areas temporarily disturbed by heavy equipment and other construction-phase related activities (including lay-down sites, temporary work sites, temporary detour and material stock pile sites) will be restored as quickly as possible by planting grass seed.
- .13 Top soil shall be supplied and placed as approved by the ESO, including the provision of erosion control blankets.

1.20 SENSITIVE AND NO-GO ZONES

- .1 The ESO may identify sensitive areas and no-go zones in proximity to the work site. Even though these areas may lie outside the construction limit they must not be intruded into by personnel. The Contractor shall describe measures to be employed to achieve that goal.

1.21 VEGATATION REMOVALS – ADDITIONAL REQUIREMENTS

- .1 General
 - .1 Remove vegetation in early spring, late fall or winter. Avoid vegetation removal during sensitive species windows eg., breeding birds and amphibians. If timing of work cannot be postponed, further mitigations (as outlined in the following mitigation measures) must be implemented.
 - .2 Minimize full removal and retain vegetation when possible to reduce erosion.
 - .3 Use temporary fencing/signs or close an area as necessary to ensure visitor safety.
 - .4 Flag or fence area to delineate the work site and minimize the amount of vegetation removal required. Equipment should remain within the flagged clearing limits.
 - .5 Remove vegetation during frozen or snow-covered ground conditions to minimize impacts to soil from heavy equipment.
 - .6 Erosion and sediment control measures will be installed and maintained to reduce sediment transport into watercourses and waterbodies from vegetation removal activities.
 - .7 For temporary vegetation clearing, use erosion controls on exposed soils, especially within 30m of a watercourse or water body.
 - .8 Suspend vegetation removal activities during wet weather to minimize erosion and sediment transport.
 - .9 Remove vegetation by chainsaw and/or brushsaw and on foot.
 - .10 Use biodegradable chainsaw bar oil for work occurring over water.
 - .11 Ensure machinery is free of leaks and well maintained.
 - .12 Equipment will arrive onsite clean and free of soil and will be inspected by the ESO prior to use on site. Equipment will also be cleaned prior to moving to a different work site.
 - .13 Restrict heavy machinery to existing roadways and/or hardened surfaces.
 - .14 Maintenance and re-fuelling should be done at least 30 m from any water body and at designated areas.
 - .15 A spill kit capable of containing 110% of available fuel should be available on site at all times and staff working at the site trained in its correct use.
- .2 Selective Removal
 - .1 Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut.

- .2 Selectively cut vegetation to allow for diversity of vegetation types and heterogeneous plant heights.
- .3 Maintain fruit bearing shrubs outside of high density Human Use Areas.
- .4 When practical, do not fall trees >15cm DBH; instead remove lower limbs and/or top trees. DBH refers to diameter at breast height (1.37m from ground level).
- .5 Maintain canopy vegetation immediately adjacent to streams and lakes, unless determined to be a hazard tree.
- .6 Do not remove vegetation within 30m of fish-bearing water bodies. Instead, trim shrubs to a height of 1 metre and limb trees to a height of 2.5 metres.
- .7 Selectively cut clusters of young trees to allow some to continue to grow.
- .8 Mow to a minimum height of 15 cm where appropriate (i.e. roadsides).
- .3 Hazard Tree Assessment
 - .1 Prior to removal of potential danger trees, a Qualified Danger Tree Assessor should conduct a danger tree hazard assessment as per the BC Wildlife/Danger Tree (WDT) Assessors guidelines.
 - .2 Submit a copy of the signed hazard tree assessment report to the ESO prior to tree removal.
 - .3 If the hazard tree assessment identifies a tree with high wildlife value, contact the ESO before falling to determine if additional mitigation measures are required.
- .4 Rare Plants / Invasive Alien Plants
 - .1 Plant surveys for rare or invasive alien plants (IAP's) may be required for specific sites based on input from Park specialists. Results of the survey may result in additional mitigations as determined by the ESO.
 - .2 Equipment will arrive on site clean and free of soil and weed seeds to prevent the spread of IAP and will be inspected by the ESO prior to use on site. Equipment will also be cleaned prior to moving to a different work site.
 - .3 Avoid staging or parking equipment on sites with high concentrations of IAP.
 - .4 Mow early to mid-July along the TCH. Clean mower frequently to prevent the spread of IAPs over large areas.
 - .5 Post-construction monitoring of IAP.
 - .6 If IAP concerns are present, the ESO will recommend the appropriate approach to mitigate the establishment/spread of IAP.
- .5 Migratory Birds
 - .1 No killing, capturing, injuring, taking or disturbing migratory birds or damaging, destroying, removing or disturbing their nests during vegetation removal.
 - .2 Implement the recommended mitigation measures for vegetation removal in the Parks Canada *National Best Management Practices for Migratory Birds* (2018).
 - .3 Prior to vegetation removal during the MRG breeding bird period (April 01 – August 31), a breeding activity survey must be conducted by a Qualified Environmental Professional (QEP).

- .4 Nesting bird surveys in areas likely to support raptors (including owls) and/or waterfowl may be required from February 15 to September 30 based on input from the MRG Wildlife Ecologist.
- .5 Submit bird breeding activity survey results to the ESO prior to starting vegetation removal. If active nests and/or tree cavities are observed, consult with the ESO for advice on timing of tree removal/trimming and additional mitigation measures including buffer and setback distances from the active nest.
- .6 Bats
 - .1 No killing, capturing, injuring, taking or disturbing bats or damaging, destroying, removing residences or roosts during vegetation removal.
 - .2 Trees should be removed outside of the period of April 1 to August 31. Ideally, work will occur after weaning of pups (approximately August 31) but before hibernation (October 15 – November 15, depending on weather).
 - .3 If trees must be removed between April 1 and August 31, a QEP to conduct an inspection prior to the removal of trees to determine their potential to support breeding or roosting bats. Refer to the *MRGNP Guidelines for Inspection of Trees and Built Assets for Bats* for survey methods.
 - .4 Submit bat roost inspection results to the ESO immediately after inspection. For trees not deemed to be roosts, removal must occur within two to five days of inspection; the timing of this should be decided in consultation with the ESO.
 - .5 If tree removal of large diameter trees with roosting characteristics occurs in winter, conduct the removal slowly and consult with the ESO in advance of removal regarding the possibility that bats need to be relocated.
- .7 Amphibians
 - .1 If vegetation removal is to occur within 300 m from a confirmed or potential amphibian breeding wetland, or within 500m from a confirmed SARA amphibian breeding wetland, additional impact analysis is required and site-specific mitigations developed.
 - .2 If vegetation removal is schedule to occur during non-frozen conditions, the Wildlife Ecologist may complete an amphibian and reptile ground search immediately prior to equipment activities.
 - .3 Minimize removal of riparian and wetland vegetation during the amphibian breeding and dispersal period (April 1 to September 30) in areas that have confirmed or potential presence of Western Toad. This will avoid accidental crushing of adult toads during the breeding migration and of juvenile western toads during dispersal.
 - .4 If ground disturbance activities are schedule to occur in frozen conditions, amphibian exclusion fencing may be required in the preceding fall season at the discretion of the ESO.
- .8 Cultural Resources
 - .1 Consult with the ESO prior to start of work to determine required mitigation measures to protect potential Culturally Modified Trees (CMTs).

- .2 For all works, implement the *Accidental Finds Protocol*: if a suspected cultural resource is discovered, halt work and contact the ESO immediately.
- .9 Vegetation Disposal
 - .1 Consult with the ESO to select the appropriate disposal method. The method for disposal of vegetative debris will depend on specific project details and environmental site conditions at the time of the project (e.g. Fire Danger Rating). Options for vegetation disposal include any one, or combination of, the following:
 - .1 Buck and limb trees so that the trunk (bole) of the tree touches the ground, scatter to avoid fuel loading;
 - .2 For large diameter (>15 cm DBH) spruce, Douglas fir and subalpine fir, bark must be peeled or scored if fallen trees are left in place or used for firewood;
 - .3 Alternative preventative measures may be taken in consultation with the Vegetation Ecologist;
 - .4 Buck/split for re-use (for fire: 15" to 20" long and 8" maximum diameter);
 - .5 Chip and leave in-situ; or
 - .6 Chip and dispose of elsewhere (i.e. landfill or designated area).
 - .7 No burning of vegetation debris within the National Park will be permitted.
 - .2 No mulching will occur within 30m of riparian areas, water bodies, bogs, lakes, streams or wetlands (including ephemeral water features) due to the potential for acid leachate to negatively affect aquatic ecosystems. The distribution of mulch chips will be non-uniform so that the native vegetation is not completely covered by mulched material. Rough mulching (i.e. removing branches but leaving logs intact) is preferable to fine mulch in areas with larger stems (i.e. where small trees are being mulched).
 - .3 Debris will not be deposited in water bodies.
- .10 Site Restoration, Monitoring and Control
 - .1 Topsoil removal, storage and management should follow the guidelines described in the Parks Canada National PRIA for *Roadway, Highway, Parkway and Related Infrastructure* (2020).
 - .2 Consult ESO for specific mitigations for sod removal and storage.
 - .3 For temporary clearing, re-seed as soon as practical with MRG-approved native seed mix and monitor re-growth. Seed certificates must be provided to the ESO for approval before seed mixes are ordered or applied to site.
 - .4 Contractor is responsible to ensure growth of vegetation and controlling any non-native vegetation for one year post-construction.
 - .5 Site inspections should be conducted by the Contractor in order to monitor restoration success during the first year post construction.
 - .6 For vegetation restoration, expectations are that:

- .1 Greater than 90% survivorship of planted live stakes will be achieved after the first growing season (if planted in the spring with dormant stakes from that year), greater than 70% of survivorship if planted in the fall;
- .2 By the fifth growing season at least 50% of the planted stakes should survive;
- .3 Greater than 90% of the representative native plant material will be established on the restored site, and;
- .4 Less than 10% priority invasive species plant cover will be present on the restored site.
- .7 For seeded grass, excessive bare ground areas after two growing season's needs to be addressed with additional seeding or alternative vegetation establishment.
- .8 Vegetation restoration and/or IAP will be assessed by Parks Canada before a Certificate of Project Completion is issued.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 CONCRETE MANAGEMENT**

- .1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which address concrete plant location, operation, and reclamation where required, to the satisfaction of the Departmental Representative. This plan shall include the following concrete management elements:
 - .1 During saw-cutting, cooling fluids shall be contained, collected, and disposed of at an approved disposal facility.
 - .2 Concrete mixer truck washout shall be contained in a buried or above ground tank, with wash products moved back to the concrete batching yard or an approved facility for disposal.
 - .3 Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
- .2 If a concrete batching plant is used it shall be operated pursuant to applicable dust, air emission, and water quality control regulations.

3.2 STORAGE AND CONTAINMENT OF EXCAVATED MATERIAL

- .1 The EPP shall detail the plan for both temporary storage and permanent disposal of surplus excavated material.

3.3 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 Removal and storage of snow shall be described, and a plan shall be approved by the ESO and the Departmental Representative.
- .2 Within the EPP a contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need.
- .3 It may be desirable or necessary to maintain security services at the construction site during quiet times. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals.
- .4 Develop a response plan for, and be suitable equipped for, fires on and immediately adjacent to the work area.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 This Work shall be incidental to contract and will not be measured for payment.

1.2 DEFINITIONS

- .1 Quality Control (QC): The process of checking specific products or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.
 - .1 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

1.3 QUALITY MANAGEMENT PROGRAM

- .1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
 - .1 The Contractor is responsible for quality control and quality assurance of all construction activities.
- .3 The Quality Management Plan shall at a minimum include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and test equipment including methods and frequency of calibration;
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;

- .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the tests;
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance; and
 - .15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.
- .4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
- .5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors, will periodically (shall be a minimum of 10% of the Quality Control checks) perform a second independent check to assess if the Quality Control process is being followed. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.

- .1 A testing agency independent from the Contractor must be engaged by the Contractor to perform either Quality Control or Quality Assurance for a given task as part of the Quality Program.
- .7 At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control Manager and Quality Assurance Manager and submitted to the Departmental Representative.

1.4 TESTING

- .1 All Quality Control technicians are to be certified by the Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .2 Testing required to provide Quality Control and Quality Assurance to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing of all structural concrete, reinforcing steel, granular material, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .3 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
 - .1 Wherever these standards refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
 - .2 If no testing standard is identified in the specifications, testing proposed shall be in accordance with BC MoTI Standard Specifications for Highway Construction.
 - .3 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.
- .4 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .5 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.

- .6 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work.
- .7 The minimum frequency for Quality Control testing for the Animal Pathway at Beaver River Bridge and the new approach asphalt at Loop Brook Bridge and Cougar Brook Bridge will be as follows:

CONSTRUCTION TYPE	TEST TYPE	MINIMUM FREQUENCY OF TESTS
Subgrade/Backfill construction with fine grained or granular soil	Standard Proctor by: ASTM D698	1 for each material type and 1 for each accepted change in material gradation
	Field density by: ASTM D1556 – Sand Cone ASTM D2167 – Balloon ASTM D2922 - Nuclear	3 tests per per lift, spaced randomly across full width of embankment
	Proof Roll and or Rutting Test	As required by the Departmental Representative

	ASTM TEST	MINIMUM FREQUENCY
Tests During Aggregate Production	C 136, Dry Sieve Analysis of Aggregate	- Split Stockpiles: 1 for each stockpile for every 2 hours of production
	Or C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab with drying done over a hotplate or similar heating element)	- One main stockpile: for every 300 tonnes - Blend Sand: 1 for every 100 tonnes during stockpiling - Natural filler: 1 for every 50 tonnes during stockpiling
	D 5821 Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.
Tests during Asphalt Plant Mixing	C 136, Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes
	C 556 & D 2216, Moisture Content	Aggregate: 1 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed
	D 5581 Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.

	ASTM TEST	MINIMUM FREQUENCY
	D 6307 Asphalt Extraction, Ignition Method	One/Sub-Lot
	D-5 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix.
	D 2171 Viscosity	Contractor's Option
	D 2041 Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245-97 Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing
	Core Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

- .1 These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency, where aggregate source is not uniform or any other condition exists that may warrant it. QC frequencies may be reduced below this level, subject to the Departmental Representative's authorization, should the Contractor's QC plan be proven very effective.
- .2 Passing the minimum quantity of QC tests does not relieve the Contractor from the obligation of meeting the Contract requirements and any identified non-compliant works or products shall be rectified by the Contractor at their cost.
- .8 Quality Assurance testing will be undertaken by the Contractor through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspections, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.
- .9 The Contractor shall be responsible for third party testing of materials incorporated into the works.
- .10 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:
 - .1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.
 - .2 Submit samples and/or materials required for testing, as specifically requested in the Specifications or as requested by the Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site.

1.5 INSPECTION

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

1.6 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 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 the Departmental Representative at no cost to the Departmental Representative. Pay costs for retesting and re-inspection.

1.7 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.

1.8 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.

1.9 REJECTED WORK

- .1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).
- .2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).
- .3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.
- .4 Make good other Contractor's work damaged by such removals or replacements promptly.
- .5 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.
- .6 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by the Contract Documents, amount of which will be determined by the Departmental Representative.

1.10 REPORTS

- .1 Submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 - Submittals Procedures.
- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.

1.11 TESTS AND MIX DESIGNS

Furnish test results and mix designs as requested

1.12 MILL TESTS

- .1 Submit mill test certificates as required in specification sections.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

Project: 1080-01

Bridge Rehabilitation
Beaver River Bridge km 9.7,
Loop Brook Bridge km 29.3 and
Cougar Brook Bridge km 31.2
Glacier National Park

Section 01 45 00

QUALITY
CONTROL

Parks Canada

Page 8

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 55 26 - Traffic Control

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.
 - .2 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement for payment will be made in this section for Construction Facilities and shall be considered incidental to the “Unit Price Items”.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled 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.

1.6 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, swing staging, platforms, ladders and temporary stairs.
- .3 Provide the Departmental Representative access to all parts of the work during construction and as required for inspection of the completed works.

1.7 HOISTING

- .1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment.
- .2 Hoists and/or cranes to be operated by qualified operator.

1.8 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.

1.9 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.10 SECURITY

- .1 The Contractor shall be entirely responsible for the security of the Work Site and of the Work at all times while the Work Sites are under the Contractor's control (including after working hours and during holidays). Provision of security personnel or other security measures, as determined necessary by the Contractor to maintain a secure site, will not be measured but considered incidental to the work.

1.11 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Departmental Representative's Site office:
 - .1 Provide temporary office for the use of the Departmental Representative with sufficient working space for minimum of two persons and to include:
 - .1 Minimum (2) desks, (2) office chairs, printer.
 - .2 Provided office to be at minimum a separate room with a lockable door separate from the Contractor's working area. A separate trailer may be provided.
 - .3 Provide uninterrupted power supply and heat for office.
 - .4 Provide air-conditioning for office.
 - .5 Provide reliable satellite Internet connection with sufficient bandwidth to support phone calls for Departmental Representative usage.
 - .6 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3m above grade, complete with four 50% opening windows and one lockable door.
 - .7 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
 - .8 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
 - .9 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.

- .10 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
- .11 Equip office with 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .12 Maintain in clean condition.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable, bear-proof, 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.

1.13 SANITARY FACILITIES

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

1.14 CONSTRUCTION SIGNAGE

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 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 the Departmental Representative.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

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

- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.16 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 British Columbia Ministry of Transportation
 - .1 Traffic Management Manual for Work on Roadways.
 - .2 Standard Specifications for Highway Construction – Traffic Management for Work Zones.
- .2 U.S. Department of Transportation
 - .1 Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD).

1.2 MEASUREMENT AND PAYMENT

- .1 Traffic Control will be paid under "**Lump Sum Price Item – Traffic Control**" - prorated by the portion of overall Contract Work completed.
 - .1 The cost of snow removal and provision of salt or sand required by the Contractor to maintain safe driving conditions within the work zone and complete the work identified in the Contract shall be considered incidental to the lump sum and no additional payment will be made.
- .2 Additional hours of Traffic Control Personnel requested by the Departmental Representative beyond those specified will be paid for separately.
- .3 Removal of temporary markings shall be considered incidental to traffic control and no additional payment will be made.

1.3 GENERAL

- .1 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement marking, other safety measures, and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.
- .2 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .3 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with Section 2.2.1 of the BC MoTI – Traffic Control Manual for Work on Roadways, 1999.

- .4 The Contractor shall develop and implement a Traffic Management Plan (TMP) in accordance with BC MoTI – Traffic Control Manual for Work on Roadways (1999), except where specified otherwise in the Contract Documents. The TMP shall take into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. The TMP shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .5 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

1.4 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 Carry out traffic regulation in accordance with BC MoTI – Standard Specifications for Highway construction – Traffic Management for Work zones except where specified otherwise.
- .3 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .4 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to Traffic Control Manual for Work on Roadways.
- .5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
- .6 A minimum of one lane in each direction (one eastbound and one westbound) shall be maintained on the Trans-Canada Highway at all times. The minimum Clear Roadway for each lane of normal traffic shall be 4.0 m when the lanes are separated by the construction work zone, and 3.9 m when lanes are adjacent, unless otherwise approved in writing from the Departmental Representative.
 - .1 Clear Roadway shall be measured by extending straight lines parallel to the roadway at the narrowest constriction point in the work zone from inside the faces of construction barriers, or from the faces of other constrictions, on each side of the clear roadway and measuring the perpendicular distance between the lines.
- .7 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of the Departmental Representative.

- .1 Manage traffic to maintain full public access and use of the parking lot for Loop Brook Trail head unless specifically noted otherwise in these specifications.
 - .1 As defined in Section 01 35 43 - Environmental Procedures, half of the parking lot may be made available to the contractor, contingent on two weeks advance notice from the contractor requesting usage. Full public access and use of the other half of the parking lot to be maintained.
- .2 The timber Trail Bridge adjacent to Loop Brook Bridge may be closed to the public for the duration of construction.
- .8 Clear snow and ice from the roadway within the work zone.

1.5 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to BC MoTI – Traffic Control Manual for Work on Roadways (1999).
- .3 Place signs and other devices in locations recommended in BC MoTI – Traffic Control Manual for Work on Roadways (1999).
- .4 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5 m from ground to the bottom of the sign, or as per BC MoTI Traffic Control Manual for Work on Roadways (1999), whichever is higher.
- .5 At each location, supply, install, maintain and remove two (2) flashing arrow boards (FAB), as required for the Works in accordance with the accepted TMP. All FAB shall be as per MUTCD (latest edition).
 - .1 Location of the FABs will be agreed with the Departmental Representative.
 - .2 Removal of FABs will only be permitted upon completion of work.
 - .3 Payment for FABs will be incidental to the Lump Sum Price for Traffic Control.
- .6 At two (2) locations, supply, install, maintain and remove two (2) changeable message signs (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition).
 - .1 Beaver River Bridge shall be one location.
 - .2 Loop Brook Bridge and Cougar Brook Bridge shall be one location.
 - .3 Location of the CMS will be agreed with the Departmental Representative.
 - .4 Text for CMS will be directed by the Departmental Representative.
 - .5 Removal of CMS will only be permitted upon completion of work.
 - .6 Payment for CMS will be incidental to the Lump Sum Price for Traffic Control.
- .7 At each location, supply, install, maintain and remove two (2) speed reader boards (SRB), as required for the Works in accordance with the accepted TMP.
 - .1 Location of the SRBs will be agreed with the Departmental Representative.

- .2 Removal of SRBs will only be permitted upon completion of work.
- .3 Payment for SRBs will be incidental to the Lump Sum Price for Traffic Control.
- .8 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
- .9 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.
- .10 Use high quality reflective pavement markings for detours and diversions in accordance with BC MoTI Traffic Control Manual for Work on Roadways (1999).
 - .1 Removal of temporary markings is considered incidental to the works.
No black-out painting is permitted.

1.6 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to BC MoTI Traffic Control Manual for Work on Roadways (1999) for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When vehicles are entering or existing Worksite access points.
 - .3 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.
 - .4 When workmen 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.
 - .5 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .6 For emergency protection when other traffic control devices are not readily available.
 - .7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .8 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to contractor's operators: 15 minutes maximum when approved by Departmental Representative. Traffic shall be controlled by flag personnel to reduce delays to 15 minutes maximum. Emergency vehicles (i.e. ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic. Delay is defined as the total

additional time required to pass through a work zone minus the time that would be required at the posted speed. Delay time shall be the maximum time elapsed as measured from the back of the approach queue to the resume speed sign.

- .3 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts. The Contractor shall bear the costs of implementing these requirements so as to ensure the traffic control specifications and associated performance standards are met.
- .4 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.
- .5 During hours of darkness, if permitted under these specifications, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
- .6 Supply, install, maintain and remove temporary concrete barriers during all extended construction stages where the travel lanes are directly adjacent to the work zone (including construction screening and barrier-mounted reflectors).
- .7 Requests for lane closures must be submitted for approval a minimum of 1 week in advance of traffic impact.
- .8 No stoppage of traffic or reduction in lane capacity is permitted for the periods specified in Section 01 14 00 – Work Restrictions for Statutory Holidays (including the periods specified for the Canada Day Holiday).

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 and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted to a reduced speed limit of 50km/hr.
- .2 Manage traffic to maintain full public access and use of the parking lot for Loop Brook Trail head unless specifically noted otherwise in these specifications.
 - .1 As defined in Section 01 35 43 - Environmental Procedures, half of the parking lot may be made available to the contractor, contingent on two weeks advance notice from the contractor requesting usage. Full public access and use of the other half of the parking lot to be maintained.
 - .2 The timber Trail Bridge adjacent to Loop Brook Bridge may be closed to the public for the duration of construction.
- .3 The privy and refuse bin in the Sir Donald Chain-up pullout (located approximately 500 m east of Cougar Brook Bridge) are not to be obstructed and require full public vehicular access at all times.

- .4 Provide the Departmental Representative with construction advisories for posting to the DriveBC website (<http://www.drivebc.ca>) and update advisories regularly to reflect the current and planned construction activities and highway closures.
- .5 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (<http://511.alberta.ca/>) and update advisories regularly to reflect the current and planned construction activities and highway closures.

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 35 43 - Environmental Procedures
- .2 Section 01 52 00 - Construction Facilities
- .3 Section 01 55 26 - Traffic Control

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-O121, Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

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

1.4 HOARDING

- .1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- .3 Provide screening around construction materials and / or equipment as directed by the Departmental Representative for protection of wildlife.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors, roofs, and bridge decks or girders.
- .2 Provide as required by governing authorities.

1.6 ACCESS TO SITE

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

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.

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 All Technical Specification sections.

1.2 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, the Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by the Departmental Representative in event of conformance with Contract Documents or by the Contractor in event of non-conformance.
- .5 Conform to latest date of issue of reference standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, up to the end of the warranty period, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the 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 project.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify the 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 right to substitute more readily available products of similar character, at no increase in Contract Price of Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and miscellaneous metals 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 the Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to the Departmental Representative's satisfaction. Use touch-up materials to match original.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative will establish course of action.

- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify the 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. The Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

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

1.10 CONCEALMENT

- .1 In finished areas conceal ducts in curbs or barriers, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.11 REMEDIAL WORK

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

1.12 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 stainless steel fasteners and anchors for securing exterior work, unless non-corrosive hot dip galvanized steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 PROTECTION OF WORK IN PROGRESS

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

1.14 EXISTING UTILITIES

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

Part 2 Products

2.1 NOT USED

Not Used.

Part 3 Execution

3.1 NOT USED

Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

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

1.4 PREPARATION

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

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .8 Conceal ducts in curbs or barriers, except where indicated otherwise.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.

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 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .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.
- .3 Clear snow and ice from work areas.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces.

1.2 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, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas.
- .11 Clean drainage systems.
- .12 Remove snow and ice.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection:
 - .1 Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify the Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .3 Request the Departmental Representative's inspection.
 - .2 Departmental Representative's Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
 - .2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 10 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Project: 1080-01

Bridge Rehabilitation
Beaver River Bridge km 9.7,
Loop Brook Bridge km 29.3 and
Cougar Brook Bridge km 31.2
Glacier National Park

Section 01 77 00
CLOSEOUT
PROCEDURES

Parks Canada

Page 2

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 As-built drawings.
- .2 Warranties and bonds.

1.2 RELATED REQUIREMENTS

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

1.3 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for the Departmental Representative, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.4 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings and in copy of Specification.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.

- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

1.5 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Warranty management plan to include required actions and documents to assure that the Departmental Representative receives warranties to which it is entitled.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Submit, warranty information made available during construction phase, to the Departmental Representative for approval prior to each monthly pay estimate.
- .5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .8 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

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 DESCRIPTION**

- .1 Removal of existing asphalt pavement to depths and extents shown in the Contract Documents and as accepted by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment for asphalt concrete pavement removals at abutment back walls (Beaver River Bridge) for local repairs of approach asphalt will be the square metres of asphalt pavement actually removed and disposed in accordance with the Contract Document or as directed by the Departmental Representative.
 - .1 Payment for removals shall be made under "**Unit Price Item – Asphalt Concrete Pavement Removals at Abutment Back Walls (Beaver River Bridge)**" and the price(s) bid shall be the full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Measure for payment for asphalt concrete pavement milling in approaches at Loop Brook Bridge and Cougar Brook Bridge (50mm to 75mm thick) will be the square metres of asphalt pavement of existing roadway actually removed and stockpiled in accordance with the Contract Document or as directed by the Departmental Representative.
 - .1 Payment for milling shall be made under "**Unit Price Item - Asphalt Concrete Pavement Milling in Approaches (Loop Brook Bridge)**", and "**Unit Price Item - Asphalt Concrete Pavement Milling in Approaches (Cougar Brook Bridge)**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Payment per square metre of asphalt removal will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 All operations involved in milling and pulverizing including but not limited to;
 - .1 Survey, cold milling or excavating, sweeping, loading, hauling, stockpiling and/or disposal and cleaning of remaining pavement surface
 - .2 Overhaul.
 - .3 Asphalt Concrete Pavement placing and subsequent removal at milled tie-in locations.
 - .4 Cleaning of existing pavement shoulder, whether via sweeping or other methods.
 - .5 Maintaining milled areas, including drainage, until completion of asphalt paving.
 - .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item - Traffic Control”** and no separate payment will be made to the Contractor.
- .6 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item – Mobilization / Demobilization”** and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.

1.3 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.4 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

1.6 DEFINITIONS

- .1 Profile Milling: Removal of asphalt concrete pavement to an accurate depth of cut, profile and cross slope and shall include loading the milled material directly into trucks.
- .2 Partial Depth Milling: Partial removal of asphalt concrete pavement, other than Profile Milling.
- .3 Full Depth Milling: Complete removal of asphalt concrete pavement within the area specified in the Contract Documents.

Part 2 Products

2.1 MATERIALS

- .1 The Contractor is to ensure that the maximum particle size of milled materials is less than 50 mm and shall sieve or otherwise separate/remove larger particles at their cost.

Part 3 Execution

3.1 PREPARATION

- .1 Prior to beginning removal operation, the Contractor shall inspect and verify with the Departmental Representative, all areas, depths and lines of asphalt pavement to be removed.
- .2 Measure and record existing bridge pavement marking prior to asphalt removals. Use existing layout for pavement marking on finished road surface.
- .3 Placement of gravels to level the running surface for the milling machine, if required, will be considered incidental to the Work and no additional payment will be made.

- .4 Have appropriate Traffic Control measures in accordance with Section 01 55 26 – Traffic Control.

3.2 PROTECTION

- .1 Protect existing pavement not designated for removal, concrete deck, concrete curb and barriers, light units and structures from damage. In event of damage, the Contractor shall immediately replace or make repairs to the satisfaction of the Departmental Representative at no additional cost.

3.3 REMOVAL

- .1 Use cold milling, planning or grinding self-powered equipment with automatic grade controls capable of operating from string line, and capable of removing part of pavement surface to depths or grades indicated.
- .2 Existing asphalt pavement thickness is not uniform and will vary from one location to the next.
- .3 Partial Depth Asphalt Pavement Removal by milling to lines and grades shown on the IFC Drawings or as established by Departmental Representative in field:
 - .1 Use self-powered equipment and methods of removal and hauling which do not damage or disturb underlying roadway structure.
- .4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
 - .1 Provide for suppression of dust generated by removal process to ensure a dust free Work Site.
- .5 To tie in from existing pavement to new overlay, remove existing asphalt pavement by milling to lines and grades established by Departmental Representative in field or as per the Contract Documents.
- .6 If applicable, at mill and fill locations, remove existing asphalt to the depths, lengths and width specified in the Contract Documents and as established by Departmental Representative in field.
- .7 If the base course is disturbed by milling operations the Contractor will be required to rectify the base course, to the acceptance of the Departmental Representative, at the Contractor's cost.
- .8 In low areas where water may pond, the Contractor shall cut drainage channels through the shoulders to prevent water from collecting in the milled areas, prior to opening the lane(s) to traffic, as directed by the Departmental Representative.
- .9 The maximum delay between the area cold milled and the completion of asphalt paving of the same area will be seven (7) days. The Contractor shall be responsible for maintaining the milled surface for the travelling public as directed by the Departmental Representative.

3.4 STOCKPILING OF MATERIAL

- .1 The Contractor shall dispose removed asphalt material outside the National Park or at other locations designated by the Departmental Representative.
- .2 The Contractor will be allowed to use millings in the crushed base coarse aggregate in accordance with Section 32 11 24 - Crushed Base Coarse Aggregate.
- .3 Removed asphalt material shall become the property of the Contractor.
- .4 The material shall be stockpiled by a loader and in such a manner as to prevent consolidation which means exercising caution and minimizing running equipment on the stockpiles. Trucks and trailers shall not drive on the pile.
- .5 The height of the pile shall not exceed the height of the loader bucket.
- .6 The Contractor shall be responsible to remove any contamination of the stockpile millings.

3.5 FINISH TOLERANCES

- .1 Finished surfaces in areas where asphalt pavement has been removed shall be within +/-5 mm of the grade specified and shall not be uniformly high or low.

3.6 SWEEPING

- .1 Sweeping shall be done using the same lane closures as the milling operation and all loose material must be removed prior to opening the lane(s) to traffic.
- .2 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand work and brooming as required. No extra payment will be made for sweeping or associated hand work.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This Section does not include local repairs of approach asphalt at Beaver River Bridge. Repair asphalt in accordance with Section 02 41 13 – Asphalt Pavement Removal and Section 32 12 16 - Asphalt Concrete Pavement (EPS).
- .2 This section does not include work for deck soffit patch repairs at Loop Brook Bridge. Complete deck soffit repairs at Loop Brook Bridge in accordance with Section 01 35 33 – Special Procedures for Bridge Rehabilitation.
- .3 This Section does not include partial depth removals (milling) of approach asphalt pavement at Loop Brook Bridge and Cougar Brook Bridge. See Section 02 41 13 – Asphalt Pavement Removal.

1.2 RELATED REQUIREMENTS

- .1 Section 01 35 33 – Special Procedures for Bridge Rehabilitation.
- .2 Section 02 41 13 – Asphalt Pavement Removal
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place concrete
- .5 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks
- .6 Section 32 12 16 – Asphalt Concrete Pavement (EPS)

1.3 MEASUREMENT AND PAYMENT

- .1 Measurement Procedures:
 - .1 Measure removal of barrier concrete at barrier joint locations in cubic metres calculated from neatline dimensions (Beaver River Bridge). Payment shall be made under "**Unit Price Item – Removal of barrier concrete at barrier joints (Beaver River Bridge)**".
 - .1 Removal of barrier joint cover plates will not be measured but considered incidental to the work.
 - .2 Measure removal of concrete at deck and abutments for deck joint installation in cubic metres using depth and width indicated (Beaver River Bridge). Payment shall be made under "**Unit Price Item – Removal of concrete at deck and abutments for deck joint installation (Beaver River Bridge)**".
 - .1 Removal of deck joint assemblies will not be measured but considered incidental to the work.
 - .3 Measure removals for new concrete overlay in square metres of material removed (Loop Brook Bridge and Cougar Brook Bridge). Payment shall be made under "**Unit Price Item – Removals for new concrete overlay (Loop Brook Bridge)**" and "**Unit Price Item – Removals for new concrete overlay (Cougar Brook Bridge)**".

- .1 Unit price to include removal of existing asphalt wearing surface (average thickness up to 90 mm) on bridge deck.
- .2 Unit price to include removal of top portion of deck (cold milling of concrete).
- .3 Unit price to include removal of deck drains.
- .4 Measure removal of concrete curb and steel railing in metres, including concrete end pylons, on deck and abutment wing walls (Loop Brook Bridge and Cougar Brook Bridge). Payment shall be made under **"Unit Price Item – Removal of Concrete Curb and Steel Railing, including End Pylons (Loop Brook Bridge)"** and **"Unit Price Item – Removal of Concrete Curb and Steel Railing, including End Pylons (Cougar Brook Bridge)"**.
 - .1 Include costs for removal of temporary precast concrete barrier on the curb at Loop Brook bridge.
- .5 Measure removal of concrete at wing walls in linear metres to the depth and width indicated (Loop Brook Bridge, and Cougar Brook Bridge). Payment shall be made under **"Unit Price Item – Removal of Concrete at wing walls (Loop Brook Bridge)"** and **"Unit Price Item – Removal of Concrete at wing walls (Cougar Brook Bridge)"**.
- .6 Measure partial depth deck patch repairs in square metres (Beaver River Bridge, Loop Brook Bridge, and Cougar Brook Bridge). Payment shall be made under **"Unit Price Item – Partial Depth Deck Patch Repairs (Beaver River Bridge)"**, **"Unit Price Item – Partial Depth Deck Patch Repairs (Loop Brook Bridge)"**, and **"Unit Price Item – Partial Depth Deck Patch Repairs (Cougar Brook Bridge)"**.
 - .1 Unit price to include costs of concrete removals, surface preparation, and supply and placement of patch repair deck concrete.
 - .1 For Loop Brook Bridge and Cougar Brook Bridge, include supply and placement of patch deck concrete to underside of deck overlay into unit price of partial depth deck removal.
 - .2 For Loop Brook Bridge and Cougar Brook Bridge, include costs for supply and installation of 10M ties as specified on drawings.
- .7 Payment for surface preparation for new concrete materials to be included in above removal items.
- .8 Local excavation and backfilling at the abutments as required to complete wingwall modifications will not be measured but considered incidental to the work (Loop Brook Bridge, and Cougar Brook Bridge).
- .9 Payment for stockpiling and disposal will be included in above removal items.
- .10 All demolished materials are considered waste and to be disposed of outside of the National Parks at a certified construction waste landfill.

1.4 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.

- .2 Department of Justice Canada (Jus)
 - .1 Impact Assessment Act (IAA), 2019.
 - .2 Canadian Environmental Protection Act (CEPA), 1999.
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
 - .4 Motor Vehicle Safety Act (MVSA), 1995
 - .5 Hazardous Substances Information Review Act, 1985
- .3 U.S. Environmental Protection Agency (EPA)
 - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
 - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
 - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 DEFINITIONS

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

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Demolished property shall become Contractor's property and shall be removed from Project site.
- .2 Pre-demolition Meetings:
 - .1 Convene pre-demolition meeting prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work.
 - .3 Co-ordination with other construction subtrades.
- .3 Hold project meetings every week.
- .4 Ensure key personnel attend.
- .5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
- .3 Shop Drawings:
 - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
 - .2 Submit demolition drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
- .4 Prepare and submit a written procedure for removal of concrete curbs, existing asphalt wearing surface, and wing wall tops at least two (2) weeks prior to commencement of Work.
 - .1 Procedure to include descriptions of removal sequences, method, equipment, tools, and containment measures.
- .5 Submit deck surveys completed prior to and after deck scarification/milling.
- .6 Submit drawing indicating identified areas of partial depth deck repairs for review and approval prior to starting removals.

1.8 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, IAA, and applicable Provincial/Territorial and Municipal regulations.
 - .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
 - .2 Standards: Comply with ANSI A10.6 and NFPA 241.
- .2 Regulatory Requirements: Perform work of this Section in accordance with the following:
 - .1 Workers' Compensation Board of British Columbia (WorkSafeBC).
 - .2 Occupational Health and Safety Standards and Programs (WorkSafeBC).

1.9 SITE CONDITIONS

- .1 Environmental protection:
 - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Do not bury rubbish waste materials.
 - .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout project.

- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.
- .8 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .11 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

Part 3 Execution

3.1 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Review Project Reference Drawings and existing conditions of as-built structure.
 - .1 Departmental Representative does not guarantee that existing conditions are the same as those indicated in Project Reference Drawings.
- .3 Measure and record existing bridge pavement marking prior to removals. Use existing layout for pavement marking on finished road surface.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

- .2 Protection of in-place conditions:
 - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, adjacent grades, and parts of existing structure to remain.
 - .1 Provide bracing and shoring as required.
 - .2 Repair damage caused by demolition as directed by Departmental Representative at no additional cost to Owner.
 - .3 Support affected structures and, if safety of structure being demolished, adjacent structures or services, appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
 - .4 Prevent debris from blocking surface drainage system.
- .3 Surface Preparation:
 - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
 - .2 Do not disrupt active or energized utilities traversing premises.
- .4 Prior to beginning of asphalt removal on bridge decks, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.3 DEMOLITION

- .1 Execute demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 Prior to start of Work remove contaminated or hazardous materials as defined by authorities having jurisdiction and as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements. Refer to Existing Conditions in PART 1.
- .5 Demolish parts of structures to permit construction of modifications as indicated on the Contract Drawings:
 - .1 Asphalt milling / asphalt removal in approaches:
 - .1 Mill 50 mm to 75 mm thick asphalt over length of approach from end of deck as specified in accordance with Section 02 41 13 – Asphalt Pavement Removal.
- .6 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
- .7 At end of each day's work, leave Work in safe and stable condition.
- .8 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

- .9 Remove and dispose of demolished materials, except where noted otherwise, and in accordance with authorities having jurisdiction.
- .10 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at the end of each day.

3.4 CONCRETE OVERLAY PREPARATION AND PARTIAL DEPTH DECK REPAIRS (LOOP BROOK BRIDGE AND COUGAR BROOK BRIDGE)

- .1 Survey and reference profile the existing deck prior to removals.
 - .1 Maximum 2 m stations
 - .2 Include 25 m of approach roadways on either end of bridge
 - .3 Additional shots at joint locations and ends of deck
 - .4 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Centreline bridge.
 - .5 Elevations are to be taken perpendicular to centreline
 - .6 Layout points such that they can be re-established within 25mm of their original locations (northing/easting).
- .2 Within each construction zone, deck soffit repairs (Loop Brook Bridge) to be completed prior to cold milling of concrete deck.
- .3 Remove the existing concrete surface by use of scarification (roto-milling), hydro-demolition or alternate methods acceptable to the Departmental Representative, over the full length and width of the bridge deck to provide a minimum 15 mm cover above top layer reinforcement.
 - .1 Submit proposed alternate methods to Departmental Representative at least two weeks prior to Work.
 - .2 Remove asphalt wearing surface before scarification of concrete deck.
 - .1 Prior to removing asphalt wearing surface, measure and record existing bridge pavement marking. Use existing layout for pavement marking on finished road surface.
- .4 Scarification equipment to be capable of concrete removal to an accuracy of +/- 5 mm with a milled surface that does not exceed 10 mm in amplitude for roughness.
 - .1 Mill 20 mm of existing concrete overlay or to within 15 mm of the reinforcing steel, whichever is less.
- .5 Monitor the total depth of concrete cover to the top layer reinforcement using a pachometer or alternate methods acceptable to the Departmental Representative.
 - .1 Readings shall be taken at regular intervals ahead of the scarification.
 - .2 Adjust the rate and depth of concrete removal to ensure that the reinforcing steel is not damaged and the desired scarified profile is achieved.

- .6 Following scarification/milling of the existing deck, survey deck:
 - .1 Maximum 2 m stations
 - .2 Additional shots at joint locations and ends of deck
 - .3 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Hinge point of crown
 - .4 Elevations are to be taken perpendicular to centreline
 - .5 Layout points such that they can be re-established within 25 mm of their original locations (northing/easting).
- .7 Following scarification/milling of the existing deck, carry out a detailed visual inspection of the scarified deck surface.
- .8 Perform a chain drag delamination survey of the entire deck surface in the presence of the Departmental Representative to jointly:
 - .1 Mark all areas of delamination or deterioration requiring further concrete removal with paint.
 - .2 Supply necessary materials to mark out repair areas.
- .9 Keep partial depth repair boundaries square or rectangular and avoid abrupt changes in width of a given repair area.
- .10 Saw cut edges of repair areas to depths as indicated.
- .11 Edge of the repair area to be vertical.
- .12 **Prior to start of removals for partial depth deck repairs, submit drawing indicating identified patch repair locations to EOR (Engineer of Record) for review and approval.**
- .13 Remove deteriorated, delaminated and all patch concrete to sound concrete.
 - .1 If approved by Departmental Representative, remove all concrete to allow a 25 mm space around all exposed reinforcing bars within partial depth repair.
 - .2 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.
- .14 Do not damage existing reinforcing steel during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra costs.
- .15 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Maximum jackhammer weight used on the deck shall be 18 kg.
 - .1 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.

- .2 Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
- .16 Existing exposed reinforcement to be retained:
 - .1 High pressure clean all reinforcement to be retained, as identified on the drawings, to remove all loose concrete and laitance materials.
 - .2 Remove and replace any existing reinforcement with damage resulting in a net section loss of 20% or greater at any location with a new bar of matching diameter or as directed by the Departmental Representative.
 - .1 Use mechanical couplers acceptable to the Departmental representative or lap splice in accordance with CAN/CSA-S6-14, Clause 8.15.9.
 - .2 Mechanical couplers shall develop at least 125% of the specified yield strength of the bar.
- .17 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) clean the surfaces of sub deck prior to the placement of the partial depth repair material to remove all bruised and fractured concrete and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.
- .18 High pressure water blast the surface of the entire concrete sub-deck no earlier than 2 days before placing the overlay concrete.
 - .1 Minimum 110 MPa/15000 psi using a rotating head.
 - .2 Roughness amplitude shall be at least 6 mm.
- .19 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .20 Saturate existing concrete with water, with free standing water removed.
- .21 Prevent detritus from falling onto the adjacent travel lanes, into the water course below or onto the adjacent trail bridge during roughening and cleaning process.
- .22 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 - Environmental Procedures.
- .23 Perform a final inspection of the prepared deck with the Departmental Representative immediately prior to placement of new concrete overlay.
- .24 Supply and placement of partial depth deck concrete and deck concrete shall be in accordance with Section 03 30 00 -Cast-in-Place Concrete and Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

3.5 PARTIAL DEPTH DECK REPAIRS (BEAVER RIVER BRIDGE)

- .1 Includes localized deck repairs adjacent to deck joints.
- .2 Carry out a detailed visual inspection of the deck surface.
- .3 Perform a chain drag delamination survey of the entire deck surface in the presence of the Departmental Representative to jointly:

- .1 Mark all areas of delamination or deterioration requiring further concrete removal with paint.
- .2 Supply necessary materials to mark out repair areas.
- .4 Keep partial depth repair boundaries square or rectangular and avoid abrupt changes in width of a given repair area.
- .5 Saw cut edges of repair areas to depths as indicated.
- .6 Edge of the repair area to be vertical.
- .7 Remove deteriorated, delaminated and all patch concrete to sound concrete.
 - .1 Remove all concrete to allow a 25 mm space around all exposed reinforcing bars within partial depth repair.
 - .2 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.
- .8 Do not damage existing reinforcing steel during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra costs.
- .9 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Maximum jackhammer weight used on the deck shall be 18 kg.
 - .1 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.
 - .2 Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
- .10 Existing exposed reinforcement to be retained:
 - .1 High pressure clean all reinforcement to be retained, as identified on the drawings, to remove all loose concrete and laitance materials.
 - .2 Remove and replace any existing reinforcement with damage resulting in a net section loss of 20% or greater at any location with a new bar of matching diameter or as directed by the Departmental Representative.
 - .1 Use mechanical couplers acceptable to the Departmental representative or lap splice in accordance with CAN/CSA-S6-14, Clause 8.15.9.
 - .2 Mechanical couplers shall develop at least 125% of the specified yield strength of the bar.
- .11 Full depth repairs will only apply when soffit concrete is removed, as instructed by the Departmental Representative.
 - .1 Finished soffit repair concrete to be flush with surrounding soffit concrete.
- .12 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) clean the surfaces of sub deck prior to the placement of the partial depth repair material to remove all bruised and fractured concrete and foreign materials such as

dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.

- .13 Prevent detritus from falling onto the adjacent travel lanes, into the water course below or onto the adjacent trail bridge during roughening and cleaning process.
- .14 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 - Environmental Procedures.
- .15 Supply and placement of partial depth deck concrete shall be in accordance with Section 03 30 00 -Cast-in-Place Concrete and Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

3.6 REMOVALS (OTHER)

- .1 Includes removals of concrete at the following locations:
 - .1 Beaver River Bridge: deck joints and barrier joints.
 - .2 Loop Brook Bridge: concrete curb, end pylons, and wing wall tops.
 - .3 Cougar Brook Bridge: concrete curb, end pylons, and wing wall tops.
- .2 Remove concrete as shown on the drawings.
 - .1 Existing reinforcement to be retained as indicated.
 - .2 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
 - .3 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.
 - .4 Limits of concrete removal shall be outlined by sawcuts.
 - .5 All saw cuts shall be made straight and in accordance with the drawings or as directed by the Departmental Representative.
 - .6 Leaving existing reinforcement intact as indicated.
 - .7 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
 - .8 Trim reinforcement as indicated to satisfy cover requirements.
 - .9 Partially exposed rebar shall be entirely exposed by removal of concrete to a depth of 25 mm behind the bar.
- .3 Supply and place additional rebar where greater than 20% section loss has occurred to the existing reinforcement.
- .4 High-pressure water blast (minimum 35 MPa/5000 psi) clean the surfaces and reinforcement to be retained prior to placement of concrete to remove all bruised and fractured concrete, rust and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.

- .5 Place reinforcing steel in accordance with Section 03 20 00 – Concrete Reinforcing.
- .6 Place concrete in accordance with Section 03 30 00 Cast-in-Place Concrete and Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks and as shown on the drawings.

3.7 WASTE DISPOSAL

- .1 All demolished materials are considered waste and to be disposed of outside the National Parks at a certified construction waste landfill.
- .2 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

3.8 CLEANING

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
- .3 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 03 20 00 - Concrete Reinforcing.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 No measurement will be made under this Section.
- .2 Include formwork costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-O86, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153, Poplar Plywood.
 - .6 CAN/CSA-O325.0, Construction Sheathing.
 - .7 CSA O437 Series, Standards for OSB and Waferboard.
 - .8 CSA S269.1, Falsework and Formwork.
 - .9 CAN/CSA-S269.3, Concrete Formwork.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06- Health and Safety Requirements.
- .3 Submit shop drawings for formwork and falsework.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of British Columbia, Canada.
 - .2 Prepare Shop Drawings in accordance with CSA S269.1 for formwork and falsework.

- .3 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
- .5 Indicate sequence of erection and removal of formwork and falsework.
- .6 Include the following information on falsework Shop Drawings:
 - .1 Longitudinal, lateral, vertical, dead, live and impact loads used in design.
 - .2 Grade of structural steel.
 - .3 Indicate steel posts, girders, beams, connections, bracing and welding, providing sufficient detail for safe performance of falsework.
 - .4 Fully detailed steel frame shoring.
 - .5 Species, grades and sizes of wood.
 - .6 Type and weight of equipment (moving or stationary) supported by falsework.
 - .7 Sequence, methods and rate of concrete placement.
 - .8 Full details and locations of splices.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
- .2 Retain a professional engineer registered or licensed in British Columbia, Canada, with experience in formwork and falsework design of comparable complexity and scope, to perform following services as part of Work of this Section.
 - .1 Design of formwork and falsework.
 - .2 Review, stamp, and design fabrication and erection Shop Drawings, design calculations and amendments.

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 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect formwork from damages.
 - .3 Replace defective or damaged materials with new.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials for recycling.
 - .2 Place materials defined as hazardous or toxic in designated containers.

- .3 Dispose concrete waste in accordance with Section 01 35 43 - Environmental Procedures and as approved by Departmental Representative.
- .4 Divert wood materials from landfill to a composting, recycling or reuse facility as approved by Departmental Representative.
- .5 Divert plastic materials from landfill to a reuse or recycling facility as approved by Departmental Representative.
- .6 Divert unused form release material from landfill to an official hazardous material collections site as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
 - .2 Forms for exposed surfaces, including barriers and deck fascia, shall be new materials, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
 - .3 All form material for exposed surfaces shall be full-sized sheets, as practical.
 - .4 The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in colour.
- .7 Form release agent shall be non-toxic, biodegradable, and low VOC.
- .8 Falsework materials shall conform to CSA-S269.1.

Part 3 Execution**3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 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 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work as shown on the drawings and specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete. If formwork is removed prior to the end of the curing period required by CSA-A23.1/A23.2, the exposed concrete surfaces shall be protected by other accepted method of curing as provided in A23.1/A23.2.
 - .1 Seven (7) days for slabs, decks and other structural members.
 - .2 Three (3) days for abutments, wing walls and barriers.
- .2 Remove formwork when concrete has reached 50% of its design strength or minimum period noted above, whichever comes later.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2 and approval of Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure reinforcing steel in kilograms of steel incorporated into Work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by the Departmental Representative. Payment shall be made under "**Unit Price Item – Reinforcing Steel - Black (Beaver River Bridge)**", "**Unit Price Item – Reinforcing Steel - Black (Loop Brook Bridge)**", and "**Unit Price Item – Reinforcing Steel - Black (Cougar Brook Bridge)**".
 - .2 Measurement for rebar T-heads will be measured in number of T-heads incorporated into Work. Payment shall be made under "**Unit Price Item – Reinforcing Steel – T-Heads (Cougar Brook Bridge)**".
 - .3 Installation of reinforcing bars drilled and anchored into existing concrete will not be measured but considered incidental to the works.
 - .4 All labour and materials required for installation of reinforcing steel including but not limited to tie wire, bolsters, chairs and supports will not be measured but considered incidental to the works.
- .2 No measurement for payment will be made in this section for the hairpins at Loop Brook Bridge – Soffit Repairs. Include costs for hairpins in unit cost for soffit repair, in accordance with Section 01 35 33 – Special Procedures for Bridge Rehabilitation.
- .3 No measurement for payment will be made in this section for the ties at Loop Brook Bridge and Cougar Brook Bridge – Deck Partial Depth Repairs. Include costs for ties in unit cost for deck partial depth repairs, in accordance with Section 02 41 16 Structure Demolition.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A1064 /A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 CSA International

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CAN/CSA-A23.3, Design of Concrete Structures.
- .3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
- .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CSA S6, Canadian Highway Bridge Design Code.
- .3 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, Departmental Representative attend.
 - .1 Verify project requirements.

1.5 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.
- .3 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by the Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
 - .1 Provide Class B lap splice unless otherwise indicated.

1.6 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

- .1 Mill Test Report: submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
- .2 Submit in writing to Departmental Representative proposed source of reinforcement material.

1.7 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, Grade 400W, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Stainless Steel: as indicated.
- .5 T-headed rebars: as indicated.
- .6 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .7 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M.
- .8 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .9 Tie wire: 1.5 mm diameter annealed wire.
- .10 Mechanical splices: subject to approval of Departmental Representative.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain the Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Inform Departmental Representative of proposed source of supplied material.

Part 3 Execution

3.1 FIELD BENDING

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

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain the Departmental Representative's approval of reinforcing material and placement.
- .3 Maintain cover to reinforcement during concrete pour.

3.3 CLEANING

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

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing.
- .3 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure cast-in-place concrete in cubic metres calculated from neat dimensions as indicated. Payment shall be made under the applicable item of "**Unit Price Item – Concrete (Beaver River Bridge)**", "**Unit Price Item – Concrete (Loop Brook Bridge)**", and "**Unit Price Item – Concrete (Cougar Brook Bridge)**".
 - .1 Concrete placed beyond dimensions indicated will not be measured.
 - .2 Supply and installation of joint fillers and joint sealers, Evazote, conduits, junction boxes, asphalt impregnated fibre board, and grout will not be measured but considered incidental to work.
 - .3 No deductions will be made for volume of concrete displaced by reinforcing steel or structural steel.
 - .4 No deductions will be made for volume of concrete less than 0.1 m² in cross sectional area displaced by individual drainage openings.
 - .5 Concrete infill for drain pipes will not be measured but considered incidental to the work.
 - .6 Additional concrete volumes caused by milling deeper than specified will not be measured.
 - .7 No measurement for payment will be made under this section for new concrete for partial depth deck repairs. Include costs in Section 02 41 16 – Structure Demolition.
 - .8 No measurement for payment will be made under this section for surface preparation. Include costs in Section 02 41 16 – Structure Demolition.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

- .4 ASTM C 881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- .5 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .6 ASTM C C1059/C1059M, Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- .7 ASTM C1583 / C1583M, Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
- .8 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .9 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .10 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .11 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .12 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- .2 CSA International
 - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .4 CAN/CSA-G40.20/G20.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
 - .5 CSA S6, Canadian Highway Bridge Design Code.

1.4

Abbreviations and Acronyms

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

- .2 Type CI - with CaO content ranging from 15 to 20%.
- .3 Type CH - with CaO greater than 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one (1) week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor - finishing, forming, concrete producer and testing laboratories attend.
 - .1 Verify project requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Site Quality Control Submittals:
 - .1 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.
 - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
 - .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide the Departmental Representative, minimum four (4) weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .3 At least four (4) weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
 - .1 Changing source of fly ash without written approval of Departmental Representative is prohibited.

- .4 Minimum of four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by the Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .5 Quality Control Plan: provide written report to the Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
 - .2 Deviations to be submitted for review by the Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.9 SITE CONDITIONS

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:
 - .1 Maintain protection equipment, in readiness on Site.
 - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
 - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
 - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
 - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

Part 2 Products**2.1 DESIGN CRITERIA**

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

2.2 PERFORMANCE CRITERIA

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

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUB to CSA A3001.
- .3 Supplementary cementing materials: with maximum 15% Type F fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve all proposed admixtures, including accelerating or set retarding admixtures during cold and hot weather placing. Contractor to submit certified mix design that contains proposed admixture in proposed dosage. Submitted certification to include verification that the proportions selected will produce concrete of the performance specified.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
 - .1 Compressive strength: 20 MPa after 48 hours, 45 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0.01%.
- .8 Evaporation Retarder: to CSA A23.1/A23.2.
 - .1 Departmental Representative to approve use of evaporation retarder. Evaporation retarder will not be permitted to be used as a finishing aid or to be worked into the concrete surface.
- .9 Curing compound: to CSA A23.1/A23.2.
- .10 Soffit repair mortar: as indicated.
- .11 Bonding adhesive: as indicated.
- .12 Premoulded joint fillers:
 - .1 Bituminous impregnated fibre board: to ASTM D1751.

- .13 Epoxy adhesive: as indicated
- .14 Anchor Rods and Anchor Bolts: as indicated.
- .15 Sealant for barrier control joints: as indicated
- .16 Sealant for barrier joints: as indicated

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-XL.
 - .2 Compressive strength at 28 days age: 45 MPa minimum.
 - .3 Intended application: Bridge deck overlay, partial depth deck repairs, wing wall toppings, deck joint blockouts, barriers.
 - .4 Aggregate size:
 - .1 14 mm maximum for bridge deck overlays, partial depth deck repairs, wing walls toppings, and deck joint blockouts.
 - .2 20 mm maximum elsewhere.
 - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .5 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain the Departmental Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

- .4 Pumping of concrete is permitted only after approval of equipment and mix by the Departmental Representative.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain the Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quantity of concrete placed, quality, workability, air content, temperature and test samples taken.
- .10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Holes shall be hammer drilled.
 - .2 No damage permitted to existing reinforcement during drilling. Use pachometer, or alternate method acceptable to the Departmental Representative, to locate existing reinforcement prior to drilling.
 - .3 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and install in accordance with Manufacturer's instructions and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by the Departmental Representative.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by the Departmental Representative.
 - .2 Where approved by the Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by the Departmental Representative.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from the Departmental Representative before placing of concrete.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts and rods:

- .1 Set anchor bolts to templates in coordination with appropriate trade prior to placing concrete.
- .2 Grout anchor rods in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 Drilled holes: to manufacturer's recommendations.
- .3 Protect anchor rod holes from water accumulations, snow and ice build-ups.
- .4 Set rods and fill holes with epoxy adhesive.
- .4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .5 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .1 Schedule:
 - .1 Concrete deck – transverse tined
 - .1 The tining shall create transverse grooves 3 mm wide by 1.5 mm to 3 mm deep at 20 mm centre-to-centre spacing.
 - .2 Concrete deck shall have a steel trowel finish at the gutter, within 300 mm of the inside face of the barrier.
 - .2 Fascia of concrete deck and abutment walls – smooth form finish.
 - .3 Exposed top surfaces of wing walls – floated surface finish.
 - .4 Top and inner surface of barriers – sack rubbed finish.
 - .5 Outer surface of barriers - smooth form finish.
 - .6 Patches to deck soffit – trowel surface finish.
 - .2 Use procedures as reviewed by the Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .6 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the Departmental Representative.
 - .2 When more than once piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form construction and expansion joints as indicated.
 - .4 Install joint filler.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1 to tolerance schedule as indicated.
 - .1 Deck, abutment walls and barriers: less than 3mm gap under a 3m straightedge.

3.4 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 and 28 days.
 - .5 Air and concrete temperature.
 - .6 Other.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by the Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and the Departmental Representative.
- .4 Frequency of testing compressive strength:
 - .1 Not less than two (2) tests for every 35m³ concrete placed, with no fewer than two (2) tests for each class of concrete placed on any one day.
 - .2 A compressive strength test shall consist of a minimum of four standard test specimens, sampled, made, cured, and tested in accordance with CSA Standards.
 - .1 One cylinder shall be tested at 7 days.
 - .2 The 28 day test results shall be the average of the strengths of the remaining three specimens.
- .5 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .6 Frequency of testing for slump, air content, and concrete temperature:
 - .1 Test every load unless approved otherwise by Departmental Representative.
- .7 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .8 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 PROTECTION

- .1 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
 - .2 Do not let walls of shelter touch formwork.

- .3 Provide sufficient space for removal of formwork for finishing.
- .4 Use heating equipment approved by Departmental Representative.
- .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
 - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
 - .2 For concrete abutments: cure at 10 degrees C for additional 4 days.
- .6 Keep concrete surfaces continually moist while protected.
- .7 Provide fogging equipment to allow for mist spray curing before start of deck pour.
- .2 Unformed surfaces: cure with burlap and water.
 - .1 Place two layers of damp burlap on surface of concrete.
 - .2 Overlap each strip by minimum 75 mm and secure against displacement by wind.
 - .3 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .3 Formed surfaces:
 - .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling.

END OF SECTION

Part 1 General

1.1 HIGH-PERFORMANCE STRUCTURAL CONCRETE FOR BRIDGE DECKS INCLUDES

- .1 Concrete deck overlay, partial depth deck patch repairs, deck joint blockouts, and cast-in-place concrete for barriers.

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 16 – Structure Demolition.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete

1.3 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include costs of items in Section 02 41 16 – Structure Demolition and Section 03 30 00 - Cast-in-Place Concrete.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused plasticizers, water-reducing agents and air-entraining agents materials from landfill to official hazardous material collections site as reviewed by the Departmental Representative.
- .4 Unused plasticizers, water-reducing agents and air-entraining agents materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products**2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcement.

Part 3 Execution**3.1 PREPARATION**

- .1 Removal of existing top of deck and preparation of subsurface in accordance with Section 02 41 16 – Structure Demolition.
- .2 Support rail elevation for mechanical bridge deck finisher:
 - .1 Submit for review by Departmental Representative survey of deck surface after removal in accordance with Section 01 33 00 – Submittal Procedures and 02 41 16 – Structure Demolition. Departmental Representative will provide input on setting elevations for rails or headers.
- .3 Partial depth deck patch repair preparation:
 - .1 Preparation/removals in accordance with Section 02 41 16 – Structure Demolition.

3.2 CONSTRUCTION

- .1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete and this section.
- .2 Place concrete at temperature limits to CSA-A23.1/A23.2.
- .3 Do not place concrete:
 - .1 When air temperature is above 22 degrees C.
 - .2 During rain or excessive wind or dust.
 - .3 When conditions, as reviewed by Departmental Representative seem detrimental to concrete.
- .4 When air temperature falls below 5 degrees C, comply with cold weather requirements.
- .5 Place deck concrete between hours of 6:00 p.m. and 10:00 a.m. as reviewed by Departmental Representative.
 - .1 Provide proper lighting for night pours as reviewed by Departmental Representative.
- .6 Maintain temperature of concrete during discharge between 10 degrees C and 18 degrees C unless permitted otherwise by Departmental Representative.
 - .1 Maintain temperature of mix below maximum temperature of 18 degrees C by adding ice to mix which does not alter design water-cement ratio.

- .7 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .8 Immediately prior to placing concrete, thoroughly wet down substrates with clean water with no standing water left prior to placement of concrete.
- .9 Consolidate deck concrete with mechanical vibration even when vibratory drum type finishing machines are used.
- .10 Cast and finish deck with mechanical bridge deck finisher, approved by Departmental Representative.
- .11 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.
- .12 Ensure that experienced finishing machine operators and concrete finishers are provided to finish deck.
- .13 Do not place concrete until rails for support and operation of finishing machines and headers for hand operated strike-off devices are in place and firmly secured.
 - .1 Rails or headers to be of type, and so installed, that no springing or deflection will occur due to weight of finishing equipment and so located that finishing equipment can operate without interruption over entire bridge roadway deck being finished.
 - .2 Extend rails for finishing machines beyond both ends of scheduled length of concrete placement sufficient distance to permit float of finishing machine to fully clear concrete to be placed.
 - .3 Set rails or headers to elevations, with allowance for anticipated settlement, camber, and deflection of falsework, as required to produce bridge roadway deck true to required grade and cross section.
- .14 Immediately prior to placing, check falsework and wedges and make necessary adjustments.
 - .1 Provide suitable means, such as telltales, to readily permit measurement by Departmental Representative of settlement and deflection.
- .15 Place concrete in uniform heading approximately normal to structure centreline, or in case of screed supported on transverse headers, parallel to centreline.
 - .1 Limit rate of placing to that which can be finished before beginning of initial set.
- .16 Immediately after concrete has been placed and consolidated, strike off surface.
 - .1 Correct immediately improper adjustment and operation which results in unsatisfactory consolidation and smoothness.
 - .2 Unsatisfactory performance may be cause for rejection of equipment and removal of concrete in place.
- .17 Following completion of strike off by hand methods, float roadway slab surface longitudinally to smooth uniform surface with hand-operated wood float boards 3.5 to 5 m long, minimum 25 mm thick, minimum 200 mm wide, ribbed and trussed as necessary to provide rigid float, and equipped with adjustable handles at each end.

- .1 Provide adjusting screws spaced at maximum 600 mm centres between float board and rib.
- .2 Maintain float board true to line and free of twist.
- .18 Use floats to remove roughness and minor irregularities left by strike board or finishing machine and to seal concrete surface to approval of Departmental Representative.
- .19 Adjust rails or headers as necessary to correct for settlement or deflection, which occurs during finishing operations.
 - .1 Operate finishing floats from transverse bridges that span area being floated: provide sufficient number and type of bridges, as reviewed by Departmental Representative, to permit operation of floats without undue delay.
 - .2 Provide minimum of two bridges when hand operated float boards are used.
 - .3 When finishing machine is used for longitudinal floating, supply one bridge for use by Departmental Representative.
- .20 Finishing bridge deck slab:
 - .1 When concrete has hardened sufficiently to prevent dislodgement of coarse aggregate particles, give surface transverse tined finish free from porous spots, irregularities, depressions, small pockets or rough spots.
 - .2 Tine freshly placed pavement as soon as practicable after floating.

3.3 PROTECTION

- .1 Protection and curing shall comply with CSA-A23.1/A23.2, including Annex I.
- .2 Unformed surfaces: cure with burlap and water.
 - .1 Burlap must be presoaked by immersing it in water for a period of at least 24 h immediately prior to placing.
 - .2 Place two layers of damp burlap on surface of concrete.
 - .3 Overlap each strip by minimum 150 mm and secure against displacement by wind.
 - .4 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .3 Formed surfaces:
 - .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork is removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.
- .5 Protection and curing for concrete placed between October 01 and May 01 shall additionally comply with cold weather requirements of CSA-A23.1/A23.2 and the following requirements.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.

- .2 Do not let walls of shelter touch formwork.
- .3 Provide sufficient space for removal of formwork for finishing.
- .4 Use heating equipment approved by Departmental Representative.
- .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
 - .1 For initial three (3) days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
 - .2 For superstructure (including concrete deck overlay, partial depth deck patch repairs, deck joint blockouts, and cast-in-place concrete for barriers): maintain concrete at 10 degrees C for additional fourteen (14) days.
- .6 Keep concrete surfaces continually moist while protected.
- .7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 00 – Cast-in-Place Concrete.
- .2 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measure steel for bridge railing in metres of rail incorporated into Work, including posts, brackets, neoprene pads, sealant, anchor bolts, anchor rods, nuts, bolts and washers. Payment will be made under "**Unit Price Item – Structural Steel – Steel Bicycle Railing (Beaver River Bridge)**", "**Unit Price Item – Structural Steel – Steel Bicycle Railing (Loop Brook Bridge)**", and "**Unit Price Item – Structural Steel – Steel Bicycle Railing (Cougar Brook Bridge)**".
 - .1 Unit prices for bridge railings at Beaver River Bridge to include costs for double rail.
- .2 Measure steel for deck joints in metres of joint incorporated into Work, including nuts, bolts, washers and studs. Payment will be made under "**Unit Price Item – Structural Steel – Deck Joints (Beaver River Bridge)**".
 - .1 Include price of strip seal into unit price of deck joint.
 - .2 Unit price at to include cost of barrier joint cover plates, complete with studs and inserts.
 - .3 Trimming of existing plow protection plates at deck joints as indicated is considered incidental to work and will not be measured.
- .3 Measure supply, fabrication, and installation of steel plow protection plate at barriers, including studs, in linear metres. Payment will be made under "**Unit Price Item – Structural Steel – Steel Plow Protection Plate at Barriers (Loop Brook Bridge)**", and "**Unit Price Item - Structural Steel – Steel Plow Protection Plate at Barriers (Cougar Brook Bridge)**".
- .4 Measure supply, fabrication, and installation of deck edge protection angle, including studs, in linear metres. Payment will be made under "**Unit Price Item – Structural Steel – Deck Edge Protection Angle (Beaver River Bridge)**", "**Unit Price Item – Structural Steel – Deck Edge Protection Angle (Loop Brook Bridge)**", and "**Unit Price Item - Structural Steel – Deck Edge Protection Angle (Cougar Brook Bridge)**".
- .5 Measure supply, fabrication, and installation of drip stop at deck soffits in metres of drip stop incorporated into Work, including steel angle, anchors, and epoxy. Payment will be made under "**Unit Price Item – Structural Steel – Drip Stop at Deck Soffit (Loop Brook Bridge)**", and "**Unit Price Item - Structural Steel – Drip Stop at Deck Soffit (Cougar Brook Bridge)**".

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - .3 ASTM F3125/3125M, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
 - .4 ASTM A449M, Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use (Metric).
 - .5 ASTM F1554, Standard Specification for Anchor Bolts, Steel 36, 55, and 105-ksi Yield Strength.
 - .6 ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness.
- .2 CSA International
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S6, Canadian Highway Bridge Design Code.
 - .3 CSA S16, Design of Steel Structures.
 - .4 CSA S269.1, Falsework for Construction Purposes.
 - .5 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
 - .6 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- .3 The Society for Protective Coatings (SSPC)
 - .1 SSPC/NACE Joint Surface Preparation Standard-2012, Waterjet Cleaning of Metals SSPC-SP WJ-4/NACE WJ-4 Light Cleaning.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Prior to start of Work arrange for site visit with the Departmental Representative to examine existing site conditions adjacent to demolition work.
- .2 Hold project meetings every week.
- .3 Ensure key personnel attend.
- .4 The Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .5 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for steel (including mill certificates) and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 Submit shop drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
 - .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 in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Ensure the Departmental Representative has delivery schedules seven (7) days minimum prior to shipping.
- .3 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection so as not to damage fabricated members.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than 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 Replace defective or damaged materials with new.

1.7 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with the Departmental Representative in carrying out inspection and tests required.

Part 2 Products**2.1 MATERIALS**

- .1 Structural steel: to CSA G40.20/G40.21, grade and types as indicated.
 - .1 Leave atmospheric corrosive resistant steel and connections material in unpainted state, include bolts, nuts, washers and weld deposits of compatible weathering characteristics.
- .2 High strength bolts, nuts and washers: to ASTM F3125M, Grade A325M. Bolts to ASTM F3125M, Grade A490M shall be approved by Departmental Representative.
- .3 Anchor bolts, washers and nuts: as indicated.
- .4 Anchor rods: as indicated.
- .5 Welding electrodes: to CSA W48 series.
- .6 Stud shear connectors: to CSA W59, Clause 6 and Annex H.
- .7 Hot dip galvanizing: to ASTM A123/A123M, minimum zinc coating of 600 g/m².
- .8 Deck Joints Assemblies: As indicated.
 - .1 Diameter of bolt connecting armouring angle and clamping plate: 19mm (¾")

2.2 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/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 the 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 the Departmental Representative.

3.2 PREPARATION

- .1 Clean steel surfaces as directed by the Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.

- .3 Work near river banks or embankments in accordance with written instructions from Departmental Representative.
- .4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
 - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
 - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .5 Place anchor bolts and anchor rods at elevations and locations indicated.
 - .1 Protect holes against entry of water and foreign material.
 - .2 Provide heating and protection as directed by Departmental Representative and completely fill space around anchor bolts with grout.
- .6 Prepare areas for field welding in accordance with CSA W59.

3.3 INSTALLATION

- .1 Do falsework in accordance with CSA S269.1.
- .2 Do fabrication and erection of structural steel in accordance with CSA S6, Design of Highway Bridges.
- .3 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CSA G40.20/G40.21, grade 350A steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative or specifically indicated.
 - .3 Weld only at locations indicated.
 - .4 Welding of galvanized steel not permitted. Fabricate prior to galvanizing or remove galvanizing where welding will occur. Repair areas damaged by welding by metalizing per ASTM A780, method A3.
- .4 High strength bolting: in accordance with CSA S6. Use 'turn-of-nut' tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .6 Mark members in accordance with CSA G40.20/G40.21.
 - .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.
- .7 Allowable tolerance for bolt holes:
 - .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
 - .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.

- .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
- .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3

- .5 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .8 Deck Joints:
 - .1 Recess deck joints and barrier joint cover plates as shown on the drawings.
 - .2 Install deck joints in accordance with manufacturer recommendations and as directed by the Departmental Representative.
 - .3 Leak test deck joints following installation to the satisfaction of the Departmental Representative.

3.4 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.
 - .2 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints.
 - .3 Schedule site visits:
 - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
 - .2 Upon completion of the Work, after cleaning is carried out.

3.5 CLEANING

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

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This section consists of work related to the animal pathway (Beaver River Bridge).
- .2 Traffic signage to be in place prior to commencement of work in accordance with Section 01 55 26 – Traffic Control.

1.2 RELATED REQUIREMENTS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 73 00 – Execution.
- .4 Section 31 36 00 – Gabions.
- .5 Section 31 37 00 – Rip-Rap.
- .6 Section 31 11 00 – Clearing and Grubbing.
- .7 Section 32 91 19 – Topsoil Placement and Grading
- .8 Section 32 92 22 – Hydraulic Seeding

1.3 MEASUREMENT PROCEDURES

- .1 Measure design and construction of animal pathway in linear metres of retaining wall constructed. Payment shall be made under **"Unit Price Item – Design and Construction of Animal Pathway (Beaver River Bridge)"**.
 - .1 Include clearing and brushing, excavation, supply and installation of gabions, supply and installation of geotextile, supply and placement of backfill, supply and placement of rip-rap, and construction of transitions into existing embankment underneath bridge deck and at pathway ends.
 - .1 For bid purposes, assume 30 m³ of rip-rap required.
 - .2 Supply, installation, and removal of temporary isolation system in accordance with Section 01 35 43 – Environmental Procedures for placing of rip-rap will not be measured but considered incidental to work.
 - .2 Supply and installation of gabions includes supply and installation of graded stone fill in gabion baskets.
 - .1 Provide wire mesh gabion baskets in accordance with Section 31 36 00 – Gabions.
 - .3 Include costs for shop drawings and detailed design of gabion retaining wall.
 - .1 Design to include all aspects of gabion retaining wall, including but not limited to, gabion baskets, geotechnical design and stability. Details and layout of gabion baskets shown on drawings included in tender package to be considered as conceptual only.

- .2 Required subbase material, and placement and compaction specifications, to be included in design.
- .3 Required backfill material, and placement and compaction specifications, to be included in design.
- .4 Unit costs to include any survey required to complete the gabion retaining wall design.
- .5 Design and provision of temporary slope support (including submission of shop drawings) as required to complete the work considered Contractor's means and methods and no additional payment will be made.
- .6 Unit price to include all costs to complete the Work, including but not limited to, supply, loading, hauling, placing, compacting, water for compaction and drying of specified backfill material, in accordance with the Contract.
- .7 Payment for stockpiling and disposal of excavated soil will be included in above items.
- .8 Stripping, stockpiling, and placement of topsoil on finished slopes in preparation for seeding will not be measured but considered incidental to work.
- .9 Hydraulic seeding of newly exposed excavated slopes and backfill slopes will not be measured but considered incidental to work.

1.4 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C117, Standard Test Method for Material Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600kN-m/m³.
 - .5 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 British Columbia MoTI – 2016 Standard Specifications for Highway Construction.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .4 CSA Group (CSA)
 - .1 CAN/CSA A-3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5 U.S. Environmental Protection Agency (EPA)/Office of Water

- .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Erosion and Sedimentation Control:
 - .1 Submit erosion and sedimentation control plan in accordance with Environmental Protection Plan (EPP).
- .3 Shop drawings for temporary slope support:
 - .1 Submit for review and approval drawings, diagrams or details showing temporary slope support, stamped and signed by a professional engineer registered or licensed in Province of British Columbia, Canada.
 - .2 Submit shop drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
- .4 Shop drawings for animal pathway:
 - .1 Submit for review and approval design drawings, diagrams and details showing pathway structure, sequence of work, supporting structures and underpinning, stamped and signed by a professional engineer registered or licensed in Province of British Columbia, Canada.
 - .1 Drawings to include survey of existing ground and design elevations and backfill slopes for completed pathway.
 - .2 Submit shop drawings for the gabion retaining wall stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
- .5 Plan for isolation systems, in accordance with Section 01 33 00 – Submittal Procedures and Section 01 35 43 – Environmental Procedures.

Part 2 Products

2.1 MATERIALS

- .1 Granular Subbase: granular, free draining material, to meet a minimum BC MoTI 25mm Well-Graded Base Aggregate unless approved otherwise by the Departmental Representative. Material specification and gradation to be included as part of design of gabion wall.
- .2 Granular Backfill: granular, free draining material, to meet minimum BC MoTI Select Granular Sub-base (SGSB) unless approved otherwise by the Departmental Representative. Material specification and gradation to be included as part of design of gabion wall.
- .3 Geotextile filter: non-woven synthetic fibre fabric. Specification to be included as part of design of gabion wall.

Part 3 Execution**3.1 INSTALLATION**

- .1 Construct animal pathway above the high water level except as indicated for new localized rip-rap.
- .2 Complete clearing and brushing in accordance with Section 01 35 43 – Environmental Procedures and Section 31 11 00 – Clearing and Grubbing and only upon approval of Departmental Representative.
- .3 Minimum width of pathway: 1400 mm.
- .4 Place rip-rap in accordance with Section 01 14 00 – Work Restrictions, Section 01 35 43 – Environmental Procedures, and Section 31 37 00 – Rip-Rap.
- .5 Construct animal pathway in accordance with Section 01 35 43 – Environmental Procedures.
 - .1 Include environmental mitigation measures, including provision of temporary isolation system around work area below high water level, including localized rip-rap placement, to ensure no deleterious material enters the waterway.

3.2 EXAMINATION

- .1 Verification of Conditions:
 - .1 Before commencing work verify locations of buried services on and adjacent to site.
- .2 Evaluation and Assessment:
 - .1 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. If required, costs for relocation services associated with the Animal Pathway at Beaver River Bridge will be paid from the Prime Cost Sum.
 - .2 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.
 - .3 Protect existing objects and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

3.3 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Use temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways and water courses, in accordance with the Environmental Protection Plan (EPP) and requirements of authorities having jurisdiction.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are to remain undisturbed.
- .3 Removal:
 - .1 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.
 - .2 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
 - .3 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris as directed by Departmental Representative.

3.4 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.
- .2 Blasting is not permitted.
- .3 Topsoil stripping:
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
 - .3 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .4 Stockpile for reuse on finished slope.
 - .5 Dispose of excess topsoil off site as directed by Departmental Representative.
- .4 Excavate as required to carry out work, in all materials met.
 - .1 Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete.
 - .2 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.

- .3 Fill excavation taken below depths shown without Departmental Representative's written authorization with material approved by the Departmental Representative.

3.5 SITE QUALITY CONTROL

- .1 Fill material and spaces to be filled to be inspected and approved by Departmental Representative.

3.6 BACKFILLING

- .1 Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from Departmental Representative.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Placing:
 - .1 Place backfill and subbase material in 150 mm lifts. Add water as required to achieve specified density.
- .5 Compaction: compact each layer of material to following densities for material to ASTM D698, unless specified greater as part of detailed design for gabion wall:
 - .1 To underside of subbase: 95%.
 - .2 Base and subbase: 100%.
 - .3 Elsewhere: 95%.
- .6 Place topsoil on finished slope and seed in accordance with Section 32 91 19 – Topsoil placement and grading and Section 32 92 22 – Hydraulic Seeding.
- .7 Place rip-rap according Section 31 37 00 – Rip Rap.

3.7 GRADING

- .1 Grade to ensure that water will drain away from walls and roadway, at all stages of construction. Grade to be gradual between finished spot elevations as indicated.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 10 - Cleaning.
 - .1 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 10 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Clearing and Grubbing and disposing of woody debris as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 BC MoTI Standard Specifications for Highway Construction (latest edition).

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement for payment will be made in this section for clearing and grubbing for the Beaver River Bridge laydown area or Animal Pathway. Include costs for clearing in these areas in "**Lump Sum Price Item – Mobilization / Demobilization**" and "**Unit Price Item – Design and Construction of Animal Pathway**", respectively.
 - .1 Items considered incidental to the Work include, but are not limited to:
 - .1 Loading, hauling and disposal of clearing and grubbing waste.
 - .2 Overhaul.
 - .3 Bird surveys must be completed and current for all Works on previously felled timber and grubbing areas in accordance with Section 01 35 43 - Environmental Procedures, when Work is to occur outside of the least risk window. Bird surveys must be completed by a Registered Professional Biologist.
 - .4 Removal and disposal of previously felled timber.
 - .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Mobilization and demobilization required for this Work shall be incidental to "**Lump Sum Price Item – Mobilization / Demobilization**", and no additional payment will be made.
 - .3 Traffic Control required for this Work shall be incidental to "**Lump Sum Price Item – Traffic Control**" and no separate payment will be made to the Contractor.

1.4 DEFINITIONS

- .1 Flush cutting consists of cutting trees, stumps or vegetative growth to within 100 mm of the ground, leaving the root structure undisturbed and disposing of felled trees, previously uprooted trees, stumps and clearing wood debris as specified.
- .2 Clearing consists of cutting trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees, stumps, and clearing wood debris as specified.
- .3 Grubbing consists of excavation and disposal of stumps, roots and wood debris to a depth of 0.6m below the ground line.

- .4 Chipping consists of chipping wood debris, except merchantable timber, into wood chips. Finished wood chip material shall be able to pass through a 100 mm by 100 mm screen.
- .5 Merchantable timber is all timber with butt diameter in excess of 150 mm and top down to 100 mm.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.

1.6 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

1.8 PROTECTION

- .1 Prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees that are to remain.
 - .1 No grubbing to be completed with 1m of the tree drip line.
- .2 Repair any damaged items to approval of Departmental Representative.
- .3 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.
- .4 Contractor shall take all measures to ensure that trees do not fall into streams, rivers, wetlands or water bodies or outside the clearing limits as marked by colored flagging. Work within a 30 metre buffer of watercourses, water bodies or wetlands to be in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Trees inadvertently felled into streams, rivers, watercourses or outside the clearing limits shall be removed by means (e.g. winch) so as not to damage the substrate or any standing trees left outside the clearing limits. Machinery shall not go outside the clearing limits, or into streams, rivers, watercourses or water bodies to remove felled trees.
- .6 Logs and other salvage materials are to be conveyed to and placed at the storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.
- .7 During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport.
- .8 No slash clearing, pickup or grubbing shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .9 Existing areas of vegetation disturbed as a result of this Contract shall be rehabilitated using approved topsoil from the Park and a native grass seed mix as specified in Section 32 92 22 – Hydraulic Seeding.

Part 2 Products**2.1 NOT USED.****Part 3 Execution****3.1 PREPARATION**

- .1 Inspect site and verify with Departmental Representative, items designated to remain.
- .2 Contractor shall not commence with grubbing until extent marked out and approval to proceed has been granted by the Departmental Representative.

3.2 CLEARING

- .1 Clear as directed by Departmental Representative by cutting trees and vegetative growth.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .4 All clearing shall be felled in such a manner that surrounding vegetation is preserved along the construction limits. Stumps remaining within 3.0 metres of cleared perimeter are to be cut flush with ground and vegetative mat left undisturbed.

3.3 GRUBBING

- .1 Grub out stumps and wood debris including roots and embedded logs up to a depth of 0.6m below the ground surface.
- .2 Grubbing ripper teeth depth shall be kept as shallow as possible to minimize contamination of topsoil with subsoils. This may require individual ripping of stumps in some locations. In addition, while removing stumps, roots or embedded logs, the Contractor shall shake them on site to remove as much soil as possible.

3.4 REMOVAL AND DISPOSAL

- .1 All cleared and grubbed wood and vegetative materials, excluding merchantable timber, shall be loaded, hauled and disposed of outside of the National Park at a disposal site as agreed with the Departmental Representative at the Contractor's expense.
- .2 Merchantable timber shall remain property of PCA and should be cut at the base to the maximum suitable length.
- .3 Burning of woody debris is not permitted.
- .4 Contractor is responsible for ensuring weights and dimensions of all haul vehicles meet all applicable regulations.

3.5 FINISHED SURFACE

- .1 In areas of grubbing, leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.

- .2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.
- .3 Finished surface requirements:
 - .1 Refer to Best Management Practices “Vegetation Removal Mitigations Module”.
 - .2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed unless otherwise directed by the Departmental Representative.
 - .3 Where possible, vegetative debris should not be left to accumulate on site and must either be burned or chipped.
 - .4 Chips cannot exceed two inches in depth to a maximum coverage of 5% ground cover.
 - .5 Where accessible, all stems suitable for firewood should be removed from site, hauled and stockpiled at a location designated by the Departmental Representative.
 - .6 At inaccessible sites or for trees with little firewood value, no more than 50 stems per linear kilometer may be left on site. A stem is defined as any tree with a diameter at breast height (DBH) greater than 15 centimeters.
 - .7 All retained stems must be limbed and lie flush to the ground.
 - .8 Accumulation of fine wood y fuels is of greatest concern from both a fire management and vegetation re-growth perspective. Fine fuel accumulation cannot exceed 10% ground cover and must be less than 10 centimeters in depth. Fine woody fuels have a diameter less than 3 centimeters.
 - .9 Medium fuels may accumulate to a maximum of 20% ground cover and shall not exceed 20 centimeters in depth. Medium fuels have a diameter ranging from 3 centimeters to 7 centimeters
 - .10 Mechanically distributed areas must be seeded with an approved native grass seed mix within 6 months of project completion.
 - .11 Ground disturbance must be kept to a minimum. Off-highway mechanical equipment must have tire pressure of 7 psi or lower.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 31 00 99 - Earthwork for Minor Works

1.2 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include cost of items in Section 31 00 99 - Earthwork for Minor Works.

1.3 ACTION AND INFORMATION SUBMITTALS

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

1.4 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A313/A313M, Standard Specification for Stainless Steel Spring Wire.
 - .2 ASTM A764, Standard Specification for Metallic Coated Carbon Steel Wire, Coated at Size and Drawn to Size for Mechanical Springs.
- .2 CSA Group (CSA)
 - .1 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert left over aggregate material from landfill to a local facility as approved by Departmental Representative and outside of National Parks.
- .4 Divert left over metal materials to a local recycling facility as approved by Departmental Representative and outside of National Parks.
- .5 Divert left over geotextiles from landfill to a local plastic recycling facility as approved by Departmental Representative and outside of National Parks.

Part 2 Products**2.1 MATERIALS**

- .1 Gabion baskets:
 - .1 Factory fabricated so that sides, ends, lid and internal diaphragms can be readily assembled at site into rectangular baskets of sizes as indicated.

- .2 Single unit construction or with joints having strength and flexibility equal to that of mesh.
- .3 Provide diaphragms of same mesh as gabion walls, when length exceeds horizontal width. Diaphragms to divide basket into equal cells of length not to exceed horizontal width.
- .4 Wire mesh gabions:
 - .1 Wire mesh: uniform hexagonal pattern wire woven in triple twist pattern with openings of approximately 80 x 100 mm, non-ravelling.
 - .2 Securely selvedge perimeter edges to form joints connecting selvedges with same strength as mesh body.
 - .3 Wire to have following dimensions:
 - .1 Mesh: 3.0 mm diameter.
 - .2 Selvedges: 3.8 mm diameter.
 - .3 Binding: 2.0 mm diameter.
 - .4 Wire: hot dip galvanized with minimum coverage of 260 g/m² to CAN/CSA G164.
 - .5 Interlocking wire fasteners: galvanized steel to ASTM A764, finish 1, class 1, type 3.
- .5 Gabion infill material:
 - .1 Hard, durable, abrasion resistant, capable of resisting degradation from action of wetting and drying, wave action, freezing and thawing cycles.
 - .2 Minimum 100 mm to maximum 200 mm dimension for individual stones.
 - .3 Stone fill material used in construction of gabion structure shall match stone fill material utilized in the design of the structure.

Part 3 Execution

3.1 INSTALLATION

- .1 Install gabions and geotextiles in accordance with Section 31 00 99 – Earthwork for Minor Works. Follow manufacturer's instructions in assembling baskets.
- .2 Excavate for and backfill behind gabions in accordance with Section 31 00 99 – Earthwork for Minor Works.

3.2 PLACING GABIONS

- .1 Wherever possible, place baskets in position prior to filling with stones.
- .2 Join adjacent baskets together at corners as recommended by manufacturer, to ensure joints are as strong as mesh.

3.3 FILLING BASKETS

- .1 On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce satisfactory alignment and appearance.
- .2 For wire mesh gabions, fill gabion cells in lifts not to exceed 300 mm and connect opposite walls with two tie wires after each lift.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Supply and installation of Riprap for the Animal Pathway at Beaver River Bridge.

1.2 RELATED REQUIREMENTS

- .1 Section 31 00 99 – Earthwork for Minor Works.

1.3 REFERENCES

- .1 BC MoTI Standard Specifications for Highway Construction (latest edition).

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement for payment will be made under this section for supply and placement of Riprap at the Animal Pathway (Beaver River Bridge).
 - .1 Include full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals, necessary to complete the work as specified in the Contract Documents in Section 31 00 99 – Earthworks for Minor Works.
 - .1 Include costs for provision of temporary isolation system for placement of riprap in accordance with Section 01 35 43 – Environmental Procedures and Section 31 00 99 – Earthworks for Minor Works.
 - .2 Suitable riprap material to be sourced from outside National Park.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.6 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove materials defined as hazardous or toxic and dispose of outside of the Parks.

Part 2 Products**2.1 STONE**

- .1 Hard, dense stone with specific gravity not less than 2.60, durable quarry stone, free from seams, cracks or other structural defects, to meet following Class for use intended:
 - .1 No sandstone or field stone will be permitted.
 - .2 Only non-acid generating and non-metal leaching rock is suitable.

- .3 Riprap for Animal Pathway at Beaver River Bridge:
 - .1 BC MoTI Class 25-100 Riprap to suit field conditions.
- .2 Suitable Riprap material to be sourced from outside of the Parks.

Part 3 Execution

3.1 INSTALLATION OF RIPRAP

- .1 Contractor shall do the layout for placement of Riprap.
- .2 Place riprap to thickness and details as indicated.
- .3 Pace stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
- .4 Hand placing:
 - .1 Use larger stones for lower courses and as headers for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface evenly, free of large openings and neat in appearance.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 16 – Asphalt Paving.

1.2 DESCRIPTION

- .1 Supply and application of a liquid asphalt to ensure a bond between the surface being paved and the Asphalt Concrete Pavement lift, in accordance with the Contract Document and as directed by the Departmental Representative.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D140, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
- .3 BC MoTI - Standard Specifications for Highway Construction (latest edition)

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement for payment will be made in this section. Supply, delivery and application of tack coat will not be measured separately and will be incidental to “**Unit Price Item – Asphalt Concrete Pavement – EPS (Loop Brook Bridge)**”, and “**Unit Price Item – Asphalt Concrete Pavement – EPS (Cougar Brook Bridge)**” and shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

1.5 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt tack coat and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit two 1 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth bottles made with plastic to Departmental Representative, at least 2 weeks prior to beginning Work.
- .4 Sample asphalt tack coat material to: ASTM D140.
- .5 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.6 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused asphalt materials to facility capable of recycling materials outside of the National Parks.

Part 2 Products**2.1 MATERIALS**

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.
- .2 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Pressure distributor to be designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .5 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .6 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .7 Equipped with an easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
 - .8 Equipped with accurate volume measuring device or calibrated tank.
 - .9 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

- .10 Equipped with nozzle spray bar, with operational height adjustment.
- .11 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

- .1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.
- .2 Apply asphalt tack coat only on clean and dry surface.
- .3 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method accepted by Departmental Representative.
- .4 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, of 0.5 L/m² plus or minus 0.2 L/m².
- .5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .6 Do not apply asphalt tack coat when air temperature is less than 10 degrees Celsius or when rain is forecast within 2 hours of application.
- .7 Apply asphalt tack coat only on unfrozen surface.
- .8 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
 - .1 Control traffic in accordance with Section 01 55 26 – Traffic Control.
- .10 Keep traffic off tacked areas until asphalt tack coat has set.
- .11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .12 Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 14 – Asphalt Tack Coat.
- .2 Section 32 17 23 – Pavement Marking.

1.2 DESCRIPTION

- .1 Work shall consist of supplying, loading, hauling and placing BC MoTI Medium Mix Class 1 Asphalt Concrete Pavement (EPS) as per the Contract Documents, or as directed by the Departmental Representative
- .2 For the asphalt mix, asphalt aggregate used shall consist of a 16 mm Medium Mix Asphalt Aggregate in accordance with BC MoTI – Standard Specifications for Highway Construction Section (latest edition), Section 502 – Asphalt Pavement Construction (EPS).
- .3 Asphalt Cement used shall be PG 58-37 in accordance with BC MoTI – Standard Specifications for Highway Construction (latest edition), Section 502 – Asphalt Pavement Construction (EPS)
- .4 Recycled Asphalt Pavement (RAP) will be permitted in the asphalt pavement mix design in accordance with this Section.
- .5 Perform and submit mix designs for BC MoTI Class 1 Asphalt Concrete Pavement using Asphalt Cement PG 58-37 and 16mm Asphalt Aggregate. Mix design is subject to acceptance by the Departmental Representative.
- .6 Acceptance and/or rejection of all placed Asphalt Concrete Pavement shall be determined in accordance with the End Product Specifications.

1.3 REFERENCES

- .1 BC MoTI - Standard Specifications for Highway Construction (latest edition)

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Asphalt Concrete Pavement
 - .1 Measure for payment of Asphalt Concrete Pavement will be in tonnes by scale tickets submitted to and accepted by the Departmental Representative in accordance with the Contract Documents.
 - .2 Payment for accepted Asphalt Concrete Pavement at Beaver River Bridge will be made under "**Unit Price Item – Asphalt Concrete Pavement (Repair of Approach Asphalt at Abutment Back Walls) (Beaver River Bridge)**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

- .3 Payment for accepted Asphalt Concrete Pavement at Loop Brook Bridge and Cougar Brook Bridge will be made under “**Unit Price Item - Asphalt Concrete Pavement (EPS) – BC MoTI Class 1 – 16mm Medium Mix Asphalt Concrete (Loop Brook Bridge)**” and “**Unit Price Item - Asphalt Concrete Pavement (EPS) – BC MoTI Class 1 – 16mm Medium Mix Asphalt Concrete (Cougar Brook Bridge)**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Unit Price Adjustments
 - .1 Applicable unit price payment adjustments (additions or subtractions as applicable) shall be in accordance with BC MoTI – Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS).
 - .1 With the exception of:
 - .1 Any current Special Provisions.
 - .2 Smoothness testing to be arranged by the Departmental Representative.
 - .3 Application Rate unit price payment adjustments to be in accordance with BC MoTI - Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS).
 - .4 Applicable unit price adjustments for Level Course shall apply only for Asphalt Content and Gradation.
 - .2 Payments shall be under “**Lump Sum Price Item – Prime Cost Sum**”.
- .3 Reclaimed Asphalt Pavement
 - .1 Production and usage of Reclaimed Asphalt Pavement (RAP) shall be considered incidental to “**Unit Price Item – Asphalt Concrete Pavement – EPS**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Production of asphalt aggregate.
 - .2 The movement of equipment and crew.
 - .1 A move is defined as the Contractor moving equipment and crew to the next section to pave after having completed, in its totality, the previous section.
 - .3 Cleaning of existing pavement prior to paving, whether via sweeping or other methods.
 - .4 Survey and layout for asphalt concrete paving.
 - .5 Preparing asphalt mix designs (including anti-stripping test), in accordance with Section 01 45 00 Quality Control and Section 01 33 00 Submittal Procedures.
 - .6 Supply, delivery and incorporation of asphalt cement.

- .7 Anti-stripping agent(s) and other additives, if required and accepted by the Departmental Representative.
- .8 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor.
 - .1 Contractor shall provide a scale person, as required, at their cost.
- .9 Asphalt Concrete Pavement placing at milled tie-in locations
- .10 Cleaning of existing pavement shoulder, whether via sweeping or other methods
- .11 Temporary and final lane marking, including but not limited to survey and layout and removal of temporary markings.
- .12 Repair or removal and replacement of incorrect pavement markings as directed by the Departmental Representative.
- .13 Adjustment of existing catch basin grates and manhole lids as accepted by the Departmental Representative
- .14 Sloped paved shoulders as described in this Section.
- .15 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures
- .16 Collection, storage, removal and disposal of asphalt plant dust outside of the National Parks.
- .17 Overhaul.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item - Traffic Control”** and no separate payment will be made to the Contractor.
- .6 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item – Mobilization / Demobilization”** and no additional payment will be made.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

- .1 PG 58-37 Asphalt Cement shall be used.
- .2 Asphalt Aggregate:
 - .1 Materials used shall be in accordance with BC MoTI – Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS) (latest edition)
 - .2 BC MoTI Class 1 – 16mm Medium Mix Asphalt Aggregate is to be supplied from outside the Park.

- .3 Reclaimed Asphalt Pavement (RAP):
 - .1 RAP to be processed by crushing and/or screening into a consistent material with uniform gradation, AC content and other properties prior to being utilized in accordance with the BC MoTI Standard Specifications for Highway Construction (latest edition), Section 502 – Use of Reclaimed Asphalt Pavement in Asphalt Pavement Construction.
 - .2 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 10% in accordance with BC MoTI Section 505 (SS 505) Category A Road Classification and as approved by the Departmental Representative.
 - .3 Only RAP sourced from the TCH shall be considered Classified RAP and no Unclassified RAP will be permitted.
 - .4 The Contractor shall fulfill or exceed the requirements of SS 505 Appendix 1 – RAP Management Best Practices for the management of RAP materials from the time of collection through processing, mix design, and quality control practices during the production of asphalt mixtures containing RAP as confirmed through the Contractor's Quality Control documentation.
 - .5 RAP testing is required in accordance with SS 505.07 Quality Control.
 - .6 The Contractor shall process and crush the RAP so as to ensure compliance with all gradation requirements of their approved Job Mix Formula.
- .4 All additives (including anti-stripping agents) to be in accordance with the Approved Products List as published by BC MoTI.

Part 3 Execution

3.1 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Contractor is responsible for all Quality Control required in accordance with BC MoTI–Standard Specifications for Highway Construction Section 502 - Asphalt Pavement Construction (EPS) (latest edition) and Section 01 45 00 – Quality Control.
- .3 Contractor is to provide a full time Road Checker during all times of asphalt placement that shall be responsible for providing a daily Road Checker's Summary in accordance with BC MoTI –Standard Specifications for Highway Construction Section 502 - Asphalt Pavement Construction (EPS) (latest edition).
- .4 The Road Checker's Summary shall be provided to the Departmental Representative no less than 24 hrs after the relevant shift end.
- .5 To assist in the Road Checker's role, the Contractor shall layout and stake stations at the appropriate intervals to achieve the desire accuracy throughout the Work Site. All survey and marking stakes shall be removed prior to completion of the Works.
- .6 The method of tests for asphalt appeal samples shall be the same method of tests conducted as during Quality Control / Quality Assurance testing.

3.2 METHODOLOGY

- .1 ACP placement:
 - .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when rain is forecasted.
 - .2 Asphalt concrete mix shall be placed only on clean, dry, and unfrozen surfaces.
 - .3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:
 - .1 in a single lift when the design compacted total thickness is 75 mm or less.
 - .2 in two or more lifts when the design compacted total thickness is greater than 75 mm. The lift thickness selection shall be determined by the Contractor except that:
 - .1 the maximum thickness of any lift shall be 75 mm.
 - .2 the minimum thickness of a final lift shall be 50 mm.
 - .3 On widenings, the thickness of asphalt concrete mix up to 75 mm may be placed in one lift. Over 75 mm thickness, the asphalt concrete shall be placed in two or more lifts.
 - .4 A pickup machine shall be used for all mainline highway lane paving.
- .2 The edge of pavement shall have sloped paved shoulders following the existing side slope for the length of the paving limits, except where there is guardrail or concrete barrier, and shall be constructed in conjunction with all lifts of ACP, as shown in the Contract Documents or as directed by the Departmental Representative.

3.3 EQUIPMENT, PLANT AND MIXING REQUIREMENTS

- .1 Execution of the Work shall be in accordance with BC MoTI - Standard Specifications for Highway Construction (latest edition), Section 502 – Asphalt Pavement Construction (EPS) and Section 504 – Pavement Drainage.
- .2 The Contractor will not be permitted to setup a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project in the National Park.
- .3 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling ponds or drainage system will not be permitted. In addition, Asphalt plant must comply with all environmental pollution control regulations applicable in the asphalt plant area. The plant operator must make daily inspections of the emission control components, to ensure proper working order and provide the most recent stack monitoring results for viewing by the Departmental Representative or their designate.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
- .2 Section 32 12 16 – Asphalt Concrete Pavement (EPS).

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Pavement marking including reflective glass beads will not be measured for payment and is considered incidental to the work.

1.3 REFERENCES

- .1 CAN/CGSB-1.5-M99 Low Flash Petroleum Spirits Thinner.
- .2 CGSB1-GP-12C-83 Standard Paint Colours.
- .3 CGSB1-GP-71-83 Method, of Testing Paints and Pigments.
- .4 CAN/CGSB 1.74-01 Alkyd Traffic Paint.
- .5 U.S. FED-STD-595B, 1989 – Colours Used in Government Procurement.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 BC MoTI Standard Specification for Highway Construction (current edition)

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 – Health and Safety Requirements and Section 01 35 43 – Environmental Procedures.
- .3 Submit to Departmental Representative following material sample quantities in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Two samples of each type of paint.
 - .2 One sample of glass beads.
 - .3 Sampling to CGSB1-GP-71.
- .4 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 The Contractor is responsible for quality control inspection throughout every stage of the Work to ensure that equipment, materials and workmanship comply with the requirements of the Contract Documents.
- .3 The Contractor to include in the Quality Control Plan actions to address all the elements that affect the quality of the line painting including, but not limited to:
 - .1 Paint Application Rates.
 - .2 Glass Bead Application Rates.
 - .3 Pavement Surface and Atmospheric Conditions.
 - .4 Line Widths, Line Lengths and Space Lengths.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products**2.1 MATERIALS**

- .1 Paint:
 - .1 To CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint.
 - .2 Colour: to FED-STD-595B, yellow 33538 and white 37925.
 - .3 Upon request, Departmental Representative will supply a qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to CAN/CGSB-1.4-2000.
- .3 Glass beads:
 - .1 Overlay type: to CGSB1-GP-74M.

2.2 DELIVERY, STORAGE AND HANDLING

- .1 Storage and handling shall meet the requirements of Section 01 35 43 - Environmental Procedures and Section 02 81 01 - Hazardous Materials.
- .2 The Contractor shall make all arrangements for the supply and delivery of paint and glass beads and shall provide the Departmental Representative with records of all materials received and/or returned, on a daily basis.
- .3 The Contractor shall provide, maintain and reclaim all material storage sites.
- .4 No paint formulation shall be diluted or mixed with a different formulation or with any other material, without the specific approval of the Departmental Representative.
- .5 The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.

- .6 The Contractor shall be responsible for the proper clean-up of waste or spilled material, and the proper disposition of containers.

Part 3 Execution

3.1 TEMPORARY MARKINGS

- .1 The Contractor shall supply and place temporary line markings on newly constructed hard surfaces (pavement, sealcoat, etc.) throughout the project, re-establishing centreline and all lane-dividing lines prior to being opened to traffic, and shall maintain such markings until the earlier of the Actual Completion Date or the date Permanent markings have been placed. Temporary line markings are not required for lane edge lines (fog lines) unless otherwise directed by the Departmental Representative.
- .2 Temporary line markings must be placed on an offset from the permanent lane marking and must be removed once permanent markings are in place.
- .3 Centreline of undivided highway shall be marked throughout as “no passing” unless otherwise directed by the Departmental Representative.
- .4 Painted temporary lines are not permitted on the final surface.
- .5 Pavement markings for traffic detours shall be in accordance with Part 2 Products.

3.2 PERMANENT MARKINGS

- .1 Original pavement marking to be re-established.
 - .1 Prior to any work affecting pavement markings, the Contractor shall pick-up survey all key control points of existing markings at intersections, turn slots, exit tapers and similar features and, upon completion of the final hard surfacing, re-establish those points, unless shown otherwise in the Contract Documents or directed by the Departmental Representative.
- .2 Further to the key control pick-up, the Contractor shall also pick-up survey all Transverse and Chevron and Crosshatch Pavement Markings and upon completion of the final hard surfacing, re-establish those points, unless shown otherwise on the IFC drawings or directed by the Departmental Representative.
- .3 All layout markings shall be done with white or yellow centreline paint which will be clearly visible after exposure to all Site Conditions for a minimum period of two (2) months past the Actual Completion Date.
- .4 Key control points shall be marked at their design location within tolerances of $\pm 50\text{mm}$ transversely and $\pm 100\text{mm}$ longitudinally. Longitudinal tolerances for intermediate points, when required, are $\pm 10\text{mm}$.
- .5 Permanent pavement markings are to be reinstated within two (2) weeks of paving completion, or earlier as acceptable to the Departmental Representative.

3.3 TOLERANCE

- .1 All painted lines shall not exceed a dimensional width of 110 mm for specified 100 mm wide line. No tolerance below 100 mm is allowed for the specified 100 mm wide line.
- .2 All painted lines shall not exceed a dimensional width of 210 mm for specified 200 mm wide line. No tolerance below 200 mm is allowed for the specified 200 mm wide line.
- .3 All painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 3 m length of line.
- .4 All spaces between painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 6 m or 3 m length of space.
- .5 All paint shall be applied at the proper locations in accordance with the Contract Documents or as directed by the Departmental Representative.
- .6 All paint and glass beads shall be uniformly applied.
- .7 All painted lines shall be uniform in thickness and free of tire tracking, with no splatter, excessive overspray or other defects.
- .8 Remove incorrect markings as directed by the Departmental Representative at Contractor's cost.
 - .1 Blackout painting for incorrect lane marking will not be permitted. Incorrect paint work must be eradicated and re-painted by method approved by the Departmental Representative.

3.4 EQUIPMENT REQUIREMENTS

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- .2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

3.5 CONDITION OF SURFACES

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.6 APPLICATION

- .1 Pavement markings to be laid out by Contractor.
- .2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 h.
- .3 Apply traffic paint evenly at rate of 3 L/m².
- .4 Do not thin paint.
- .5 Paint lines to be of uniform colour and density with sharp edges.

- .6 Thoroughly clean distributor tank before refilling with paint of different colour.
- .7 Apply glass beads at rate of 200 g/m² of painted area immediately after application of paint.

3.7 REMOVAL, REPAIR OR REPLACEMENT OF UNACCEPTABLE PAVEMENT MARKINGS

- .1 All painted lines that do not meet the requirements of the Contract Documents shall be removed and correctly applied or repaired by the Contractor.
- .2 In cases where the paint is "tracked" by vehicles tires, the lines may be repaired by reapplying paint and glass beads to the damaged areas.
- .3 In cases where incorrectly painted lines need to be removed, the Contractor shall use methods and equipment that will totally eliminate the pattern of the lines without damaging the integrity of the pavement surface. The methods and equipment used for such work shall be reviewed and accepted by the Departmental Representative prior to their use. Obliterating incorrectly painted lines through the sole use of paint, liquid asphalt, slurry seal or other similar materials will not be permitted.
- .4 No additional payment will be made to the contractor for repair or re-work due to any reason.

3.8 HIGHWAY OPERATION

- .1 Highway operation shall be in accordance with the Contractor's accepted Traffic Management Plan and shall meet the following requirements:
 - .1 General
 - .1 Painting shall be carried out in accordance with Section 01 14 00 - Work Restrictions and Section 01 55 26 – Traffic Control.
 - .2 Operation of the painting truck against the flow of traffic will not be permitted.
 - .3 Loading glass beads or paint onto the painting truck is not permitted on a roadway surface.

3.9 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Topsoil to be native organic soils stripped from the Contract Work area and placed on finished slopes from stockpile(s) as directed by the Departmental Representative.

1.2 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .4 BC MoTI Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include cost of items in Section 31 00 99 – Earthwork for Minor Works.
 - .2 Items considered incidental to the Work include, but are not limited to:
 - .1 Preparing the finished grade.
 - .2 Loading and hauling from stockpiles.
 - .3 Placing and fine grading.
 - .4 Preparing the topsoil materials for planting.
 - .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .3 If required, payment for testing of topsoil to be paid under **“Lump Sum Price Item - Prime Cost Sum”**.
- .4 Payment for supply and application of soil amendments will be paid under **“Lump Sum Price Item – Prime Cost Sum”**.
- .5 Traffic Control shall be incidental to **“Lump Sum Price Item – Traffic Control”** and no additional payment will be made.
- .6 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item Mobilization/ Demobilization”** and no additional payment will be made.

1.4 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.
- .2 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 – Environmental Procedures.
- .2 Divert unused soil amendments from landfill to official hazardous material collections site, outside of the Parks, as approved by Departmental Representative.
- .3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 TOPSOIL**

- .1 Unless otherwise approved by the Departmental Representative, topsoil is to be sourced from onsite stripping and no topsoil from outside of the Park will be permitted.
- .2 Topsoil for seeded areas and planting beds: mixture of particulates, microorganisms and organic matter that provides suitable medium for supporting intended plant growth.
 - .1 Native topsoil to be stripped from on-site sources.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 100 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

2.2 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.
- .3 Contractor is responsible for amendments to supply topsoil as specified.
- .4 Soil testing by recognized testing facility for PH, P and K, and organic matter.

- .5 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
- .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENT CONTROL

- .1 In accordance Section 01 35 43 – Environmental Procedures
- .2 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris that protrudes more than 75mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area that is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL / PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 100 mm.
- .3 Spread topsoil as indicated to following minimum depths after settlement.
 - .1 100 mm for seeded areas.

- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
- .2 Prepare loose friable bed by means of cultivation and subsequent raking.
- .3 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
- .4 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

- .1 Topsoil not required is to be stockpiled at locations as directed by Departmental Representative.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Supply and application of Hydraulic Seeding to complete the work in accordance with the Contract Documents and as directed by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include cost of items in Section 31 00 99 – Earthwork for Minor Works.
 - .1 Items considered incidental to the Work include, but are not limited to:
 - .1 Areas of blending into existing landscape will not be measured for payment.
 - .2 Maintenance.
 - .3 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item – Mobilization / Demobilization**”, and no additional payment will be made.
- .3 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item – Traffic Control**” and no separate payment will be made to the Contractor.

1.3 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data
 - .1 Provide product data for:
 - .1 Seed
 - .2 Mulch
 - .3 Tackifier/Soil Stabilizer
 - .2 Submit in writing to Departmental Representative prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties to be provided to the Departmental Representative.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Use all means necessary to protect all materials before, during and after installation. Provide adequate protection to materials that may deteriorate if exposed to weather.
- .2 Seed to be stored in dry weatherproof place and shall be protected from damage by heat, rodents and other causes. Deliver and store grass seed in original packages with label indicating:
 - .1 Analysis of seed mixture;
 - .2 Percentage of pure seed by weight;
 - .3 Year of production;
 - .4 Net mass, and
 - .5 Date tagged and location.

Part 2 Products**2.1 SEED**

- .1 Seed shall be Certified Canada No. 1 Grade quality seed varieties, in accordance with the Canadian Seeds Act and Regulations, and having a minimum purity of 97% and germination of 75%. Seed shall be free of impurities and disease.
- .2 Seed mix for all applications to be the following, by weight:
 - .1 For West Glacier
 - .1 42% Awned wheat grass
 - .2 2% Bluejoint reedgrass
 - .3 54% Blue wildrye
 - .4 2% Hair bentgrass
 - .2 For Beaver Valley
 - .1 15% Awned wheat grass
 - .2 38% Blue wildrye
 - .3 47% Mountain Brome
 - .3 For Riparian Areas
 - .1 49% Fowl bluegrass
 - .2 51% Tufted hairgrass
- .3 Seeding rate to be 100 kg/ha for hydraulic seeding.
- .4 **Seed certificate to be approved by the PCA ESO prior to ordering.**
- .5 Seed mix shall be free of Scentless Chamomile, Downy Brome and Canada Thistle.

2.2 WATER

- .1 In accordance Section 01 35 43 – Environmental Procedures

2.3 SOIL STABILIZER/TACKIFIER

- .1 Soil stabilizer/tackifier shall be a nontoxic, colourless copolymer emulsion with no less than 52.6% solids. Acceptable product is: Soil Master WR or approved alternate.

2.4 MULCH

- .1 Wood fibre mulch shall be manufactured from virgin wood fibres and contain not less than 3% of an organic tackifier by volume. Cellulose type products are not acceptable. Acceptable product is: Eco Fibre Plus or approved alternate.

Part 3 Execution**3.1 GENERAL**

- .1 No mechanical seeding will be allowed for this project.
- .2 Contractor shall advise Departmental Representative prior to the start of seeding operations.
- .3 Contractor shall mechanically remove any weeds prior to seeding. Weed removal method to be approved by Departmental Representative prior to commencement. This will be incidental to the work.
- .4 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous project to prevent site contamination.
- .5 Seeding shall be done upon completion of stripped soil material/chip compost placement.
- .6 Contractor shall not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil, or soil covered with snow, ice or standing water.
- .7 Contractor shall hydraulic seed only during dry weather conditions with no rain forecasted for the next 24 hours and ensuring a seasonably dry seedbed to provide for proper curing of soil stabilizers/tackifier. Contractor shall check weather conditions to ensure soil stabilizer has sufficient time to cure prior to heavy rainfall.
- .8 Seeding shall be done to ensure a catch satisfactory to the Departmental Representative's approval. In areas where seed fails to germinate for whatever reason, the Contractor shall re-cultivate and reseed until acceptable germination takes place.
- .9 Contractor shall carry out seeding in locations as per the Contract Documents or, as directed by Departmental Representative.

3.2 HYDRAULIC SEEDING

- .1 The following application rates are the minimum required for hydraulic seeding:
 - .1 Seed: 100 kg/hectare
 - .2 Mulch: 1500 kg/hectare

- .3 Tackifier: As per Manufacturer's Instructions
- .4 Water: 30,000 L/hectare
- .2 The Contractor shall measure quantities of materials by weight, or weight calibrated Contractor to calculate and submit applicable area of coverage per tank load of slurry in accordance with Section 01 33 00 – Submittal Procedures
- .3 Contractor shall physically stake and identify limits of tank coverage prior to seeding to the satisfaction of Departmental Representative.
- .4 Each tank load of slurry shall be fully applied within the designated boundaries for each load as staked volume measurement, to the satisfaction of the Departmental Representative.
- .5 The Contractor shall fill the tank half full with required water and add mulch while continuing to fill with water. Seed mix and fertilizer is to be added. All material is to be added into the hydraulic seeder under agitation. The Contractor shall pulverize mulch with tackifier and charge slowly into seeder.
- .6 The Contractor shall charge soil stabilizer/tackifier into seeder after all other material is well mixed in seeder. Contractor shall mix slowly to avoid foaming but thoroughly to complete slurry.
- .7 The Contractor shall use hydraulic seeding equipment with a minimum slurry tank capacity of 4500 litres.
- .8 The Contractor's equipment shall have an agitation system for slurry capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and mechanical method:
 - .1 Pumps shall be capable of maintaining a continuous non-fluctuating flow of solution.
 - .2 Equipment shall be capable of seeding up to 150 m distance from hydraulic seeder using hand operated hoses and appropriate nozzles.
- .9 The Contractor shall apply slurry when wind velocities will not affect the application and cause the mixture to be blown.
- .10 The Contractor shall apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed. Ensure good contact of slurry with soil with minimal air pockets.
- .11 The Contractor shall use the correct nozzle(s) for application and use hoses to access difficult to reach surfaces and to control application.
- .12 The Contractor shall ensure that the application is uniform and the surface is evenly covered. Contractor shall blend into retained landscape for approximately 1 metre.
- .13 The Contractor shall clean all structures, appurtenances and natural features not designated to be seeded of any overspray, to the satisfaction of the Departmental Representative.

- .14 The Contractor shall ensure that at all times during the seeding, that no vehicles are parked within the path of public travel and the Contractor shall provide warning devices as directed by the Departmental Representative to ensure safe operations.
- .15 Traffic Control to be in accordance with Section 01 55 26 – Traffic Control.

3.3 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Establishment period is a minimum of four months of continuous growing season. Growing season shall not to be divided by winter.
- .2 The Contractor shall repair and reseed dead or bare spots, as directed in the Contract Documents, to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.
- .3 For areas of poor seed germination and growth, as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding and fertilizing undertaken as specified. This work is incidental to the Contract.

3.4 CONSTRUCTION COMPLETION ACCEPTANCE

- .1 Seeded areas will be accepted by the Departmental Representative provided that all areas are uniformly established and turf is not eroded or rutted and relatively free of weeds. Seeded areas to be growing for a minimum of four continuous months prior to construction completion acceptance inspection.
- .2 Areas seeded in fall will be accepted in following spring, a minimum of four months after start of growing season, provided acceptance conditions are fulfilled.
- .3 Minimum 75% growth by area of coverage of specified seed mixture must be present in order to be acceptable.

3.5 MAINTENANCE DURING WARRANTY PERIOD

- .1 Maintenance shall occur for one full year from Construction Completion Acceptance. The estimated period of maintenance within one calendar year shall be from approximately April 1 to October 31. The Contractor will be required to employ all of the necessary measures to establish and maintain all seeding in an acceptable, vigorous and healthy growing condition.
- .2 The Contractor shall repair and reseed dead or bare spots, as directed in the Contract Documents, to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.
- .3 For areas of poor seed germination, or as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding and fertilizing undertaken as specified. This work is incidental to the Contract.

- .4 For small areas of poor seed germination or as determined by the Departmental Representative, the soil shall be scarified to a depth of 25 mm and seeding and fertilizing shall be undertaken as specified. This work is incidental to the Contract.
- .5 Weed control shall be undertaken as determined by the Departmental Representative. Hand pulling of weeds may be required. This work is incidental to the Contract.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Removal and disposal of existing precast barriers, supply and installation of new Precast Concrete Barriers, and supply and installation of drainage flumes / spillways, in accordance with the Contract Documents. Precast Concrete barrier supplied shall be as per British Columbia Standard Specifications for Highway Construction (latest edition), Section 941 – Precast Reinforced Concrete Barriers. In addition, all end faces to **have 25 mm chamfered edges**.

1.2 REFERENCES

- .1 BC MoTI Standard Specification for Highway Construction (Latest Edition).
- .2 CAN/CSA-A23.1 Concrete materials and methods of concrete construction.
- .3 CAN/CSA-A23.4 Precast concrete – Materials and construction.
- .4 CAN/CSA-G40.21-M General Requirements for rolled or welded structural quality steel / Structural quality steel.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Remove and Dispose Barrier:
 - .1 Removal and disposal of concrete barrier will be measured for payment in number of barriers removed and disposed from its existing location in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .2 Payment will be made under "**Unit Price Item – Precast Concrete Barrier – Remove and Dispose (Loop Brook Bridge)**" and "**Unit Price Item – Precast Concrete Barrier – Remove and Dispose (Cougar Brook Bridge)**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Supply and Install Precast Concrete Barriers:
 - .1 Supply and installation of precast concrete barrier shall be measured per unit of specific type precast concrete barrier including end treatments supplied, loaded, hauled and installed in their final location in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .2 Payment will be made per the applicable component under "**Unit Price Item – Precast Concrete Barrier – Supply and Install Concrete Barrier (Loop Brook Bridge)**" and "**Unit Price Item – Precast Concrete Barrier – Supply and Install (Cougar Brook Bridge)**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Supply and installation of drainage flumes/spillways:

- .1 Measure supply and installation of spillways (drainage flumes) as individual units as installed. Payment will be made under "**Unit Price Item – Spillways/Drainage Flumes (Loop Brook Bridge)**", and "**Unit Price Item – Spillways/Drainage Flumes (Cougar Brook Bridge)**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Cleaning of shoulders, by methods accepted by the Departmental Representative, in front and behind barrier locations shall be considered incidental to the Work. Barriers that are to be placed back into their original location must be cleaned of all debris.
 - .2 Temporary stockpiling of barrier.
 - .3 Survey and layout.
 - .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .5 The placement and removal of Precast Concrete Barriers for use as temporary barricades during construction.
- .5 Mobilization and demobilization required for this Work shall be incidental to "**Lump Sum Price Item – Mobilization / Demobilization**", and no additional payment will be made.
- .6 Traffic Control for survey, installation, removal or relocation of Precast Concrete Barriers shall be incidental to "**Lump Sum Price Item – Traffic Control**" and no separate payment will be made to the Contractor.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

- .1 Precast Concrete barriers shall be manufactured as per British Columbia Standard Specifications for Highway Construction (latest edition), Section 941 - Precast Reinforced Concrete Barriers with the following exceptions:
 - .1 All end faces to have 25mm chamfered edges.

- .2 Synthetic Fiber reinforcing shall be added to the precast concrete barriers in accordance with the Contract Documents.
- .3 Precast barrier types: as indicated.

2.2 PRECAST CONCRETE BARRIER

- .1 Concrete Quality: to CAN/CSA-A23.1 except where amended below.
 - .1 Compressive Strength: Compressive strength test result is equal to or exceeds 30 MPa and no individual cylinder strength is less than 27 MPa.
 - .2 Calcium chloride or admixtures containing calcium chloride are not to be used in concrete.
 - .3 Cement Content: minimum of 320 kg/m³.
 - .4 Water/Cement Ratio: maximum of 0.45.
 - .5 Coarse Aggregate: nominal maximum size not exceeding 28mm.
 - .6 Slump: 50 mm plus or minus 20mm.
 - .7 Entrainment Air: 5 to 8%.
 - .8 Reinforcement:
 - .1 Fibrillated fiber strand reinforced concrete to be used for production of barriers. Welded wire mesh reinforcement will not be permitted.
 - .2 50 mm fibrillated polypropylene fibres to be added at the rate of 1.0 kg/m³.
 - .3 Fibrillated fibres shall meet requirements of ASTM C 1116 Type 3 Synthetic Fibre Reinforced Concrete or shotcrete.
 - .4 Fibres shall have a minimum tensile strength of 350 MPa and a minimum modulus of elasticity of 4.2 GPa.
 - .5 Fibres are to be added early in the mixing process following manufacture's recommendations to ensure evenly distributed fibres.
 - .6 A single length of 15 mm rebar shall be wire tied to the horizontal sections of the hook or eye assemblies as indicated in the Contract Documents.
 - .7 Reinforcement shall be installed for drainage barriers as indicated in BC MoTI (latest edition).
- .2 Concrete Placing and Consolidation:
 - .1 To CAN/CSA-A23.4, Clause 19.
- .3 Concrete Curing and Protection:
 - .1 Strictly to CAN/CSA-A23.4, Clause 21.
 - .2 During curing period temperature differential between concrete surface and ambient air not to exceed 20 °C.
- .4 Exposed Concrete Surfaces:

- .1 Uniform in texture and colour as produced from well-maintained steel form surfaces and proper vibration methods without excessive surface fines or laitance.
- .5 Surface defects will normally be cause for rejection of any unit except where such are within the following permissible limits or area subject to making good within the following permissible limits:
 - .1 Unobtrusive defects of any kind where their total area is not in excess of 2% of exposed surface area of unit.
 - .2 Air holes not greater than 3 mm in diameter and not more than 20 in any isolated 300 mm x 300 mm area.
 - .3 Sharp ridges at edges of exposed concrete surfaces softened where necessary by careful rubbing or grinding.
 - .4 Patching of isolated small holes, cavities and similar self-confining defects may be permitted when authorized by the Departmental Representative.
- .6 Patching, if authorized, to be completed as follows:
 - .1 Defective are saturated with water and defect prepared with cement paste and filled with mortar.
 - .1 Mortar to be properly proportioned to same sand and cement as original concrete and reasonably colour-matched to cured dry unit with addition of white cement where necessary, to be pre-shrunk for about one hour before retempering and use.
 - .2 Patching mortar to be well tooled in, finished flush and smooth and are covered to cure adequately.
- .7 Surface tolerance to be +/- 3 mm unless otherwise directed by the Departmental Representative.
- .8 Finished Product:
 - .1 Contractor to notify Departmental Representative in advance of manufacturing of schedule so that inspection can be carried out. All processes are subject to inspection by the Departmental Representative. Inspection or release of units by the Departmental Representative is required prior to shipping.
 - .2 Identification indicated by embedding manufacturer's name or trademark, year of manufacture, and form number on end of each unit in manner, size and depth that will be permanently legible.
 - .3 Authorized patching or making good to be inspected by the Departmental Representative before shipment or upon delivery and rejected units replaced at no cost.
- .9 Welded Steel Wire Mesh Reinforcement:
 - .1 Welded wire mesh reinforcement will not be permitted.
- .10 Reinforcing Steel for Bent and Hooked Connections:
 - .1 To CAN/CSA-G40.21-M, Grade 260W.
- .11 Bending:

- .1 Carefully bend reinforcing steel to radii detailed and install as indicated in the Contract Documents.
- .2 Inspect reinforcing steel after bending for evidence of fracture. Fractured pieces to be replaced.
- .12 Surface Treatment:
 - .1 Treatment of exposed surfaces not required.
- .13 Pick-up Points:
 - .1 Form with accurately placed rigid PVC pipe recessed 15 mm from both finished surfaces as indicated in the Contract Documents.
- .14 Drainage Slots:
 - .1 Drainage slots to be cast-in as indicated in the Contract Documents.

Part 3 Execution

3.1 REMOVAL AND DISPOSAL

- .1 All barrier being removed and disposed shall be hauled and disposed of outside the National Parks unless directed otherwise by the Departmental Representative.

3.2 DELIVERY, STORAGE AND HANDLING

- .1 Care shall be taken to protect Precast Concrete Barrier from elements and temperature extremes during curing period. Under no circumstances are barrier components to be exposed to freezing conditions until fully cured.
- .2 Storage of Precast Concrete Barriers on site to be in single layer, for first seven days.
- .3 Stacking of three layers high, with wood blocking between lifts, permitted with Departmental Representative approval, after seven days.
- .4 Barriers to be stacked three layers high, with wood blocking between lifts, at delivery location. Cost of supply and installation of wood blocking shall be incidental to the Contract and no separate payment will be made.

3.3 INSTALLATION

- .1 Precast Concrete Barriers shall be installed permanently on asphalt concrete pavement in accordance with the Contract Documents or as directed by the Departmental Representative.
- .2 Contractor shall do the layout of the barriers for both removal and installation operations.
- .3 Precast Concrete Barriers shall be installed within seven (7) calendar days following toplift paving.

END OF SECTION