

Parks Canada Agency

01 11 00	SUMMARY OF WORK	4
01 14 00	WORK RESTRICTIONS	11
01 21 00	ALLOWANCES	18
01 25 20	MOBILIZATION AND DEMOBILIZATIONS	22
01 29 01	SITE OCCUPANCY	23
01 31 00	PROJECT MANAGEMENT AND COORDINATION	24
01 32 16	CONSTRUCTION PROGRESS SCHEDULES	28
01 33 00	SUBMITTAL PROCEDURES	31
01 35 29	HEALTH AND SAFETY REQUIREMENTS	37
01 35 31	SPECIAL PROCEDURES FOR TRAFFIC CONTROL	40
01 35 32	SPECIAL PROCEDURES FOR TRAFFIC DETOURS	46
01 35 43	ENVIRONMENTAL PROCEDURES	49
01 45 00	QUALITY CONTROL	59
01 52 00	CONSTRUCTION FACILITIES	67
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES	69
01 61 00	COMMON PRODUCT REQUIREMENTS	71
01 71 00	EXAMINATION AND PREPARATION	75
01 74 11	CLEANING	79
01 77 00	CLOSEOUT PROCEDURES	81
01 78 00	CLOSEOUT SUBMITTALS	82
02 41 13	ASPHALT PAVEMENT REMOVAL	84
02 81 01	HAZARDOUS MATERIAL	87
10 14 53	TRAFFIC SIGNAGE	90
31 05 10	CORRECTED DRY DENSITY FOR FILL	93
31 11 00	CLEARING AND GRUBBING	95
31 24 13	ROADWAY AND DRAINAGE EXCAVATION	99
31 32 19	GEOTEXTILES	109
31 37 00	RIPRAP	112
32 01 11	ASPHALT PAVEMENT CRACK SEALING	114
32 01 12	ASPHALT PAVEMENT SPRAY PATCHING	117
32 11 20	SUB-BASE AGGREGATES	120
32 11 24	CRUSHED BASE COURSE AGGREGATE	124
32 12 14	ASPHALT TACK COAT	128
32 12 16	ASPHALT CONCRETE PAVEMENT (EPS)	131
32 17 23	PAVEMENT MARKING	135
32 17 31	GUIDE POSTS	141
32 32 34	REINFORCED SOIL RETAINING WALL	144
33 46 19	PERFORATED PIPE DRAINS	150
32 91 19	TOPSOIL PLACEMENT AND GRADING	153
32 92 22	HYDRAULIC SEEDING	157
33 42 13	PIPE CULVERTS	162
33 71 13	PRECAST CONCRETE BARRIER	168

Drawings :

CIVIL DRAWING INDEX		
SHEET NO.	DRAWING NO. and REVISION	SHEET TITLE
1	000	COVER
2	001 Rev 0	LOCATION PLAN
3	002 Rev 0	LEGEND & DRAWING INDEX
4	110 Rev 0	PLAN & PROFILE - PHASE 1 TIE IN STA 25+850 TO STA 26+500
5	111 Rev 0	PLAN & PROFILE STA 26+500 TO STA 27+150
6	112 Rev 0	PLAN & PROFILE STA 27+150 TO STA 27+800
7	113 Rev 0	PLAN & PROFILE STA 27+800 TO STA 28+450
8	115 Rev 0	PLAN & PROFILE – WESTBOUND STA 125+800 TO STA 126+300
9	116 Rev 0	PLAN & PROFILE – WESTBOUND STA 126+300 TO STA 126+800
10	117 Rev 0	PLAN & PROFILE – WESTBOUND STA 126+800 TO STA 127+300
11	118 Rev 0	PLAN & PROFILE – WESTBOUND STA 225+850 TO STA 226+500
12	119 Rev 0	PLAN & PROFILE – WESTBOUND STA 226+500 TO STA 227+150
13	301 Rev 0	TYPICAL SECTIONS TRANS-CANADA HIGHWAY
14	302 Rev 0	TYPICAL SECTIONS MISCELLANEOUS DETAILS
15	406 Rev 0	INTERSECTION DETAILS ILLECILLEWAET CAMPGROUND & ASULKAN TRAILHEAD
16	407 Rev 0	INTERSECTION DETAILS CP ACCESS AND WEST TURNAROUND
17	408 Rev 0	INTERSECTION DETAILS GUN PLATFORM RELOCATION (GLACIER CP)
18	605 Rev 0	SIGNAGE & PAVEMENT MARKINGS STA 25+850 TO STA 27+150
19	606 Rev 0	SIGNAGE & PAVEMENT MARKINGS STA 27+150 TO STA 28+450
20	700 Rev 0	CULVERT INSTALLATION TABLE
21	901 Rev 0	EAST GATE LANDSLIDE BORROW EXCAVATION AREA STA 2+900 TO STA 4+200
22	1001 Rev 0	PAVING PLAN STA 0+000 TO STA 5+650
23	1002 Rev 0	PAVING PLAN STA 5+650 TO STA 12+150
24	1003 Rev 0	PAVING PLAN STA 12+150 TO STA 18+650
25	1004 Rev 0	PAVING PLAN STA 18+650 TO STA 25+150
26	1005 Rev 0	PAVING PLAN STA 25+150 TO STA 31+650
27	1006 Rev 0	PAVING PLAN STA 31+650 TO STA 38+150
28	1007 Rev 0	PAVING PLAN STA 38+150 TO STA 43+794

Drawings:

RETAINING WALL DRAWING INDEX		
SHEET NO.	DRAWING NO. and REVISION	SHEET TITLE
1	G1	SITE LOCATION PLAN AND SPECIFICATIONS
2	G2	KM 27.1 & 28.0 RETAINING WALLS TYPICAL SECTIONS & DETAILS
3	G3	KM 27.1 WALL SITE PLAN & ELEVATION
4	G4	KM 28.0 WALL SITE PLAN & ELEVATION
5	G5	SURFACE WATER MANAGEMENT TYPICAL SECTIONS & DETAILS

Reference Documents:

1. Basic Impact Analysis – Illecillewaet Curve Safety Improvements, Glacier National Park, BC March 2016
2. Standard CMS Translations Rev 1 Nov 2016
3. Construction Signage Translation Rev 1 Nov 2016
4. Direction for Permitted Users Conducting Water-Related Activities – April 2017
5. Final Geotechnical Report – Illecillewaet GNP- July 27, 2016
6. Illecillewaet Curve Retaining Wall Design Review – Golder - May 11, 2017
7. Illecillewaet Curve Slope Stability Review – Golder August 10, 2017
8. Fish Habitat Assessment, DFO Self-Assessment – Golder Sept. 28, 2016
9. Archaeological Impact Assessment Letter of Clearance - Golder - Aug. 4, 2016
10. MRG BMP – Burning of Brush and Woody Debris – June 2015
11. Parks Canada National Best Management Practices - May 2015
12. Geotechnical Investigation and Stability Assessment (East Gate Landslide) - Golder Mar. 27, 2017
13. Lock + Load Retaining Wall Product Guide – Armtec
14. Glacier Station Storage Area Plan – Oct. 15, 2017

01 11 00 SUMMARY OF WORK

Part 1 General

1.1 PRECEDENCE

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.2 DEFINITIONS

- .1 British Columbia Ministry of Transportation and Infrastructure is referred to as "MoTI".
 - .1 BC MoTI specifications specified for the work can be found at the following website address:
<http://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/standard-specifications-for-highway-construction>
- .2 Alberta Transportation is referred to as "AT".
 - .1 AT specifications specified for the work can be found at the following AT website address:
http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf
- .3 Changes in Definition, - The following changes in definitions have been made to the "BC MoTI Specifications":
 - .1 Ministry Representative – The word "Ministry Representative" shall mean Parks Canada Departmental Representative or their duly appointed representative.
 - .2 Ministry – The word "Ministry" shall mean Parks Canada Agency.
- .4 Changes in Definition, - The following changes in definitions have been made to the "AT Specifications":
 - .1 Consultant – The word "Consultant" shall mean Departmental Representative or their duly appointed representative.
 - .2 Department – The word "Department" shall mean Parks Canada Agency.
- .5 Glacier National Park of Canada is referred to as "GNP".
- .6 TCH means Trans-Canada Highway
- .7 Parks Canada Agency is referred to as "PCA".
- .8 Canadian Pacific Railway is referred to as "CP Rail".
- .9 Environmental Surveillance Officer is referred to as "ESO".
- .10 Watercourse is as defined in the National Parks Act.
- .11 Site means the areas on or within the limits of Construction as referenced on the Drawings and/or described in the Contract Documents.
- .12 Work means the provision of all labour, services, material, and equipment as necessary, for the Contractor to complete and perform its obligations in accordance with the Contract.

1.3 PROJECT LOCATION

- .1 The project is located in Glacier National Park, British Columbia. Construction work is on the Trans Canada Highway between Km 3.8 and Km 43.8. The following are key locations relative to the Project, kilometre markers are approximate:
 - .1 East Boundary GNP: TCH km 0
 - .2 Beaver River Bridge: TCH km 10
 - .3 Tupper Timber Snowshed east portal: TCH km 16.8
 - .4 Single Bench Snowshed west portal: TCH 19.8
 - .5 Glacier Maintenance Compound: TCH km 22.7
 - .6 Roger's Pass Monument Truck Stop: TCH km 24.1
 - .7 Illecillewaet Campground: TCH km 26.4
 - .8 Glacier Station Yard: TCH km 27.9
 - .9 Fidelity Campground: TCH km 39.9
 - .10 West Boundary GNP: TCH km 43.8

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- .1 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .2 Without limiting the scope of work, the work of this Contract generally comprises the following, as directed by the Departmental Representative:
 - .1 Grubbing of areas designated in the Contract documents in accordance with Section 31 11 00 – Clearing and Grubbing.
 - .2 Stripping of organic material designated in the Contract documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Removal of existing asphalt by milling and stockpiling material in accordance with Section 02 41 13 – Asphalt Pavement Removal.
 - .4 Excavating all types of material from the right-of-way cuts, hauling and placing this material in embankments or in stockpiles designated in the Contract Documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .5 Load, haul and place borrow fill in areas designated in the Contract Documents in accordance with Section 31 24 12 – Roadway and Drainage Excavation.
 - .6 Install Owner supplied Reinforced Soil Retaining Walls designated in the Contract Documents and in accordance with Section 32 32 34 – Reinforced Soil Retaining Wall.
 - .7 Supply, load, haul and place Sub-Base course and Base Course materials in accordance with Section 32 11 24 - Crushed Base Course Aggregate and Section 32 11 20 – Sub-Base Aggregates.
 - .8 Perform mix design for BC MoTI Medium Mix Class 1 (16mm) PG 58-37 asphalt binder. BC MoTI Class 1 -16mm Medium Asphalt Aggregates and PG 58-37 asphalt binder is to be supplied by the Contractor.
 - .9 Recycled Asphalt Pavement (RAP) will be permitted in the asphalt pavement mix design as per BC MoTI Standard Specifications for Highway Construction

(latest edition), Section 502 – Use of Reclaimed Asphalt Pavement in Asphalt Pavement Construction. In accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).

- .10 Purchase asphalt binder PG 58-37 mix with aggregate, haul and place BC MoTI Medium Mix Class 1 (16mm) Asphalt Concrete Pavement as described in the Contract Documents and Section 32 12 16 – Asphalt Concrete Pavement (EPS).
- .11 Supply and install crack sealant product, mix with aggregate and place as Asphalt Pavement Spray Patching in accordance with Section 32 01 12 – Asphalt Pavement Spray Patching and Section 32 01 11 – Asphalt Crack Sealing.
- .12 Remove and dispose of existing Corrugated Steel Pipe (CSP) culverts in accordance with Section 33 42 13 – Pipe Culverts, as per the Contract Documents and as directed by the Departmental Representative.
- .13 Supply and installation of new CSP culverts and culvert extensions as per the Contract Documents and as directed by the Departmental Representative in accordance with 33 42 13 – Pipe Culverts.
- .14 Installation of Riprap in accordance with Section 31 37 00 – Riprap.
- .15 Supply and installation of Geotextiles in accordance with Section 31 32 19 – Geotextiles.
- .16 Placement of screened topsoil on finished slopes in accordance with Section 32 91 19 – Topsoil Placement and Grading.
- .17 Supply and installation of hydroseeding on finished slopes in accordance with Section 32 92 22 – Hydraulic Seeding.
- .18 Removal and disposal of precast concrete barrier in accordance with Section 33 71 13 – Precast Concrete Barrier.
- .19 Supply and installation of modified British Columbia Ministry of Highways Precast Concrete Barriers as per the Contract Documents and as directed by the Departmental Representative in accordance with Section 33 71 13 – Precast Concrete Barrier.
- .20 Supply and install temporary roadway paint markings during construction as required in accordance with Section 01 35 31 – Special Procedures for Traffic Control and 32 17 23 – Pavement Markings.
- .21 Permanent line markings to be installed at the completion of the work as per the Contract Documents and as directed by the Departmental Representative in accordance with Section 32 17 23 – Pavement Marking.
- .22 Supply and install regulatory signs in accordance with Section 10 14 53 – Traffic Signage.
- .23 Installation of Rumble Strips in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).
- .24 Installation and maintenance of temporary barriers and supply and installation of temporary traffic control and other temporary construction facilities required for completion of the Work of the Project.
- .25 Traffic signage, control and other traffic accommodations in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .26 Miscellaneous Additional Work as directed by the Departmental Representative.

- .3 The Contractor will not be permitted to set up a crushing plant within the National Parks
- .4 The Contractor will not be permitted to set up a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project within the National Parks.
 - .1 The asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonnes per hour production, 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.
 - .2 There is no power available in the Park.
- .5 The Contractor is responsible for sourcing water required for the Works and may be required to obtain it from outside of the National Parks. Accessing local water sources from Parks facilities is not guaranteed. If permitted, access can be coordinated through the Departmental Representative and the ESO but will require the Contractor to obtain a Restricted Access Permit and to adhere to all conditions contained therein.
- .6 In preparation for and during construction of this project, an “Environmental Protection Plan” (EPP) is to be prepared by the Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Contractor’s EPP must be approved by Parks Canada Agency 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 Documents. The EPP will form part of the Contract.
- .7 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, **BC MoTI –Standard Specifications for Highway Construction (latest edition)** shall apply unless directed otherwise by the Departmental Representative.

1.5 CONTRACT METHOD

- .1 Construct Work under combined price Contract.

1.6 WORK BY OTHERS

- .1 The Contractor is advised that the following Work in the vicinity has been or will be contracted by Parks Canada:
 - .1 Snowshed Lighting and Column Repairs, Km 16 - 20
 - .2 Snowshed Drainage Works, Km 19 - 20
 - .3 Trans-Canada Highway Widening, Km 20 – 26
 - .4 Parks Canada Maintenance Compound Stormwater Works, Rogers Pass
 - .5 Glacier Park Lodge Demolition and Gas Station Works, Rogers Pass
 - .6 East Gate Landslide Cleanout and Beaver Valley Vehicles Ponding
 - .7 Rock Scaling and Recapitalization, Km 12 - 13
 - .8 Line painting, various locations
 - .9 Other projects and maintenance work may occur along the TCH in 2018 and 2019.

- .2 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors and the PCA Departmental Representative in reviewing their construction schedules and sharing their work space, and shall coordinate their operations with the other Contractors, including traffic management and construction staging.
- .3 The Contractors shall coordinate all work on this project with other Contractors including Site Safety and Traffic Control.
- .4 The pits, borrow areas and staging areas mentioned in the Contract Documents are operational and are used by many contractors and Parks Canada. The Contractor shall cooperate with the other users of the applicable areas.

1.7 WORK SEQUENCE

- .1 Schedule work progress to allow Owner / Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Maintain fire and emergency access on the roadways at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.
- .4 The Contractor shall prepare a meaningful bar chart or network diagram showing the proposed schedules of major work, which shall be submitted to the Departmental Representative in accordance with 01 32 16 Construction Progress Schedules.
- .5 The Contractor shall:
 - .1 **Complete all crack sealing / spray patching and mill and fill pavement repairs by June 28, 2018.**
 - .2 **Obtain the Interim Certificate (Substantial Performance) by September 28, 2018.**
 - .3 **Complete all of the Work by October 12, 2018 (Contract Completion Date).**
 - .4 Mobilize to site only when the relevant area is declared to not 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 June 1.
 - .5 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.

1.8 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of site subject to Section 01 14 00 –Work Restrictions and Section 01 29 01 – Site Occupancy, until Contract Completion date. The Contractor's use of the site is not exclusive of other contractors or work zones within the limits of this Contract.
- .2 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other Contractors.
- .3 Coordinate use of premises under direction of the Departmental Representative.

- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 The Contractor and any subcontractors shall obtain a business license and vehicle work passes in accordance with Section 01 35 43 - Environmental Procedures.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Contractor must allow access to the Work Site for other Contractors and PCA. It is up to the Contractor to plan their work accordingly.

1.10 OWNER FURNISHED ITEMS

- .1 Notify the Departmental Representative immediately of any Owner supplied items which may be unfit for purpose.
- .2 The following items are available at Glacier Station for the Contractor's use:
 - .1 152.4mm (6") PVC Perforated Pipe – 365 metres (1,200 ft). Supplier is Corix.
 - .2 12.19m x 30.48m (40' x 100') Poly 6mm – 7 rolls. Supplier is Brockwhite.
 - .3 Non-Woven Geotextile Nilex 4545 – 9 rolls. Supplier is Nilex.
 - .4 19mm Drain Rock – 911.11 tne. Supplier is Valley Blacktop.
 - .5 Screened Topsoil – 2,500 m³
 - .6 Armtex Lock and Load Retaining Wall System – 866m².
 - .7 CSP Culverts, including couplers and gaskets:
 - .1 600mm – 29.0 metres
 - .2 800mm – 84.0 metres
 - .3 900mm – 67.0 metres
 - .4 1000mm – 11.8 metres
 - .5 1200mm – 16.0 metres

1.11 CONSTRUCTION SIGNAGE

- .1 To be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.
- .2 Signage shall be coordinated with other Contractors.
- .3 No signs or advertisements, other than warning signs, are permitted on site.

1.12 SETTING OUT OF WORK

- .1 Departmental Representative will establish control points and provide:
 - .1 Detailed cross-section templates showing design centreline and shoulder grades.
 - .2 Complete set of construction Drawings.
 - .3 Alignment notes showing curve data and control point coordinates.
 - .4 Provide a list of control monuments including coordinates and elevations on request.

- .5 Measurements for Payment (Quantity Surveys) and volumes by the surface to surface prismatic method for roadway and drainage excavation and neat line for all surfaces above the excavated surface at a maximum of 20m intervals. Coordinates unless otherwise stated are UTM Grid and no adjustments will be made to scale the coordinates to ground when calculated volumes by cross-section or setting out of work.
- .2 Contractor shall:
 - .1 Not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.
 - .2 Set additional control points as necessary.
 - .3 Set all work stakes necessary to complete work.
 - .4 Allow sufficient time for Departmental Representative to take measurements for payment.
 - .5 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.
- .3 No separate payment for setting out work, unless changes are made and approved by the Departmental Representative and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative to be paid for as part under **“Lump Sum Price Item 3 – Prime Cost Sum”**

Part 2 Products

- .1 To be in accordance with BC MoTI Standard Specifications for Highway Construction (latest edition).

Part 3 Execution

- .1 To be in accordance with BC MoTI Standard Specifications for Highway Construction (latest edition).

END OF SECTION

01 14 00 WORK RESTRICTIONS**Part 1 General****1.1 ACCESS AND EGRESS**

- .1 All existing CP Rail accesses are to be maintained or relocated as required. Location and details of any proposed relocation to be approved by both CP Rail and PCA.
- .2 Provide for pedestrian, cyclist, and vehicular traffic for the duration of the construction.
- .3 Construction operations shall be conducted to cause minimal inconvenience to the public and to owners of adjoining property. Existing access to property shall be maintained as far as possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed. Contractor will be responsible for repairing any damage incurred, at the Contractor's cost.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.2 USE OF THE SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site (limits shown on the Drawings) will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site 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.
- .3 The Contractor will not be permitted to set up a camp in the National Parks. PCA regulations prohibit anyone working within the Park from using public campground facilities.
- .4 Office-tool trailer may also be set up at Glacier Station, approximately km 27.9 on the TCH. See Section 01 35 43 – Environmental Procedures.
- .5 The Contractor shall not store material or park equipment along the Highway Right of Way within the clear zone.
- .6 Contractor shall maintain adequate drainage at the Work Site.
- .7 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at their cost for the performance and inspection of the Work.
- .8 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and Section 01 35 43 - Environmental Procedures. 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 Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .10 Pets shall not be brought to or maintained at the construction site.

1.3 WORKING TIMES

- .1 Work in GNP is permitted during daylight hours from 06:00 to 22:00, Monday to Saturday unless stipulated otherwise in the Contract documents.
- .2 No work will be permitted on Sundays unless prior written approval is granted by the Departmental Representative
- .3 The Contractor will not be permitted to work during the period of any Alberta or British Columbia statutory holiday long weekend, including one day prior to and one day following. The Contractor will not be permitted to work during the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
 - .1 Statutory and Civic Holidays (2018)
 - .1 Good Friday weekend: From 22:00 Thursday, March 28, 2018 to 06:00 Tuesday, April 3, 2018.
 - .2 Victoria Day Weekend: From 22:00 Thursday May 17, 2018 to 06:00 Tuesday, May 22, 2018.
 - .3 Canada Day weekend: From 22:00 Thursday June 28, 2018 to 06:00 Tuesday, July 3, 2018.
 - .4 Heritage Day weekend: From 22:00 Friday August 2, 2018 to 06:00 Tuesday August 7, 2018.
 - .5 Labour Day long weekend: From 22:00. Thursday, August 30, 2018 to 06:00 Tuesday, September 4, 2018.
 - .6 Thanksgiving Day weekend: From 22:00 Thursday, October 4, 2018 to 06:00 Tuesday, October 9, 2018.
 - .7 Remembrance Day Weekend: From 22:00 Thursday, November 8, 2018 to 06:00 Monday, November 13, 2018.
- .4 Variance of the Working Times and any others may be provided on the strict condition of satisfactory performance in all requirements as determined at the Departmental Representative's discretion and may be revoked at any time for any reason. It is provided on the presumption that no additional costs or any delay will be attributed to Parks Canada in relation to conducting Works in accordance with the Variance and if that is not the case, the Contractor shall not commence work under the Variance. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from a Variance will be entertained.

1.4 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 shall be conducted without equipment entering into wetlands, water bodies, or streams.
- .3 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.

1.5 UTILITIES

- .1 The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from their operations.
- .2 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall co-operate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .3 The Drawings include indicative utility details from within the area for reference however the Contractor remains fully responsible for determining the full and accurate extent of utilities within the area of their Works.
- .4 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.
- .5 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.
- .6 **The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.**
- .7 The Contractor shall immediately report any damage 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.

1.6 SURVEY OF EXISTING CONDITIONS

- .1 Submission of tender is deemed to be confirmation that the Contractor has inspected the Site and is conversant with all conditions affecting execution and completion of 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 Owner 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 Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If requested and available, 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.
- .5 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.
- .6 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 property within or adjacent to the Work Site, whether all such property is covered by the survey or not.

1.7 ARCHAEOLOGICAL RESOURCES

- .1 As identified in the Basic Impact Analysis known archaeological sites and others that have high archaeological potential are located within the construction limits. The Archaeological Overview Assessment (AOA), included in the BIA, provides a list of areas of archaeological concern.
- .2 The Contractor shall undertake the Works in accordance with the Archaeological Impact Assessment Letter of Clearance and AOA as described in Section 01 35 43 - Environmental Procedures.

1.8 FISH HABITAT ASSESSMENTS

- .1 Contractor shall adhere to recommendations for measures and standards to mitigate serious harm to fish as identified in the BIA and National BMPs.
- .2 The period of least risk for instream works is June 1 – August 31. Work outside of the period of least risk will only be conducted if approved by the Departmental Representative, MRG Field Unit and DFO. These dates supersede the dates in the FHA and the BIA. If the Contractor requests to complete any instream works outside of the least risk window they shall be responsible for the coordination of approvals with DFO. The Contractor shall not start the DFO approval process without written approval by the Departmental Representative.

1.9 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafe BC and the Workers Compensation Act of British Columbia and Alberta including, but not limited to, Occupational Health and Safety Regulations and General Safety Regulations. Within the Site, the Contractor has all the responsibilities of an “employer” under the *Workers Compensation Act* and the *Occupational Health and Safety Regulation* and is designated as the “Prime Contractor”. Other contractors will be working within the limits of construction of this project.
- .2 Prime Contractor must comply with Workers Compensation Act and Occupational Health and Safety Regulation Section 20.3 Coordination of multiple employer workplaces.
- .3 Comply with all applicable safety regulations of the Workers’ Compensation Board of British Columbia and Alberta (WCB) including, but not limited to, WCB’s Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations, when working in that province.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .5 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .6 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.

1.10 USE OF PUBLIC AREAS

- .1 Off-road construction equipment will not be allowed on the existing highway except at designated areas where the existing highway is scheduled for re-construction in this Contract, material loading areas, or alternate sites as designated and approved by the Departmental Representative.
- .2 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. If or when crossing asphalt designated for future use, rubber mats must be used under the tracks to protect the asphalt. Asphalt, granular, embankment and excavation materials may be hauled on existing highway by standard highway trucks not exceeding legal highway load limits unless accepted in writing by the Departmental Representative.
- .3 Flag persons shall be provided when vehicles are entering or exiting Work Site access points and when vehicles are entering or exiting gravel pits in the park. Pit access gates must remain closed at all times or have a gate person monitoring the opening for wildlife.
- .4 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. 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. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that 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. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .5 Construction areas and construction crossings shall be flood-lit for night operations.

1.11 USE OF PITS AND QUARRIES

- .1 The Contractor is not approved to use any existing pits or quarries within the National Parks.

1.12 USE OF PITS, QUARRIES, AND DISPOSAL SITES, OUTSIDE OF THE NATIONAL PARKS

- .1 When the Contractor is supplying material from a pit or quarry outside of the National Parks the Contractor is responsible for all permits and approvals. Pit or quarry development and reclamation must be in accordance with local and Provincial regulatory agency requirements.
- .2 When the Contractor is disposing of; stripping, unsuitable, or surplus material in a pit or other disposal sites outside of the National Parks the Contractor is responsible for all permits and approvals. Disposal site or pit development and reclamation must be in accordance with local and Provincial regulatory agency requirements.
- .3 The Contractor shall bear and pay all costs, fees, and royalties for pits, quarries, or disposal sites, outside of the National Parks.

- .4 Material supplied from pits and quarries outside of the National Parks must be clean of all, seeds, organics, top soil, or contaminants. No additional payment will be made for cleaning or washing material supplied from pits and quarries outside of the National Parks.
- .5 Material supplied from pits and quarries outside of the National Parks must meet all requirements specified in the Contract Documents.

1.13 SUBMITTALS

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

1.14 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 - Project Management and Coordination, 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.
- .2 At a minimum, the following personnel shall be included in the list:
 - .1 Contractor Manager
 - .2 Project Superintendent;
 - .3 Safety Representative;
 - .4 Quality Control Manager;
 - .5 Environmental Representative;
 - .6 Traffic Control Representative;
- .3 The above personnel shall perform the following duties:
 - .1 Contractor Manager with full authority, as agent of the Contractor, to act on behalf of and legally bind the Contractor in connection with the Work and the Contract. The Contractor may, at its discretion, appoint one person as both Contractor Manager and Project Superintendent.
 - .2 The Project Superintendent shall be employed full time with full authority to supervise the Work, who shall be directly available to the Department Representative during all active periods of Work. Either they or their designated deputy 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 The Safety Representative shall possess a minimum of 2 years' construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
 - .5 The Quality Control Representative shall be responsible for the development, implementation and execution of the Quality Management Plan and shall be the single point of contact for all quality related queries.
 - .6 The Traffic Control Representative shall be responsible for the development, implementation and execution of the Traffic Management Plan and shall be the single point of contact for all traffic control related queries.

- .7 The Environmental Representative shall be responsible for the development, implementation and execution of the Environmental Protection Plan and shall be the single point of contact for all environmental related queries.

1.15 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the Work Sites to approved sites outside the National Parks. Refer to Section 01 35 43 - Environmental Procedures.
- .2 Deposit of any construction debris into any waterway is strictly forbidden.
- .3 Cost for Waste Disposal described above shall be considered incidental to the Unit Price items and no additional payment will be made.
- .4 One "Bear Proof" garbage container will be provided by PCA in accordance with Section 01 74 11 - Cleaning.

1.16 WORK STOPPAGE

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

1.17 WINTER SHUTDOWN

- .1 If the Work is scheduled to span over winter months, the Contractor shall prepare the Site for safe, efficient winter operations and the travelling public. Winter shutdown requirements include, but are not limited to, Erosion and Sediment Controls, relocation of barriers, re-instatement of damaged pavement, line painting, traffic signage, and re-instatement of existing highway speed limits for winter shutdown.
- .2 Although no guarantee is provided as to when winter shutdown will be required, in the past it has been mid-October to June 1.
- .3 The Contractor shall arrange a meeting with the Departmental Representative in mid-September, or as weather dictates, to review winter shutdown requirements.
- .4 **All winter shutdown requirements shall be made to the satisfaction of the Departmental Representative, and no additional payment will be made.**

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 21 00 ALLOWANCES**Part 1 General****1.1 REFERENCES**

- .1 General Conditions.

1.2 PRIME COST SUM

- .1 Included in Contract Price a total Prime Cost Sum of: **\$900,000.**
- .2 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 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.
- .4 No interpretation of the items listed under Prime Cost Sum Allowances shall indicate that work will be included under the Prime Cost Sum. Items, tasks, and activities included in the Works elsewhere in the Contract, including Unit Price and Lump Sum Items, shall be paid as indicated in those sections and not under the Prime Cost Sum.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement and Payment Procedures below.
- .7 Such work may include, but not be limited to:
 - .1 Additional supply and delivery of bituminous materials including asphalt prime, anti-stripping agents, and warm mix A/C admixtures;
 - .2 Supply and implementation of full depth reclamation additives;
 - .3 Additional supply and installation of asphalt concrete pavement;
 - .4 Additional installation of integral asphalt curb;
 - .5 Additional pavement removal;
 - .6 Additional crack filling, pot hole patching and other related minor asphalt repairs;
 - .7 Additional clearing and grubbing;
 - .8 Sale of merchantable timber to a mill or equivalent as directed by the Departmental Representative. Revenue generated from this sale will be credited back to this Contract;
 - .9 Additional stripping, excavation and disposal of waste materials as directed by the Departmental Representative;
 - .10 Danger tree assessment and removal;
 - .11 Additional relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;
 - .12 Additional supply and installation of permanent signs (not construction signs);
 - .13 Additional removal and disposal or plugging of existing culverts;

- .14 Additional supply and installation of lane markings;
- .15 Additional survey resulting from changes made by the Departmental Representative;
- .16 Relocation / protection of existing utilities, including payment of utility service provider costs;
- .17 Utility Pole Relocation;
- .18 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract documents;
- .19 Additional supply and installation of seeding;
- .20 Additional supply / processing and installation of Riprap;
- .21 Additional road structure repairs;
- .22 Additional drainage improvements; ditching; culvert repairs; and cleaning;
- .23 Additional sub-drainage not specified in the tender documents;
- .24 Additional supply and installation of precast concrete barrier;
- .25 Additional supply and installation of barrier drains;
- .26 Additional supply and installation of crash attenuator(s);
- .27 Additional removal and disposal of existing guardrail or precast concrete barrier;
- .28 Additional supply and installation of Guide Posts;
- .29 Additional supply and installation of raised reflective road and barrier markers
- .30 Asphalt EPS unit price adjustments;
- .31 Additional installation of milled rumble strips;
- .32 Miscellaneous rock scaling as directed by the Departmental Representative;
- .33 Supply and installation of rock bolts;
- .34 Shoulder graveling;
- .35 Traffic control equipment additional to what is required by the applicable regulations and standards.
- .36 Relocation of existing structures;
- .37 Processing of blast rock / boulders as requested by the Departmental Representative;
- .38 Supply and maintenance of office and washroom facilities for the use of the Departmental Representative.
- .39 Miscellaneous work as directed by the Departmental Representative.
- .8 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for Work under the “**Lump Sum Price Item 3 – Prime Cost Sum**” made using negotiated rates or by material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with the current British Columbia Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated.

- .2 Vehicles (i.e. Pickup trucks) will be paid either at daily rates as per the current British Columbia Roadbuilders and Heavy Construction Association or by mileage using National Joint Council (NJC) rates. The Contractor will not be permitted to claim both daily rental and mileage rates.
- .3 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.
- .4 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
- .5 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .6 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- .7 A claim for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
- .8 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.
- .9 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
- .10 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.
- .11 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.

Part 2 Products

- .1 Products shall be in accordance with BC MoTI Standard Specifications for Highway Construction (current edition) or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be in accordance with BC MoTI Standard Specifications for Highway Construction (current edition) or as directed by the Departmental Representative.

END OF SECTION

01 25 20 MOBILIZATION AND DEMOBILIZATIONS**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, camp, 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 Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
 - .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete, and all materials, equipment, camp, 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.
 - .4 Payment of only **5%** of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than **5%** of the total price tendered, payment of the remainder of the amount will be authorized when the Contract has been completed.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 29 01 SITE OCCUPANCY

Part 1 General

1.1 DEFINITION OF OCCUPANCY

- .1 The Contractor shall be permitted to lease and occupy sites where they will be working in the National Parks, free of charge from the date of award of the Contract up to and including the specified completion date. The sites to be leased by the Contractor include all the roads and areas specified in the Contract documents and as directed by the Departmental Representative.
- .2 The Contractor's occupancy of the sites identified in Contract will be deemed to have ended, when the following conditions are met to the satisfaction of Parks Canada:
 - .1 All the work identified under this Contract, has been completed.
 - .2 All sites' have been cleaned up and any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
 - .3 Contractor has removed from the park all trailers and equipment and sites have been cleaned-up to the satisfaction of the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 CHANGES TO DESIGN

- .1 If a change from the IFC design is accepted in writing by the Departmental Representative and agreed on by the Contractor, a design variance letter will be issued by the Departmental Representative. The design variance letter must state what changes are being made from the IFC design and what the method of measurement for payment will be, if varying from the Contract Documents.
- .2 The design variance letter must be signed by both the Contractor's Representative and the Departmental Representative prior to performing the Work.
- .3 The Departmental Representative reserves the right to use as-built survey or neat line measurements for payment if for any reason tolerances are not in accordance with the IFC design.

1.3 COORDINATION

- .1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other Contractors, and Work by Owner, under instructions of the Departmental Representative.

1.4 PROJECT MEETINGS

- .1 During the course of the Work, the Contractor shall attend weekly construction meetings as scheduled, chaired, and documented by the Departmental Representative.
- .2 The agenda will include among other things, general construction, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .3 The Contractor shall provide physical space and make arrangements for meetings at or near the Work Sites for all meetings that take place in relation to the Contract from their mobilization until their demobilization.
- .4 Meetings held outside of the time noted above (before mobilization or after demobilization) will either be held in the local PCA Field Unit offices, or at the Owner's site office, as notified by the Departmental Representative.
- .5 The Contractor will attend or otherwise ensure the attendance of their staff, subcontractors, consultants, suppliers, or other key parties all other meetings identified in the Contract or reasonably requested by the Departmental Representative in an effort to resolve specific issues as they may arise.
- .6 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.

- .7 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, request a Preconstruction meeting of Contract Representatives to discuss and resolve administrative procedures and responsibilities. Meeting shall be chaired by the Departmental representative who will prepare the minutes of the meeting.
- .2 Senior representatives of the Owner, Departmental Representative, Contractor, major subcontractors, field inspectors and supervisors are to be in attendance.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 16 – Construction Progress Schedules.
 - .3 Schedule of submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
 - .5 Site safety and security in accordance with Sections 01 14 00 – Work Restrictions, 01 35 29 – Health and Safety Requirements, 01 52 00 – Construction Facilities and 01 35 43 – Environmental Procedures.
 - .6 Quality Control in accordance with Section 01 45 00 – Quality Control.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .8 Owner-furnished materials.
 - .9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .10 Closeout procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
 - .11 Insurances and transcript of policies.
 - .12 Other business.
- .4 Comply with Departmental Representative's allocation of mobilization areas of site, for field offices and sheds, and for access, traffic, and parking facilities.
- .5 During construction, coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .6 Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .7 Coordinate field engineering and layout work with the Departmental Representative.

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings if part of tender
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings and mix designs
 - .5 Change Orders
 - .6 Other modifications to Contract
 - .7 Traffic Management Plan
 - .8 Safety Plan
 - .9 WHMIS
 - .10 Environmental Protection Plan
 - .11 Quality Control Plan and field test reports
 - .12 Copy of accepted Work schedule and most recent updated schedule
 - .13 Labour conditions and wage schedules
 - .14 Equipment rate schedule and applicable versions of the relevant rate guides
 - .15 Applicable current editions of municipal regulations and by-laws
 - .16 WorkSafe BC Notice of Project

1.7 SUBMITTAL SCHEDULE

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare a schedule of the required submissions and the date the submissions will be made. Include columns for Actual Date of Submission, Review Comments Received, Final Submission and Final Acceptance Received. Provide this schedule to the Departmental Representative in Excel format.
- .3 The Owner will not be responsible for any construction delays resulting from delays in submission acceptance if the submittal dates shown in the Submittal Schedule are not achieved.

1.8 PROJECT SCHEDULES

- .1 In accordance with Section 01 32 16 - Construction Progress Schedules.

1.9 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 Process substitutions through Departmental Representative.
- .5 Process change orders through Departmental Representative.

1.10 CLOSEOUT PROCEDURES

- .1 In accordance with Section 01 77 00 - Closeout Procedures.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 32 16 CONSTRUCTION PROGRESS SCHEDULES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 DEFINITIONS

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (Gantt Chart): A graphic display of schedule-related information. In a 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 accepted plan for Project.
- .4 Construction Work Week: Monday to Saturday, inclusive, will provide six-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 an activity or other Project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of a major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A 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.

1.3 REQUIREMENTS

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.
- .2 Ensure all 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 Include an allowance in the schedule for Work performed and paid for as Prime Cost Sum. Refer to Section 01 21 00 – Allowances for a list of activities.
- .4 Plan to complete Work in accordance with prescribed Project Schedule.

- .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 After review, revise and resubmit schedule to comply with revised project schedule.
- .7 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .8 Include the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.4 SUBMITTALS

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

1.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
- .2 Include in Project Schedule the Contractual dates under Section 01 11 00 - Summary of Work.

1.6 MASTER PLAN

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

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule separately identifies the Work by area and station.
- .3 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Contract Award
 - .2 Obtaining Permits
 - .3 Pre-mobilization Submittals
 - .4 Mobilization
 - .5 Grubbing
 - .6 Stripping
 - .7 Type D Excavation and Embankment Construction
 - .8 Type D Borrow
 - .9 Sub-Base and Base Aggregate

- .10 Retaining Wall
- .11 Asphalt milling
- .12 Asphalt Concrete Paving
- .13 Crack Sealing
- .14 Spray Patching
- .15 Culvert removal, replacement and extensions
- .16 Riprap
- .17 Topsoil
- .18 Hydraulic Seeding
- .19 Barrier installation
- .20 Traffic signage
- .21 Line painting
- .22 Rumble Strips
- .23 Interim Inspection
- .24 Remediation of any noted deficiencies
- .25 Site Clean-up / Demobilization
- .26 Final Completion

1.8 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on monthly basis or as and when requested by the Departmental Representative, reflecting activity changes and completions, as well as activities in progress.
- .2 Provide Weekly Progress Reports that identify completed work and Work planned for the following week in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Include as part of Project Schedule Update, a narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impacts with possible mitigation.

1.9 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 accepted dates shown on baseline schedule.
- .2 Meetings in accordance with Section 01 31 00 - Project Management and Coordination.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 33 00 SUBMITTAL PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an 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, and written acceptance of the submittal has been issued by the Departmental Representative.
- .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 Submittals must be accompanied by a completed Quality Control Checksheet in accordance with Section 01 45 00 – Quality Control prior to submission to Departmental Representative. This completed Quality Control Checksheet represents that all the necessary requirements have been met and that the 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 shall be considered rejected.
- .6 Notify Departmental Representative in writing at time of submission, identifying any deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work is consistent.
- .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 accepted copy of each submission on site.

1.3 "DESIGN AND BUILD", SHOP DRAWINGS, PRODUCT DATA, AND MIX DESIGNS

- .1 "Design and Build": The term "Design" refers to all detailed design activities (survey, investigation, drawings, specifications) based on general requirements contained in the Contract Documents. "Build" refers to construction of Contractor's detailed design after design has been reviewed by the Departmental Representative. Contractor's responsibility for error and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by the Contractor to illustrate details of a portion of Work.

- .3 The term “Mix Design” means an engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials properties, that is acceptable to the Departmental Representative. **Asphalt and concrete mix designs to be performed by a qualified member of the Engineers and Geoscientist of British Columbia who is licenced to practice in British Columbia, or by a qualified technician registered in British Columbia who has CCIL Asphalt Certification.**
- .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 coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to Contract Documents.
- .5 Allow fourteen (14) calendar days for Departmental Representative’s review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with the Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .8 Submit letter(s) of certification with all mix designs.
- .9 Accompany submissions with a transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor’s name and address.
 - .4 Identification and quantity of each shop drawing, mix design, product and sample.
 - .5 Other pertinent data.
- .10 Submissions shall 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 the Contract Documents.
 - .5 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication,
 - .2 Performance characteristics,
 - .3 Standards.

- .11 After the Departmental Representative's review, distribute copies.
- .12 Submit one (1) electronic copy of the shop drawings or mix design for each requirement requested in the Contract Documents and as requested by the Departmental Representative.
- .13 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Contract Documents and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .14 Delete information not applicable to project.
- .15 Supplement standard information to provide details applicable to project.
- .16 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.
- .17 The review of shop drawings and mix designs by Departmental Representative is for the sole purpose of ascertaining conformance with the Contract requirements. This review shall not mean that Departmental Representative approves details of the design inherent in shop drawings, responsibility for that shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting the generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

- .1 Material samples to be provided as outlined in the Contract Documents or as requested by the Departmental Representative.

1.5 MOCK-UPS

- .1 Not used.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

1.7 REQUIRED CONTRACTOR 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

The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of submittals in writing. 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:

- .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in Section 01 32 16 – Construction Progress Schedules. In addition, for each activity critical elements that could impact on the schedule are to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format
- .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone and cellular telephone.
- .3 Plan describing methods the Contractor will have to meet their responsibilities as the Prime Contractor for Safety and Traffic Control within the Work limits and to co-ordinate Work, traffic control, site access, safety, with other Contractors working in or adjacent to the Contract Work zone.
- .4 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone and cellular telephone. The list shall include the names and telephone/cellular telephone for contact persons who are available on a 24-hour basis in the event of emergencies.
- .5 Work Plan, describing in detail for each activity by road segment and location, the Contractor's intended methods of construction, and materials, equipment and manpower that will be used to meet stages specified in Section 01 32 16 – Construction Progress Schedules. The Work Plan must be linked to the Project Schedule.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples.
- .7 Traffic Management Plan, in accordance with the requirements of Section 01 35 31 – Special Procedures for Traffic Control.
- .8 Environmental Protection Plan (EPP) that meets the requirements of Section 01 35 43 – Environmental Procedures. Submission of EPP must allow 2 weeks for review by the Parks ESO, in accordance with Section 01 35 43 – Environmental Procedures.
- .9 Site Access and Detour Plans shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
- .10 Survey Plan describing the Contractor's intended methods of surveying during this project.
- .11 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. On site Contingency and Emergency Response Plan to address standard operating procedures to be implemented during emergency situations.
- .12 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.

- .13 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. Health and Safety Plan must include in accordance with Section 01 35 29 – Health and Safety Requirements.
- .14 BC One Call and Utilities Coordination Plan, including notifications to Utility Owners.
- .15 The Contractor shall not begin any Work on the Site until the Departmental Representative has provided a Notice to Proceed.
- .16 Submit a copy of the filed Notice of Project with Provincial authorities.
- .3 **Construction Phase Submittals**
 - .1 Monthly Progress Reports in accordance with Section 01 32 16 – Construction Progress Schedules.
 - .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities by road segment or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc. Weekly Progress Reports shall be submitted at the end of each week.
 - .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be submitted to the Departmental Representative with the Weekly Progress Report. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each Weekly Progress Report.
 - .4 “Design and Build” documents, Shop Drawings and Mix Designs – The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum fourteen (14) days prior to fabrication / production.
 - .5 Progress Photographs:
 - .1 Format:
 - .1 Electronic: .jpg files, minimum three (3) mega pixels.
 - .2 Submission requirements: one (1) set of electronic files.
 - .3 Identification: Name and number of project, description of photograph and date.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .6 Submit all electronic pictures as part of closeout package.

- .6 Submit an electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors immediately.
- .8 Submit copies of incident and accident reports immediately.
- .9 Submit daily extra work reports in accordance with Section 01 21 00 – Allowances.
- .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 Records – The Contractor shall submit a .pdf electronic file containing an itemized set of project quality control documentation.
 - .3 All other documents noted within the Contract Documents, and under Section 01 78 00 – Closeout Submittals.
- .5 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 and 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.
- .6 The Departmental Representative may, at their sole discretion, withhold payment from the Contractor for Work completed until acceptable submittal documents have been provided by the Contractor to the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 35 29 HEALTH AND SAFETY REQUIREMENTS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System
 - .1 (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia / Alberta - Occupational Health and Safety Act, depending on the province where the Work is occurring.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan in accordance with this Section and Section 01 33 00 – Submittal Procedures.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work and provide a copy to the Departmental Representative. Notice of Project to be posted onsite upon mobilization and remain posted until project completion.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. This meeting may be combined with the Organization and Start-Up meeting identified elsewhere.
 - .1 At this meeting the Contractor is required to complete and sign an Attestation to certify the Contractor will comply with the requirements set out in the Attestation and the terms and conditions of the Contract
 - .2 A copy of the “Attestation and Proof of Compliance with Occupational Health and Safety (OHS)” form is part of the Invitation to Tender package.
- .2 Parks Canada recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon Parks Canada as owner of the work place. In order to meet those requirements, Parks Canada has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving contractor(s) to undertake work in Parks Canada work places, including on Parks Canada property.

1.7 REGULATORY REQUIREMENTS

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

1.8 PROJECT / SITE CONDITIONS

- .1 Work at site will involve contact with British Columbia / Alberta Occupational Health and Safety, depending on which province the Work is occurring in.

1.9 GENERAL REQUIREMENTS

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

1.10 RESPONSIBILITY

- .1 The Contractor shall act as the Prime Contractor in all matters relating to Occupational Health and Safety. They shall conduct their work and make all such arrangements necessary to allow them to be accepted as such by the relevant Provincial Authorities.
- .2 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.
- .3 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.

1.11 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, British Columbia / Alberta, depending on which province the Work is occurring in.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORESEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or conditions 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 Departmental Representative verbally and in writing.

1.13 HEALTH AND SAFETY REPRESENTATIVE

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years' site-related working experience specific to activities associated with roadway 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.

1.14 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 Departmental Representative.

1.15 CORRECTION OF NON-COMPLIANCE

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

1.16 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written approval by the Departmental Representative.
- .2 Production of blasting powder must be done in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Do blasting operations in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

1.17 POWDER ACTUATED DEVICES

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

1.18 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

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

01 35 31 SPECIAL PROCEDURES FOR TRAFFIC CONTROL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Cost of Traffic Control, including temporary pavement markings, and detours described in this Section, shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .2 The Contractor shall receive payment for traffic management on a monthly basis prorated by the number of months working on site divided by the number of months on site identified on Contractor schedule, not to exceed the total lump sum bid price for Traffic Management.
- .3 Payment for traffic control will commence once the Contractor has implemented their accepted Traffic Management Plan and setup is accepted by the Departmental Representative.
- .4 Cost of keeping the existing roadway within the Work limits, clean, free of pot holes while Contractor is on site shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .5 The cost of snow removal required by the Contractor to complete the work identified in the Contract shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .6 The Contractor shall not be responsible for the snow removal required for general highway road maintenance operations within the limit of construction so long as the roadway has been left in a condition deemed suitable, by Departmental Representative, for maintenance crews to safely complete the work.

1.2 REFERENCES

- .1 The Contractor shall provide traffic control in accordance with:
 - .1 British Columbia - Traffic Control Manual for Work on Roadways (1999)
 - .2 BC MoTI – Standard Specifications for Highway Construction – Traffic Management for Work Zones (latest edition)
 - .3 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada. (latest edition)

1.3 QUALITY CONTROL

- .1 All Quality Control by the Contractor.

1.4 GENERAL

- .1 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.

- .2 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 the Section 2.2.1 of the **“BC MoTI - Traffic Control Manual for Work on Roadways, 1999”**.
- .3 The Contractor shall develop and implement a Traffic Management Plan in accordance with BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise in the Contract Documents. The Traffic Management Plan will include plans specific to each roadway for this project.
- .4 The Traffic Management Plan must duly consider the traffic volumes associated with the direction volume increases typically experienced on the lead up to weekends and/or special events. Adjustments to the TMP may be required at the request of the Departmental Representative to mitigate delays in excess of the stipulated maximum 20 minutes.
- .5 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.
- .6 The Contractor shall supply, install and maintain Flashing Arrow Boards (FAB), as required for the Works, in accordance with the accepted TMP. All FAB shall be as per MUTCD (latest edition). Exact installation locations of FABs to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of FABs will be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. Removal will only be permitted upon completion of the Works.
- .7 The Contractor shall supply, install and maintain 2 Portable Changeable Message Signs (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition) and shall be in both English and French with equal space allotted to each. Exact installation locations of the CMS to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of the CMS will be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. Removal of the CMS will only be permitted upon completion of the Works.
- .8 The Contractor shall supply, install and maintain 2 speed reader boards (SRB), as required for the Works. Exact installation locations of SRBs to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of SRBs will be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. Removal will only be permitted upon completion of the Works.
- .9 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. All signs are to be selected from the Construction Signage Translation Database provided in the Reference Documents.
- .10 All Changeable Message Sign (CMS) messages are to be selected from the preapproved database provided and are to be bilingual as shown.

- .1 Any signage requiring translation that is not shown in the standard translation reference documents must be approved by Parks Canada prior to fabrication.
- .11 Temporary pavement marking used shall be acceptable to the Departmental Representative and in accordance with Section 2.2.1 of the BC MoTI Traffic Control Manual for Work on Roadways, 1999. Spacing between temporary line markings to not exceed 10m.
- .12 All temporary pavement markings will be removed at the Contractor's expense prior to the completion of the Contract.
- .13 Temporary lane markings that are not consistent with the final geometric design layout shall be removed using eradication or water blasting to the satisfaction of the Departmental Representative. Blackout painting of existing lines will not be permitted. No additional payment will be made for removal of existing paint lines.
- .14 Contractor shall have appropriate traffic control measures in place so that one lane of highway traffic is maintained in each direction through the work zone at all times throughout the construction.
- .15 The Contractor shall coordinate traffic management procedures with other Contractors working in the immediate vicinity as well as collaborate with the Departmental Representative in respect to Traffic Management restrictions on the Highway Network. In consideration of the number of grading, paving and bridge construction projects in the corridor the Contractor must make a concerted effort to coordinate their traffic management strategies with other stakeholders. The Contractor must also be prepared to attend traffic management and construction staging coordination meetings as requested by the Departmental Representative.
- .16 The Contractor is responsible for keeping the roadway, within the Construction Limits, clean at all times. Sweeping, grading and/or dust control to the acceptance of the Departmental Representative is considered incidental to the Contract and no additional payment will be made.

1.5 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 (latest edition), except where specified otherwise.
- .3 When working on existing travelled way:
 - .1 Place equipment in a position presenting a minimum of interference and hazard to traveling 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 within clear zone overnight.
- .4 The Contractor shall develop and have in place a completed Traffic Management Plan taking into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. This plan shall be

updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.

- .5 The Contractor shall submit a Traffic Management Plan prior to commencement of work in accordance with Section 01 33 00 – Submittal Procedures. Short closures may be allowed by the Departmental Representative for some activities such as asphalt removal as long as the delay to motorists does not exceed **20 minutes**.
- .6 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with the requirements of the BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise.
- .7 Contractor to provide a minimum of 10.0m wide available paved surface for traffic, with at least one lane in each direction, unless otherwise authorized by the Departmental Representative.
- .8 Regardless of type of traffic control being used, maximum period of delay to public traffic shall be 20 minutes. 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.
- .9 The Contractor shall provide competent supervision and/or contact personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc., are in proper working order.
- .10 Traffic control measures will be monitored by the Departmental Representative, who may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.
- .11 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.

1.6 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 that requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the Traffic Management Plan submitted by the Contractor and approved by the Departmental Representative. **All temporary signs that are used for longer than one day shall be mounted on wood or steel posts installed in the shoulder areas at locations accepted by the Departmental Representative.**
- .3 At each end of the Work site, supply, install and maintain CMS's with a minimum of three (3) lines with 8 characters for the duration of the project.
- .4 Place signs and other devices to standards and in locations recommended in BC MoTI - Traffic Control Manual for Work on Roadways (1999). Provide intermittent signage if work zones exceed 2.0 km in length.
- .5 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 1.5m from ground to the bottom of the

sign, or as per BC MoTI - Traffic Control Manual for Work on Roadways (1999), whichever is higher.

- .6 As situation on site changes, Contractor to update their Traffic Management Plan outlining signs and other devices required for the project and submit for the acceptance of the Departmental Representative.
- .7 Continually inspect and maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability, location and height.
 - .2 Cleaning, repairing or replacing signs as required ensuring clarity and reflectance.
 - .3 Removing or covering signs that do not apply to conditions existing from day to day or time to time.

1.7 CONTROL OF PUBLIC TRAFFIC

- .1 Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in BC MoTI - Traffic Control Manual for Work on Roadways (1999).
 - .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 exiting Work Site access points.
 - .3 When vehicles are entering or exiting gravel pits in the park.
 - .4 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.
 - .5 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.
 - .6 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .7 For emergency protection when other traffic control devices are not readily available.
 - .8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .9 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to Contractor's operations: **maximum 20 minutes**. In consideration of the anticipated cumulative effect of the multiple construction sites in the corridor traffic total travel time delay through the construction zones must not exceed 90 minutes, as a result of all construction activities in GNP. To maintain that objective a concerted effort must be made between all of the active contractors to coordinate construction sequencing.
- .3 During hours of darkness, 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.

- .4 No stoppage of traffic will be allowed for the periods specified in Section 01 14 00 – Work Restrictions, pertaining to Statutory Holiday or long weekend.
- .5 If night shift operations are implemented on 2-lane undivided sections, the public traffic must be escorted through the work zone by pilot cars in both directions.

1.8 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of Contract except that, when required for construction under Contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
 - .1 Speed limit reduced to 70 km/h in work zones in non-work periods.
 - .2 Speed limit reduced to 50 km/h in work zones in work periods.
 - .3 Speed limit reduced to 50 km/h on detours at all times.
 - .4 Contractor to provide a minimum of 10.0m wide available paved surface for traffic, with at least one lane in each direction, unless otherwise authorized by the Departmental Representative.
 - .5 The delay due to single lane alternating traffic shall not exceed 20 minutes.
 - .6 A schedule for all full work zone closures required longer than 45 minutes must be provided to the Departmental Representative at least one (1) week in advance of the planned closure.
 - .7 There may be restrictions to accommodate special events within the National Parks. PCA will provide two (2) weeks' notice of any upcoming restrictions.
 - .8 The Departmental Representative reserves the right to stop work in the case of excessive traffic delays.
 - .9 Maintain existing conditions for traffic crossing right-of-way.
 - .10 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. A minimum of 4 days notice is required for changes to the accepted TMP.
 - .11 Emergency vehicles are to be directed through the Work Site immediately once conditions are safe.
 - .12 No stoppage of traffic shall be allowed during inclement weather conditions.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 No stoppage of traffic shall be allowed during inclement weather conditions.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

01 35 32 SPECIAL PROCEDURES FOR TRAFFIC DETOURS**Part 1 General****1.1 REFERENCES**

- .1 BC Supplement to TAC Geometric Design Guide (latest edition)

1.2 SUPPLIED PRODUCTS UNDER THIS SECTION

- .1 None

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Detour required for this project at Km 28.0 (Wall #2).
- .2 All work and materials associated with the design, survey, layout, construction, staging, maintenance, traffic control, markings, signing and removal of the detours shall be included under **“Lump Sum Price Item 2 – Traffic Accommodation”** no additional payment will be made.
- .3 Removal of detours to include topsoil placement, landscaping back to original state and hydroseeding. This Work is considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no additional payment will be made.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .5 Pavement markings for detours shall be in accordance with Section 32 17 23 – Pavement Markings.
- .6 Waste materials removed from the detour shall be disposed of outside the limits of the National Parks in accordance with Section 01 14 00 – Work Restrictions. No additional payment will be made for disposal of waste materials.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for construction and maintenance of these detours by the Contractor shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.4 SCHEDULE

- .1 The Contractor is prohibited from conducting work that will, in the opinion of the Departmental Representative, interfere with smooth traffic flow in accordance with Section 01 14 00 - Work Restrictions.

1.5 TRAFFIC CONTROL REQUIREMENTS

- .1 The Contractor shall provide traffic control in accordance with Section 01 35 31 – Special Procedures for Traffic Control.

1.6 DESIGN CRITERIA

- .1 Detour Road Design Speed to be 60 km/hr. Detour Road Posted Speed to be 50 km/hr. However, these criteria may be reduced by the Departmental Representative at their absolute discretion based on constructability and functionality.
- .2 Detour shall match the laning at the tie-in. Minimum travel lane width shall be 3.7 m lanes plus 1.3 m shoulders on both sides. Minimum total available paved surface width of Detour Roads to be 10.0 m at all locations. Detour is to be a minimum of two (2) lanes, one (1) lane in each direction.
- .3 Detour design must accommodate off tracking of oversized loads without impacting opposing lanes.
- .4 Detour Road pavement structure shall include:
 - .1 75mm Asphalt Concrete Pavement placed in single lift,
 - .2 150mm base course using BC MoTI 25mm well-graded base material
 - .3 275mm sub-base course using BC MoTI Select Granular Sub-base
- .5 Design shall incorporate as much as possible the final roadway layout to avoid removing detour built. Sections of the detour road incorporated into the final roadway must be constructed to match the final road structure design.
- .6 Design shall accommodate drainage and waterways in accordance with applicable environmental approvals and permits.

1.7 DETOUR DESIGN REVIEW

- .1 Provide Departmental Representative with four (4) sets of complete working Drawings and one copy of detailed design calculations, for review in accordance with Section 01 33 00 – Submittal Procedures. Drawing to show both detour and final roadway design at each stage. Drawings and design calculations to bear signature and stamp of qualified professional engineer registered or licensed in the Province of the British Columbia or Alberta, depending on which province the Work is occurring.
- .2 Verify existing site conditions and ground elevations before preparing working Drawings.

1.8 QUALITY CONTROL – TESTING

- .1 All Quality Control testing by the Contractor.
- .2 Testing as per accepted Contractor's Quality Control Plan.

Part 2 Products

2.1 MATERIALS

- .1 BC MoTI Select Granular Sub-base Aggregate to be supplied by the Contractor.
- .2 BC MoTI 25mm Well-Graded Base Aggregate to be supplied by the Contractor.
- .3 BC MoTI Class 1 – 16mm Medium Mix Asphalt Aggregate to be supplied by the Contractor.

Part 3 Execution

3.1 CONSTRUCTION AND PARTIAL REMOVAL OF DETOURS

- .1 Construction and removal to the full extent required to return to the original condition or the final design as is applicable.

3.2 MAINTENANCE OF DETOURS

- .1 Maintenance as per Contractor's Drawings and in accordance with BC MoTI Maintenance Specifications (latest edition).
- .2 Maintenance of detours shall be incidental to the Contract Works and no additional payment will be made.
- .3 During winter shutdown no detours shall remain in service and the Contractor is to reinstate the Highway and speed limits.
 - .1 Although no guarantee is provided as to when winter shutdown will be required, in the past it has been mid-October to June 1.

END OF SECTION

01 35 43 ENVIRONMENTAL PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Preparation and implementation of an Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures, including certification by a registered Qualified Environmental Professional (QEP), will not be measured separately for payment and will be considered incidental to the Work.
- .2 The cost of environmental and aesthetic protection in accordance with this Section 01 35 43 – Environmental Procedures will not be measured separately for payment and will be considered incidental to the Work.

1.2 REFERENCES

- .1 Basic Impact Analysis – Illecillewaet Curve Safety Improvements, Glacier National Park, BC March 2016
- .2 Parks Canada National Best Management Practices - May 2015
- .3 Fish Habitat Assessment, DFO Self-Assessment – Golder Sept. 28 2016
- .4 Archaeological Impact Assessment Letter of Clearance - Golder - Aug. 4 2016
- .5 MRG BMP – Burning of Brush and Woody Debris – June 2015
- .6 Direction for Permitted Users conducting Water-Related Activities – April 2017

1.3 SUBMITTALS

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures and Section 01 33 00 – Submittal Procedures. The EPP document will be reviewed and accepted for use on the project by the Departmental Representative in collaboration with the Parks Canada designated ESO.

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 a Parks Canada Administration Office, prior to commencement of the Contract. The business license must be valid for the Park in which the Work is occurring.
- .3 All Contractor's vehicles are required to display a vehicle work pass from PCA. These permits may be obtained free of charge from the PCA Administration Office once a business permit has been obtained.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act* (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .2 Refer to the PCA Basic Impact Analysis (BIA) for the Work included with this tender. The Contractor is required to implement all recommendations and mitigations, and follow all procedures and processes whether supply, construction, administration or otherwise as described in the BIA.
- .3 The Contractor shall prepare their Environmental Protection Plan (EPP) to implement the mitigations identified in the BIA as a minimum but shall ensure that all environmental requirements under the Contract and associated with the Works are appropriately managed through their EPP processes.
- .4 Where there is a discrepancy or inconsistency between the BIA and other documents, the BIA takes precedence over other documents.
- .5 Failure to comply with or observe environmental protection measures as identified in the Contract Documents may result in the work being suspended pending rectification of the problems.

1.6 START-UP AND ENVIRONMENTAL BRIEFING

- .1 **All staff employed at the construction site will be required to attend an approximate one (1) hour environmental briefing presented by PCA prior to their commencement of work on site.** It is recognized that new employees may join the Contractors' work force after the initial round of "environmental briefing". In that case and as required, subsequent "environmental briefings" can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the "environmental briefing" will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.
- .2 Parks Canada will have an ESO attending the site to inspect 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 inspect 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.
- .3 The ESO is not to act as daily environmental monitor, but shall check activities with the approved EPP to ensure compliance, at their discretion. The Contractor's QEP shall be responsible for ensuring all activities are conducted in accordance with the approved environmental documents.

1.7 ENVIRONMENTAL PROTECTION PLAN

- .1 The EPP is to be prepared and certified by a Qualified Environmental Professional. Certification by a QEP is considered incidental to the Works and no additional payment will be made.
- .2 Changes and/or revisions to the EPP may be required by the ESO as the Work progresses and more information becomes available. No additional payment will be made for changes and/or revisions to the EPP.
- .3 The Contractor's EPP will detail how the work limits shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO.
- .4 The EPP will include how the Contractor will manage all environmental risks and specify site-specific details for implementing mitigation or achieving mitigation outcomes identified in the BIA.
- .5 Spill Response and Erosion and Sedimentation Management Plans are to be included in the EPP, in accordance with this Section.
- .6 QEP resumes are to be included in the EPP for Departmental Representative and ESO review.
- .7 The Contractor shall submit the EPP in accordance with Section 01 33 00 – Submittal Procedures, yet **allow no less than 2 weeks for the review of their EPP** and shall address and respond to all comments raised during the review within a maximum of 2 weeks.

1.8 RESTRICTED ACTIVITY PERMITS

- .1 Prior to commencing any activity, the Contractor may be required to first obtain a Restricted Activity Permit (RAP) in consultation with PCA and Departmental Representative.
- .2 Prior to mobilization, Contractor is to establish what RAPs are required for the Works, for the duration of the project. Include, in the project schedule, the acquisition of the application for RAPs, allowing no less than 2 weeks for review and acceptance by the ESO.
- .3 Contractor shall list RAPs they require in the EPP.
- .4 The Contractor is required to submit an application form to the Departmental Representative for each required RAP.
- .5 RAP application details include, but are not limited to: Name of activity, start and end date of activity, location of Work, Contractor company name and address, Contractor contact name, phone number and email address and vehicle / equipment information.
- .6 Following the application submission, the Contractor may be required to provide further details regarding the Work to PCA.
- .7 Submission of a RAP application to the Departmental Representative does not permit the Contractor to commence the restricted activity.

1.9 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Points of access from the existing roadway to the various construction sites will be required. The Contractor shall review both short and long-term construction access requirements with the Departmental Representative, both at start-up and on an ongoing basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles.
- .2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

1.10 ACCIDENTAL FINDS

- .1 It is possible that a scattering of historic objects will be found within the Project limits. If significant features are encountered, stop Work in the immediate area, notify the Departmental Representative, take photographs of the findings and a GIS location reading.
- .2 Significant features include items such as:
 - .1 Structural remains, high artifact concentrations, tent platforms, log cribbing retaining features, human remains, marked trees and other various items.
 - .2 If unsure, contact the Departmental Representative immediately.
- .3 The Departmental Representative will notify the Contractor when Works can resume in the area.
- .4 Should any process or requirements regarding archeological matters listed in this Section contradict the BIA, the BIA shall take precedence.

1.11 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 A RAP application will be required for any permitted Work camps or off-highway operation of a motor vehicle.
- .2 A Contractor's office and work headquarters material laydown, equipment parking and storage area will be permitted in accordance with this Section and Section 01 14 00 - Work Restrictions.
- .3 Removal and storage of snow shall be in accordance with Section 01 35 31 - Special Procedures for Traffic Control. If coordination is required, the Contractor shall coordinate through the Departmental Representative.
- .4 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down dry materials and rubbish. Dust generated during the grade construction and or utilization of any temporary access roads must be kept at a reasonable level so as not to impart any hazard to the public traffic. Control measures must be initiated as and when required and may require increased vigilance at the discretion of the Departmental Representative.

1.12 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 The Contractor's QEP shall prepare an Erosion and Sedimentation Management Plan (ESMP) for the components of the Contract that are undertaken in proximity to watercourses, wetlands or riparian environments. The plan shall be included in the EPP and prepared to the satisfaction of the Departmental Representative and ESO.
- .2 The ESMP shall be prepared so as to ensure that there is no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are <250 mg/L, or a maximum instantaneous increase of 10% over background levels when background levels are >250 mg/L. This threshold shall not be exceeded.
- .3 If necessary, on-site sediment control measures shall be constructed and functional prior to initiating construction activities.
- .4 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control performance.
- .5 The site will be secured against erosion during any periods of construction inactivity or shutdown.

1.13 SPECIFIC CONCERNS RELATIVE TO WATER DIVERSIONS

- .1 The Contractor's EPP shall describe the proposed locations and types of temporary stream or channel diversions, complete with construction procedures and timing of construction. Temporary stream or channel diversions shall be subject to the same environmental constraints as permanent watercourses and shall be built to pass, at least, the 10-year return period flood for the time of year during which the temporary diversion will be in place. Temporary stream or channel diversions that have been constructed during periods of low precipitation shall be completely removed prior to periods of increased precipitation unless otherwise approved by the Departmental Representative.

1.14 POLLUTION CONTROL

- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres from watercourses.
- .2 A Spill Response Plan will be prepared by the Contractor's QEP as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and PCA and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products

- and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, fuels, solvents, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
- .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from watercourses.
 - .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection / drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
 - .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
 - .6 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
 - .7 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. Parks Canada Dispatch shall be notified immediately of any spill immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
 - .8 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
 - .9 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.15 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the National Parks before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer

- than 100 metres from any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative and ESO.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
 - .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed above.
 - .5 Equipment used on the project shall be fuelled with E10, and low sulfur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of vehicles is avoided.
 - .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc., anywhere within the National Parks.
 - .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
 - .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in the National Parks. Alternatively, the Contractor may hire a security person employed to prevent vandalism in accordance with Section 01 52 00 - Construction Facilities.

1.16 OPERATION OF EQUIPMENT

- .1 Equipment movements shall be restricted to the 'footprint' of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities. Some of the construction shall require working close to watercourses or water bodies. In these instances, the Contractor is to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) do not enter any watercourses, to the satisfaction of the Departmental Representative and ESO.
- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the right-of-way or into watercourses or water bodies.
- .3 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 features

beyond the designated work area, the Contractor shall be responsible, at their expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc., to the satisfaction of the Departmental Representative and ESO.

- .4 Restrict vehicle movements to work limits.
- .5 Workers private vehicles are to remain within the construction footprint.

1.17 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher shall be carried and available for use on each machine and at locations within the plant in the event of fire. Basic firefighting equipment recommended (e.g. a water truck; minimum 500 Imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two pulaskis, and two five-gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all the Contractors' staff.
- .2 A water truck may be necessary and will depend on the timing of the Contract (e.g. not required during winter or snow-covered conditions).
- .3 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .4 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. Parks Canada Dispatch shall be notified immediately of any fire immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified.
- .6 Fires or burning of waste materials is not permitted.

1.18 WILDLIFE

- .1 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- .2 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- .3 Notify the ESO and Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported within 24 hours. If the ESO or Departmental Representative is not available, Parks Canada Dispatch will be contacted at a phone number provided in the Preconstruction Meeting.

1.19 RELICS AND ANTIQUITIES

- .1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site

shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.

- .2 All historical or archaeological objects found in the National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.20 WASTE MATERIALS STORAGE AND REMOVAL

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in the National Parks. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers will have lids, and waste loads shall be covered while being transported.
- .4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials.
- .5 All efforts to prevent wildlife from obtaining food, garbage or other domestic wastes shall be made by the Contractor and Contract staff while undertaking their work in the National Parks. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other attractive products to bear proof containers is mandatory. It is incumbent on the Contractor to notify Parks Canada and make specific arrangements to have garbage collected by Parks Canada when using existing Parks Canada receptacles.
- .6 The Contractor and workers shall immediately report any circumstances related to food/garbage (e.g. overflowing container or strong smell) and wildlife to the ESO or the Departmental Representative. If neither can be reached, the Contractor/worker shall immediately contact Parks Canada Dispatch at the phone number provided in the Preconstruction Meeting and report the details.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.21 PRODUCTS

- .1 Not Used.

Part 2 Execution**2.1 INSTREAM WORK**

- .1 In accordance with this Section, the National BMPs and the BIAs.
- .2 A QEP hired by the contractor will provide surveillance while working within 30 metres of a watercourse and during any instream works, in accordance with the applicable BIA. The QEP is considered incidental to the Work and no additional payment will be made.
- .3 The period of least risk for instream works is in accordance Section 01 14 00 – Work Restrictions.

2.2 WATER EXTRACTION AND DISTRIBUTORS

- .4 All water related activities are to be conducted in accordance with *Direction for Permitted Users conducting water-related activities in Alberta*.
- .5 Backflow prevention is required on all water trucks.
- .6 All water trucks and water extraction equipment must be thoroughly cleaned prior to entering any Park. Proof of cleaning must be provided to the Departmental Representative and ESO for verification.
- .7 Extraction of water within any National Park requires a RAP.
- .8 Care must be taken by the Contractor to ensure extracted water does not enter another water body, other than the initial source of extraction.
- .9 ESO may require water trucks to be cleaned prior to moving between sites within the Parks to mitigate the risk of cross- contamination of water bodies.

2.3 CLEARING AND GRUBBING

- .1 Clearing, grubbing and/or tree removal is only permitted during the migratory bird least risk window, which is September 1 – March 31 in Glacier National Park. A RAP must be obtained prior to any vegetation removal. Clearing, grubbing and/or tree removal will only be permitted outside of the migratory bird least risk window upon written approval by the Departmental Representative.

2.4 SPECIFIC CONCERNS RELATIVE TO SENSITIVE SITES AND ACTIVITIES

- .1 Grade construction and paving activity near streams, rivers, wetlands, water bodies or watercourses must be undertaken with care to prevent damage to aquatic and riparian habitat or associated tree and plant communities. A large and mobile spill kit shall be kept at hand during construction at these sensitive sites in proximity to watercourses.

END OF SECTION

01 45 00 QUALITY CONTROL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete
- .2 BC MoTI – Standard Specifications for Highway Construction Manual (latest edition)

1.3 QUALITY CONTROL PLAN

- .1 Contractor's quality control plan shall be in accordance with Section 101 of the BC MoTI – Standard Specifications for Highway Construction (latest edition).
- .2 Submittals in accordance with Section 01 33 00 – Submittals Procedures.

1.4 TESTING BY THE CONTRACTOR

- .1 Testing required to provide quality control to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, miscellaneous metals, concrete barriers, and all source acceptance testing; and
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 Testing proposed shall be based on testing requirements in the latest edition of the BC MoTI Standard Specifications for Highway Construction in collaboration with current ASTM and CSA Standards or as stated below.
- .3 All Quality Control technicians are to be certified by Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .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 during embankment construction will be as follows:

CONSTRUCTION TYPE	TEST TYPE	MINIMUM FREQUENCY OF TESTS
Embankment construction with fine grained or granular soil	Standard Proctor by: ASTM D698	1 per change in material or 1 per week, whichever is more frequent
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 – Nuclear	1 per 1000 m ² per lift, spaced randomly across full width of embankment
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Embankment construction with blasted rock or oversize granular	Field observation with daily field report; and a summary report signed and stamped by the Contractor's Engineer.	Full time during blasted rock placement
Road structure construction with granular materials	Standard Proctor by: ASTM D698	1 for each material type and 1 for each accepted change in material gradation.
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 – Nuclear	3 tests per 50 m per lift; on centreline and on lt and rt fog lines
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Culvert Installation	Field Density	Minimum three per 300 mm lift per culvert, spaced through the length and depth of the culvert backfill

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	ASTM C136 / C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates	- Split Stockpiles: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 tonnes.
	Or C 117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	- Blend Sand: 1 for every 100 tonnes during stockpiling. - Natural filler: 1 for every 50 tonnes during stockpiling.

Tests During Aggregate Production (cont.)	ASTM D5821 – Standard Test Method for 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 / C 136M – Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	D 2216 – Moisture Content	Aggregate: 2 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.
	D 6307 – Asphalt Extraction, Ignition Method	One/Sub-Lot.
	D 5 / D 5M – 13 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix production.
	D 2171 / D 2171M – Viscosity	Contractor's Option
	D 2041 / D 2041M – Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245- 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 100 mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

**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.*

** 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.*

1.5 CONTRACTOR'S QUALITY CONTROL PROGRAM

- .1 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Control Program shall be described in a Quality Control Plan. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. 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.
- .3 The Quality Control Plan shall 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 testing 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 Departmental Representative, if the Departmental Representative witnesses the tests; and
 - .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 Contract Document compliance.

- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of their time dedicated to quality matters and who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matters and shall be onsite for the duration of the Contract.
- .5 The Quality Control Plan shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .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. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.6 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, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order any 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.
- .5 The Departmental Representative will provide the Contractor with an Approval to Proceed document, after performing an audit and confirming all requirements are met, as stated in Section 01 71 00 - Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.
 - .1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

1.7 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will 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.

1.8 ACCESS TO WORK

- .1 Allow inspection / testing agencies access to Work, including but not limited to: off site manufacturing and fabrication plants, QC testing facilities and asphalt plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.9 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Provide labour and facilities to obtain and handle samples and materials on site.

1.10 NON-CONFORMANCES

- .1 A Non-Conformance can relate to any item within the Contract including but not limited to: materials testing, lines and levels, products, design-build items, traffic accommodation, quality control, environmental, health and safety, and other general procedural matters including communication protocols.
- .2 Contractor's Internal Non-Conformance Report (NCR):
 - .1 Should the Contractor's QC reporting indicate that the Work is not in conformance, the Contractor's QC Manager shall issue an internal Non-Conformance Report (NCR) to the Contractor, with a copy to the Departmental Representative, including a response time.
 - .3 The Contractor shall then respond to the QC Manager, with a copy to the Departmental Representative, with respect to the NCR, within the specified time, with proposed resolutions and corrective actions. The Contractor and/or the QC Manager shall consult with the Departmental Representative on the resolutions.
 - .4 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
 - .5 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .6 Owner Issued NCR:
 - .1 Should the Quality Assurance reporting indicate that the Work is not in conformance, the Departmental Representative will issue to the Contractor a NCR, including a response time.
 - .2 The Contractor shall then respond to that NCR, within the specified time, with proposed resolutions and corrective actions.
 - .3 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.

- .4 Assurance testing and inspection will be performed to determine if the corrective action has provided an acceptable product. Acceptance and rejection will continue until the Departmental Representative determines that a quality product has been achieved.
- .5 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .7 The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.
- .8 Appealing an NCR:
 - .1 If the Contractor disputes the validity of a finding in an NCR, the Contractor may file an appeal with the Departmental Representative. The Departmental Representative and the Contractor Representative will use all reasonable efforts to refine the area of dispute and to resolve the determination of conformance with the Contract.
 - .2 If the Departmental Representative and the Contractor Representative cannot come to a mutually agreeable resolution, the Work that is the subject of the Non-Conformance Report shall be re-evaluated by an independent third-party, selected by the Departmental Representative in consultation with the Contractor, at a test frequency equivalent to twice that specified in the Contract or to such other frequency as may be mutually agreed between the Departmental Representative and the Contractor.
 - .3 If the appeal testing confirms the non-conformance determination, all appeal testing costs will be borne by the Contractor. If the appeal testing shows that the Work did in fact meet the requirements of the Contract, all appeal testing costs will be borne by the Owner.

1.11 OPPORTUNITIES FOR IMPROVEMENT

- .1 Should the QA review indicate that the Work is not in conformance, but the variance is deemed minor by the Departmental Representative, the Departmental Representative may issue an Opportunity for Improvement (OFI) report.
- .2 The Contractor is encouraged to review the findings and undertake such modifications to the QC Plan and the work procedures as necessary to address the issue.

1.12 REJECTED WORK

- .1 Remove defective Work, whether as a result of poor workmanship, use of defective products or damage and whether incorporated in Work or not. Replace or re-execute defective Work in accordance with Contract Documents, through the NCR process.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in the opinion of the Departmental Representative, it is not expedient to the greater benefit of the Project to remedy defective Work or Work not performed in accordance with Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by Contract Documents, the amount of which shall be determined by Departmental Representative.

1.13 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.

1.14 TESTS AND MIX DESIGNS

- .1 Furnish test results and designs as may be requested.

1.15 MILL TESTS

- .1 Submit mill test certificates as required in the Contract Documents.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 52 00 CONSTRUCTION FACILITIES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 All work of this section except for the provision of the Departmental Representatives office trailer, shall be incidental to Contract and will not be measured for payment.

1.2 INSTALLATION AND REMOVAL

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

1.3 SITE STORAGE / LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 CONSTRUCTION PARKING

- .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 Build and maintain temporary roads and provide snow removal during period of Work.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.5 SECURITY

- .1 If required by the Contractor, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays. For extended shut-downs, the Contractor shall provide the level of security as required to protect the Work. The Contractor is advised that some random acts of vandalism to equipment have occurred within the Park. Cost of security personnel is incidental to the Work and no additional payment will be made.
- .2 It is strongly advised that the Contractor consider the provision of security personnel.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.7 SANITARY FACILITIES

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

1.8 CONSTRUCTION SIGNAGE

- .1 To be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 56 00 TEMPORARY BARRIERS AND ENCLOSURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to the Contract and will not be measured for payment.

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

- .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 GUARDRAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.

1.5 WEATHER ENCLOSURES

- .1 Not used.

1.6 DUST TIGHT SCREENS

- .1 Not used.

1.7 ACCESS TO SITE

- .1 Provide and maintain access roads, as may be required for access to Work.

1.8 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 the public in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 In accordance with Section 01 14 00 - Work Restrictions.

1.10 PRODUCTS

- .1 Not Used.

Part 2 Execution

- .1 Not Used

Project No. 566-04

Trans Canada Highway
Illecillewaet Curve Safety Improvements -
Phase 1A Km 26.1 to 28.2
and
Pavement Rehabilitation Km 3.8 to 43.8

Glacier National Park

Parks Canada Agency

Page 70

END OF SECTION

01 61 00 COMMON PRODUCT REQUIREMENTS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 REFERENCE STANDARDS

- .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 the Contract Documents.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced 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 (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in Contract Documents, maintain uniformity of manufacture for any particular or like item throughout building.

1.4 AVAILABILITY

- .1 Immediately after signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work
- .2 In the event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

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

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the Contract Documents, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between Contract Documents and manufacturer's instructions, so that Departmental Representative may 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 In accordance with Section 01 45 00 – Quality Control.
- .2 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .3 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.9 CO-ORDINATION

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

1.10 CONCEALMENT

- .1 The Departmental Representative will inspect all work prior to any concrete pours. The Contractor shall notify the Departmental Representative 24 hours before any pour for inspection.

1.11 REMEDIAL WORK

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

1.12 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 non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings that cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 PROTECTION OF WORK IN PROGRESS

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

Part 2 Products

- .1 Materials shall be in accordance with BC MoTI –Standard Specifications for Highway Construction (latest edition), or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be completed in accordance with BC MoTI – Standard Specifications for Highway Construction (latest edition), or as directed by the Departmental Representative.

END OF SECTION

01 71 00 EXAMINATION AND PREPARATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 REFERENCES

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

1.3 QUALIFICATIONS OF SURVEYOR

- .1 Qualified surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY REQUIREMENTS

- .1 The Departmental Representative shall identify the location of all work sites.
- .2 The Contractor shall be responsible for all other survey and layout work identified in the Contract documents and as required to complete the works including but not limited to:
 - .1 Establishing lines and levels, locate and layout, by instrumentation.
 - .2 Staking for grading, cut and fill.
 - .3 Staking for slopes and top of embankment, sub-base course, base course and centreline for paving.
 - .4 Establishing culverts, catch basin structures, invert elevations and locations.
 - .5 Layout for interim and final lane markings, including those for intersection treatments
 - .6 Re-establishing the start and finish of "No Passing Zones", Passing Lanes or at new limits as directed by the Departmental Representative
 - .7 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
- .3 Survey Accuracy:
 - .1 All survey work shall be tied into the existing Control Monument Network with grid coordinates in UTM Zone 11 NAD 83. Departmental Representative will provide information on Control Points.
 - .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
 - .3 Secondary Control Points will be tied into and relative to Control Monument Network. Accuracy for Control Point surveys shall be to second order:
 - .4 Horizontal shall be less than $r = 5(d+0.2)$ where "r" is in cm and "d" is in km
 - .5 Vertical shall be less than $0.008 \times \sqrt{k}$ where k is distance in kilometres.
- .4 Staking accuracy shall be:

- .1 In bush areas, all elevations shall be within 100 mm of correct elevation. In open ground, all elevations shall be within 50 mm of correct elevation.
- .2 In bush areas, all horizontal locations shall be within 100 mm of Design. In open ground, all horizontal locations shall be within 50 mm of Design.
- .3 On highway surface, all elevations shall be within 100 mm of correct elevation.
- .4 All structures shall be within 20 mm of Design elevation and horizontal
- .5 The Contractor shall provide cut sheet reports to the Departmental Representative for all stages of road construction to demonstrate that the defined construction tolerances have been achieved before advancing to the next stage.
- .6 The Departmental Representative will complete quality assurance construction survey measurements to verify grades and alignment, interim survey re-measurements for excavation limits and final neat line measurements to verify payment quantities for completed works.
- .7 Contractor to provide cut sheet reports for all layers of road template to prove they meet the Contract tolerances. Departmental Representative to verify that they are correct by performing an audit.
 - .1 Shots are to be taken at 10m intervals along centreline, mid-points and shoulders.
 - .2 The Departmental Representative will provide the Contractor with an Approval to Proceed document in accordance with Section 01 45 00 - Quality Control.
- .8 Contractor to provide a stake out report as requested by the Departmental Representative.

1.5 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.6 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 On request of Departmental Representative, submit survey data.
- .4 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform to the Contract Documents.

Part 2 Products

- .1 Not Used.

Part 3 Execution**3.1 CROSS SECTIONS**

- .1 Cross sections will be taken at a maximum of 20 metre intervals. Additional cross sections will be taken where variations occur, including but not limited to: drainage channels, structures and/or other obstructions.
- .1 Cross section intervals will be established on OG and are to be used for the duration of the project.

3.2 LAYOUT REQUIREMENTS

<u>Survey Layout</u>	<u>Maximum Interval</u>	<u>Product</u>
Right-of-way	At each point of deflection and at sufficient points between as to be continuously visible.	Stake showing station and offset, or flagging.
Clearing and Grubbing	Same as Right-of-way.	Same as Right-of-way.
Grading – Slope Stakes	10 m in rock cuts; 20 m in all other cases. (100 m for machine-controlled grading)	One slope stake each side, at top of cut or bottom of fill, showing station, offset, vertical dimension to subgrade, and slope, plus cut/fill transition stake. Non-standard ditches will be staked separately. An additional slope stake, where applicable, at the top of a rock cut after the removal of overburden.
Grading – Subgrade	20 m. (100 m for machine-controlled grading)	One stake at each side of the subgrade, showing station, offset and grade at the stake location, one at each break point, and one at centreline.
Top of Sub-base	20 m. (100 m for machine-controlled grading)	One stake at each side of the sub-base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.
Each Base Course	20 m. (100 m for machine-controlled grading)	One stake at each side of the base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.
Final Base Course only	20 m. (100 m for machine-controlled grading)	One stake at each side of the base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.
Culverts	Inlet and outlet.	One stake at each end of the culvert, plus an offset line, showing invert elevation and station.
Storm Drainage, Subdrain, Watermain or Sanitary Sewer		Stakes showing locations of manholes, catch basins and other structures, and invert locations of pipe inlets and outlets, as well as stations.
Retaining Walls	Not more than 10 m, and at alignment changes.	One stake showing control line location and either the elevation at the top of the wall or the elevation at the bottom of footing excavation, as well as station.
Paving	20 m	Stake showing station and offset, reference points (e.g. centerline offset, barrier, changes in paint lines etc.)
Superelevation change	At percentage change points	Stakes showing station and superelevation percentage.
Concrete Barriers	Same as paving.	Same as paving.

Signs		Stake at each sign location with stationing and sign designation.
Curb and Gutter	10 m and at alignment changes. Curb returns: 5 m or at quarter points, whichever is less.	Offset hub and nail with cut/fill to gutter grade, show stationing.
Median/Island Curb	Continuous.	Paint line at face/edge of curb
Pavement Marking	10 m, changes in line type, symbols	Paint dots and lines

3.3 MACHINE CONTROLLED GRADING

- .1 Machine controlled grading may be used as a substitute for conventional grade staking under the following conditions:
 - .1 The equipment utilized shall be capable of meeting the Design vertical and horizontal tolerances and the use of machine-controlled equipment will in no way relieve the Contractor of the requirement to meet the specified tolerances.
 - .2 The Departmental Representative may require the Contractor to revert to conventional staking methods at any point during construction if the machine-controlled grading is producing unacceptable Work and the cost of doing so will be borne by the Contractor.
 - .3 The Departmental Representative may provide the Contractor the available electronic files of Design information without warrant with respect to the suitability for the purposes intended by the Contractor and the cost of making them suitable shall be borne by the Contractor. The Contractor remains responsible for completing the works as described in the Contract Documents, even in the event that the electronic Design information provided is not consistent with the Contract Documents.
- .2 As a minimum, the Contractor shall provide an orientation stake every 100 metres showing station, offset and grade.

END OF SECTION

01 74 11 CLEANING**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 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 regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice in accordance with Section 01 35 31 – Special Procedures for Traffic Control
- .4 Keep roadway clean in accordance with Section 01 35 31 – Special Procedures for Traffic Control
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 One bear proof container will be provided by Parks Canada. Contractor to provide any additional on-site bear proof containers they require for collection of waste materials and debris.
- .7 Remove waste material and debris from site at end of each working day.
- .8 Dispose of waste materials and debris off site.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 The Departmental Representative and Environmental Surveillance Officer may, at their total discretion, require the Contractor to suspend work activities until such a time as the Work Site is cleaned and debris, waste, and animal attractants are satisfactorily managed. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .3 Remove waste products and debris including that caused by Owner or other Contractors.

- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Inspect finishes, and ensure specified workmanship and operation.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.
- .9 Remove all construction debris and accumulated dirt from completed drainage systems; manholes; catch basins; and all piping.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 77 00 CLOSEOUT PROCEDURES

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for Final Inspection.
 - .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 78 00 CLOSEOUT SUBMITTALS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following documents and information to the Departmental Representative prior to them being eligible for Final Completion as detailed in Section 01 77 00 – Closeout Procedures.

1.3 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the 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.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.4 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque Drawings and in copy of the Project Manual.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.

- .2 Changes made by change orders.
- .3 Details not on original Contract Drawings.
- .4 References to related shop drawings and modifications.
- .4 Specifications: legibly mark each item to record actual construction, including:
 - .1 Changes made by Addenda and change orders.

1.5 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.6 WARRANTIES AND BONDS

- .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 the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

02 41 13 ASPHALT PAVEMENT REMOVAL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Payment under “**Unit Price Item 1 – Asphalt Pavement Removal**” shall be the total compensation for all operations involved in milling and pulverizing including but not limited to survey, cold milling, sweeping, loading, hauling, stockpiling and cleaning of remaining pavement surface. Measurement for payment in square metres of asphalt pavement of existing roadway actually removed and stockpiled. Milling shall be completed according to the Contract Documents or as directed by the Departmental Representative, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 No overhaul will be paid for this Work.
- .3 For Profile Milling, the depth of milling is not uniform and will vary from 0 – 150mm deep depending on location.
- .4 For Partial depth milling, the depth of milling shall be 50mm or less as directed by the Departmental Representative.
- .5 Payment per square metre of asphalt removal, whether partial or full depth, 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.
- .6 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.
- .7 Asphalt Concrete Pavement placing at milled tie-in location is considered incidental to the Work and no additional payment will be made.
- .8 Cleaning of existing pavement shoulder, whether via sweeping or other methods, is considered incidental to the Work and no additional payment will be made.
- .9 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 - Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .10 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**” and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.
- .11 Environmental mitigations required in accordance with Section 01 35 43 –Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse in accordance with Section 01 35 43 - Environmental Procedures.

1.3 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.

- .1 Partial Depth Milling: Removal of asphalt concrete pavement, other than Profile Milling.

Part 2 Products

2.1 EQUIPMENT

- .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 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 Have appropriate Traffic Control measures in accordance with Section 01 35 31 - Special Procedures for 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 If required, full depth asphalt pavement removal shall be done to the lines shown on the IFC Drawings or as designated by the Departmental Representative.
- .2 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.
- .3 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.
- .4 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.
- .5 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.

- .6 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.

3.4 STOCKPILING OF MATERIAL

- .1 The Contractor shall place removed asphalt milling material in a stockpile at the East Gate Debris Field or at other locations designated by the Departmental Representative.
- .2 Removed asphalt milling material Stockpiled at the East Gate Debris Field shall remain the property of Parks Canada.
- .3 **1,500** cubic metres of asphalt milling material produced under this project will be made available to the Contractor to haul outside of the Park for processing into Reclaimed Asphalt Pavement (RAP) for use in this project. Any costs associated with the removal of milling material from the Park and processing into RAP shall be considered incidental to the unit price items.

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 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

02 81 01 HAZARDOUS MATERIAL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work shall be incidental to Contract and will not be measured for payment.

1.2 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHWR Regulations), SOR/92-637.
- .2 National Fire Code of Canada 1995.
- .3 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).
- .4 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .5 Parks Canada National Best Management Practices - May 2015

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Retain current Material Safety Data Sheet (MSDS) for each hazardous material required on site. Submit MSDS to Departmental Representative upon request.

1.5 STORAGE AND HANDLING

- .1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

- .4 All explosives must be mixed outside of the Park and delivered to the site. No storage of explosives shall be allowed within the National Parks.
- .5 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .6 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .7 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .8 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept the material.

- .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report any discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

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

Part 3 Execution

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

END OF SECTION

10 14 53 **TRAFFIC SIGNAGE**

Part 1 General

1.1 REFERENCES

- .1 Parks Canada Exterior Signage Standards and Guidelines (latest edition)
- .2 ASTM A276, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- .3 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 ASTM B210M, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .5 ASTM B211M, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.
- .6 CAN/CSA-G40.21 Structural Quality Steels.
- .7 CAN/CSA-G16-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CAN/CSA-O80 Series, Wood Preservation.
- .9 CSA O121M, Douglas Fir Plywood.
- .10 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
- .11 CGSB1-GP-12c-65, Standard Paint Colours:
- .12 CAN/CGSB-1.28, Alkyd, Exterior House Paint.
- .13 CAN/CGSB-1.59, Alkyd, Exterior Gloss Enamel.
- .14 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).
- .15 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.
- .16 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.
- .17 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
- .18 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.
- .19 CGSB 31-GP-3M-88, Corrosion Preventive Compound, Cold Application, Soft Film.
- .20 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.
- .21 CGSB 62-GP-11M-78, Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing.
- .22 BC MoTI Standard Specification for Highway Construction (latest edition), Section 635.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment Procedures for removal and disposal of existing signage, markers, hangers, posts and bases as indicated will be based on each complete unit removed and disposed of outside of the Parks and shall include all labour, equipment and material to satisfactorily complete this item of work. Payment will be made under **“Unit Price Item 2a – Traffic Signage – Remove and Dispose”**.
- .2 Measurement and Payment Procedures for supplying, loading, hauling and installation of hangers, posts, bases and incidental pieces will be based on each complete unit installed according to the Contract Documents, and shall include all labour, equipment and material

to satisfactorily complete this item of work. Payment will be made under “**Unit Price Item 2b – Traffic Signage – Supply and Install – Steel Post, Base and Hanger**”.

- .3 Measurement and Payment Procedures for supplying, loading, hauling and installation of sign faces will be based on the square meter area of sign face supplied and installed according to the Contract Documents, and shall include all labour, equipment and material to satisfactorily complete this item of work. Payment will be made under “**Unit Price Item 2c – Traffic Signage – Supply and Install – Sign Face**”.
- .4 Filling the holes from removal and disposal of signs will be incidental to the Work.
- .5 Temporary stockpiling of signs will be incidental to the Work.
- .6 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .7 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**”, and no additional payment will be made.
- .8 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Divert unused metal and/or plastic materials to recycling facility, outside of the National Parks, as approved by Departmental Representative. Disposal of waste and/or recycling is incidental to the Work and no additional payment will be made.

Part 2 Products

2.1 MATERIALS

- .1 The Contractor is responsible for supplying all materials associated with the installation of signage.
- .2 Traffic signs, posts and bases shall be supplied and installed in accordance with the Contract Documents and BC MoTI Standard Specification for Highway Construction (latest edition), Section 635.
- .3 All custom signs to be accepted by the Departmental Representative prior to ordering.
- .4 All signs (permanent and temporary) shall be in both English and French. Translations to be accepted by the Departmental Representative prior to ordering.

Part 3 Execution

3.1 INSTALLATION

- .1 In accordance with BC MoTI Standard Specification for Highway Construction (latest edition), Section 635.
- .2 The Contractor shall load, haul and install supplied single post and aluminum signs and bases in the following manner:

- .1 The Contractor is responsible for locating power / telephone / gas lines / services / utilities at all proposed sign locations.
- .2 The Contractor is responsible for layout and measurements to ensure signs are installed as per the Contract Documents.
- .3 Concrete bases: Excavate one hole for the concrete base at the location and depth as per the Contract Documents. Using some of the excavated material, level and compact bottom of hole. Place base with one side parallel to the edge of asphalt and level. The top of the base is to be flush or 50mm above finished grade.
- .4 Adjust the post height by using a pipe cutter or cut off saw in accordance with BC MoTI Standard Specification for Highway Construction (latest edition), Section 635. The Contractor will measure existing elevations at each site and calculate the cuts needed.
- .5 Bases must be perfectly plumb. Vertical and horizontal tolerances for the base are 0.075m. Tolerance for the plumb of the posts is 0.01 m per 1.0 m or 1/4" on a two-foot carpenters level. Tolerances for the signs are 0.075 m for distance from asphalt and 0.075 m for height above white line.
- .6 The Contractor is responsible for hauling all materials to and from each work site.
- .7 Landscape so the top of the base is flush or 50 mm above finished grade.
- .8 Remove all excess material from site, including boulders larger than 100 mm.
- .9 All signs are to be covered until the Departmental Representative advises to uncover.
- .10 Payment for this item shall be based on the number of signs installed and shall include all material, labour and equipment required to satisfactorily complete this item of work.

3.2 REMOVE AND DISPOSE

- .1 Signage, posts and bases or foundations are to be removed and disposed of outside of the Parks. Disposal is considered incidental to the item and no additional payment will be made.
- .2 Fill holes with gravel and compact.

3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers, in accordance with Section 01 74 11 - Cleaning

END OF SECTION

31 05 10 CORRECTED DRY DENSITY FOR FILL**Part 1 General****1.1 SUMMARY**

- .1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 19mm.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
 - .2 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .3 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .4 ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 DEFINITIONS

- .1 Corrected maximum dry density is defined as:
 - .1 $D = (D1 \times D2) / ((F1 \times D2) + (F2 \times D1))$.
 - .2 $D = (F1 \times D1) + (0.9 \times D2 \times F2)$.
 - .3 Where: D = corrected maximum dry density kg/m³.
 - .4 F1 = fraction (decimal) of total field sample passing 19mm sieve.
 - .5 F2 = fraction (decimal) of total field sample retained on 19mm sieve (equal to 1.00 - F1).
 - .6 D1 = maximum dry density, kg/m³ of material passing 19mm sieve determined in accordance with Method A of ASTM D1557.
 - .7 D2 = bulk density, kg/m³, of material retained on 19mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
- .1 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 wet method when directed by Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

Project No. 566-04

Trans Canada Highway
Illecillewaet Curve Safety Improvements -
Phase 1A Km 26.1 to 28.2
and
Pavement Rehabilitation Km 3.8 to 43.8

Glacier National Park

Parks Canada Agency

Page 94

END OF SECTION

Section 31 05 10
CORRECTED DRY DENSITY FOR FILL

31 11 00 CLEARING AND GRUBBING**Part 1 General****1.1 REFERENCES**

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Quantities for payment for grubbing will be paid under **“Unit Price Item 3 – Grubbing”** and will be measured based on the areas in horizontal (2D) hectares of grubbing that has been acceptably completed in accordance with the Contract Documents and will, unless otherwise specified, be measured from the edge of the existing pavement to 1m past the cut fill line as shown approximately on the IFC Drawings or as directed by the Departmental Representative. Payment under this item shall include all labour, equipment and material to satisfactorily complete the work.
- .2 If required, quantities for payment for clearing will be paid under **“Lump Sum Item 3 – Prime Cost Sum”** and will be measured based on the area in horizontal (2D) hectares of clearing that has been acceptably completed in accordance with the Contract Documents and will, unless otherwise specified, be measured from the edge of the existing pavement to 3m past the cut fill line as shown approximately on the IFC Drawings or as directed by the Departmental Representative. Payment under this item shall include all labour, equipment and material to satisfactorily complete the work.
- .3 Clearing and grubbing waste shall be removed from the Park. Loading, hauling and disposal of clearing and grubbing waste shall be incidental to the Work.
- .4 No overhaul will be paid for clearing and grubbing.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor
- .8 Bird surveys must be completed and current for all Works on clearing, 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 and be current. No additional payment will be made for bird surveys.
- .9 If the Contractor is requested to arrange for sale of merchantable timber. Any credit for the sale of merchantable timber will be reimbursed to the Contract under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
 - .1 Loading, hauling and delivering merchantable timber is considered incidental to the Work.

- .10 Removal and disposal of previously felled timber to be incidental to **“Unit Price Item 3 – Grubbing”** and no additional payment will be made.
- .11 The extent of grubbing shall be as indicated in the Contract Documents and the Contractor shall not commence work on this activity until approval to proceed has been granted by the Departmental Representative.

1.3 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 60mm 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.

1.4 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor as per Section 01 45 00 – Quality Control.

1.5 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

- .1 Not used.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site and verify with Departmental Representative, items designated to remain.

3.2 CLEARING

- .1 If required, 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 600mm 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 guaranteed and can only be carried out when a Restricted Activity Permit (RAP) has been requested, granted and authorized by the MRG Field Unit

Superintendent as coordinated with the Departmental Representative and in accordance with Section 01 35 43 – Environmental Procedures. All burning will follow the guidelines outlined in the MRG Best Management Practice – Burning of Brush and Woody Debris and will be carried out at the Contractor's expense.

- .4 If burning of Woody Debris is not approved, the Contractor must haul the debris outside of the Parks and dispose of at their cost.
- .5 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 woody 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 Mechanical distributed areas and burn piles 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

31 24 13 ROADWAY AND DRAINAGE EXCAVATION

Part 1 General

1.1 REFERENCES

- .1 BC MoTI Standard Specifications for Highway Construction (latest edition).
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³) (600 kN-m/m³).
- .3 Geotechnical Investigation and Stability Assessment, East Gate Landslide Deflection Berm – March 27, 2017

1.2 DESCRIPTION

- .1 This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimension indicated in the Contract Documents and as directed by the Departmental Representative and includes:
 - .1 Stripping of organic material.
 - .2 Roadway, culvert and borrow excavation.
 - .3 Construction of roadside ditches, embankments, permanent access and connecting roads, approaches, entrances and other earthworks necessary for the construction of the Project.
 - .4 Removal and disposal of unsuitable / surplus materials from excavations.
 - .5 Transportation of excavated materials.
 - .6 Finishing of top surfaces and slopes.
 - .7 Maintenance of the work set forth under this section in a finished condition until any portion thereof has been accepted as completed by the Departmental Representative.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Stripping and placement in stockpiles:
 - .1 The quantity of stripping materials for which payment will be made shall be the volume in cubic metres measured in its original position from cross-sections take before and after stripping. Payment will be made under “**Unit Price Item 4a – Roadway and Drainage Excavation - Stripping and Stockpiling**” and will include cost to strip, load, haul and stockpile as directed by the Departmental Representative.
 - .2 Stripping depth for the removal of organic material is estimated to be on average 200 mm but will fluctuate from one location to the other. Contamination of non-organic material will not be permitted during stripping.
 - .3 No overhaul will be paid for this Work.
 - .4 Stripping material is to be hauled to and stockpiled at Glacier Station, or other location(s) as directed by the Departmental Representative. Loading, hauling,

stockpiling and managing stockpiles is incidental to the work and no additional payment will be made.

- .5 In areas where the design subgrade ditch elevation is less than the depth of stripping, payment will only be made to the design grade (neatline). No payment will be made for stripping below the design ditch grade.
 - .6 No payment will be made if the ditch of backslope are overcut below the design grade line and/or if the area needs to be filled back in to grade.
 - .7 Stockpiling along the ROW outside of the cut/fill slope will not be permitted unless approval has been given by the Departmental Representative.
 - .8 **Screening of stripping/organic material will be paid for in accordance with Section 32 91 19 - Topsoil Placement and Grading.**
- .2 Roadway and Drainage Excavation:
- .1 The quantity of Type D shall be measured by neatline cubic meter volumes calculated from the Design surface and cross sections taken by the Departmental Representative in areas of excavation. Payment will be made under **“Unit Price Item 4b - Roadway and Drainage Excavation - Type D Exc – Cut and Place Embankment as Fill”** and shall include cost of excavating, loading, hauling, placing and compacting material within the limits of the Works.
 - .2 The quantity of borrow fill from East Gate Landslide incorporated into the Work for which payment will be made shall be the volume in neat line cubic metres measured from cross sections taken by Departmental Representative in areas of fill. Payment will be made under **“Unit Price Item 4c – Roadway and Drainage Excavation – Type D Exc – Place Fill from East Gate Landslide”** and shall include cost of access road construction and maintenance, drainage management, sorting of woody debris and boulders, temporary stockpiling, loading, hauling, placing, compacting and moisture adjustment (watering or drying) of suitable material for the construction of the roadway embankment in accordance with the Contract Documents.
 - .1 Contractor must have Traffic Control Personnel at the entrance and exits for any borrow site(s) while hauling borrow material in accordance with Section 01 35 31 Special Procedures for Traffic Control. Traffic Accommodation at the borrow site(s) is considered incidental to the Work and no additional payment will be made.
 - .2 No additional payment will be made for separating and stockpiling unsuitable material, boulders and woody debris from borrow locations.
 - .3 The quantity of Type D Excavation material deemed by the Departmental Representative as unsuitable and/or surplus for which payment shall be made will be the volume in cubic metres measured in its original position from cross sections taken by Departmental Representative in areas of excavation. Payment will be made under **“Unit Price Item 4d – Roadway and Drainage Excavation Type D Exc – Dispose of Unsuitable Material”** and shall include cost of excavation, loading, hauling, and disposal of material outside of the Park at a location determined by the Contractor.

- .4 Separating of organic material from non-organic material and stockpiling, as directed by the Departmental Representative, is considered incidental to the Work and no additional payment will be made.
- .5 The Contractor shall take care not to contaminate suitable embankment materials with unsuitable materials.
- .6 Written Approval to Proceed must be completed by the Departmental Representative prior to sub-excavation for the removal of unsuitable material(s). Sub-excavation for the removal of unsuitable material(s) to be paid under **“Unit Price Item 4d – Roadway and Drainage Excavation – Type D Exc – Dispose of Unsuitable Material”**.
- .7 Payment for Excavation of material deemed by the Departmental Representative as Type A will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
 - .1 Type A Excavation will be measured as the in situ “bank” volume of rock excavated, based on survey measurements taken by the Contractor and confirmed by the Departmental Representative. Payment for this item will be made per cubic meter and shall include the cost of drilling, blasting, rock hammering, excavation, loading, hauling, placement and or disposal of unsuitable / surplus material as directed by the Departmental Representative. Over-excavation and over-break beyond the Limits of Excavation, and secondary breaking of oversize material resulting from blasting will not be measured for payment. The agreed upon pricing shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.
 - .2 The Contractor shall submit an existing rock face survey for review prior to proceeding with removal works, and all costs related are considered incidental to Type A Excavation.
 - .3 Structural support, remedial work, half barrels, or blast hole traces shall not be visible on the final rock face and shall be considered incidental to Type A Excavation.
- .8 Payment will not be made until all related submittals have been received and approved by the Departmental Representative.
- .9 Departmental Representative will take initial cross sections upon completion of grubbing and again upon completion of stripping and immediately prior to excavation of material to be incorporated into work.
- .10 No overhaul will be paid.
- .11 Embankment construction will not be measured for payment directly, rather it shall be considered incidental to **“Unit Price Item 4 – Roadway and Drainage Excavation”**.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .4 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.

- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor
- .6 No measurement payment will be made for:
 - .1 Excavating unnecessarily beyond design lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
 - .2 If overcut, no payment will be made for filling an area back to grade.
 - .3 Loading hauling, placing and compaction of boulders less than 2.0 cubic metres into large embankments.
 - .4 Scarifying or benching existing slopes or existing road surfaces.
 - .5 Removing unsuitable material from embankment attributable to negligence.
 - .6 Overhaul.
 - .7 Watering, drying or compacting soils to achieve specified densities inclusive of all compaction efforts.
 - .8 Proof rolling.
 - .9 Compaction of material (300 mm) below subgrade horizon in areas of cut.
 - .10 Placing material in stockpiles, grading, or maintaining the stockpile site.
 - .11 Finishing.

1.4 DEFINITIONS

- .1 Type A Rock Excavation: excavation of:
 - .1 All forms of “solid rock in place” occurring in masses, ledges, seams or layers of sufficient hardness to require breaking by continuous drilling and blasting before excavation and removal.
 - .2 Detached masses of rock or boulders individually containing a volume of 2.0 cubic metres or more.
- .2 Type D Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .3 Borrow:
 - .1 Suitable material obtained from locations outside the limits of the roadway cut and placed as embankment material.
- .4 Stripping: excavation of organic material covering original ground.
- .5 Embankment: material derived from usable excavation and placed above original ground or stripped surface.
- .6 Unsuitable Material: material unsuitable for embankment, embankment foundation, and material surplus to requirements.
- .7 Topsoil: material passing a 100 mm sieve and capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.5 QUALITY CONTROL

- .1 Regulatory Requirements:

- .1 Adhere to regulations of authority having jurisdiction when blasting is required.
- .2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .2 All Quality Control testing by the Contractor in accordance with Section 01 45 00 – Quality Control.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Waste shall be disposed of at a suitable disposal facility outside of the National Parks.

Part 2 Products

2.1 MATERIALS

- .1 Embankment materials require acceptance by Departmental Representative.
 - .1 The Contractor shall provide material test certificates to the Departmental Representative for consideration.
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Borrow material:
 - .1 Obtained from the East Gate Landslide.
 - .1 The East Gate Landslide borrow material is as per Geotechnical Investigation and Stability Assessment, East Gate Landslide Deflection Berm – March 27, 2017.
 - .2 Oversized rock and woody debris are present in the borrow material. Contractor is responsible for sorting out rock, woody debris and other unsuitable materials prior to hauling borrow material to site. No additional payment will be made for sorting out of rock, woody debris or other unsuitable materials.
 - .2 BC MoTI Standard Specification for Highway Construction Section 201 (latest edition)

Part 3 Execution

3.1 UTILITY COORDINATION

- .2 In accordance with Section 01 14 00 - Work Restrictions.
- .3 Coordinate relocations or protection of utilities (manholes, ducts, conduits or other associated infrastructure) with utility service providers and perform works required to complete relocation or protection. Work to be in accordance with utility service provider instruction or as directed by the Departmental Representative.
- .4 Existing buried utilities are to be located at all new culvert locations and every 100 m along segments of the Work where the utilities may be damaged by the Work, by using

low impact excavation such as hydrovac or similar methods which will not damage buried utilities.

- .5 Payment for locating utilities is incidental to the Works and no additional payment will be made.
- .6 Payment for utility relocations or protection to include all coordination efforts, labour, equipment and materials to be made under **“Lump Sum Item 3 – Prime Cost Sum”** in accordance with Section 01 21 00 - Allowances and Section 01 14 00 - Work Restrictions.

3.2 COMPACTION EQUIPMENT

- .1 Compaction equipment must be equivalent of one 12 tonne vibratory packer capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.

3.3 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution and in accordance with Section 01 35 43 – Environmental Procedures.

3.4 STRIPPING OF TOPSOIL

- .1 Commence topsoil stripping of areas on acceptance by the Departmental Representative after clearing and grubbing debris have been removed from these areas.
- .2 Strip topsoil to depths as verified by the Departmental Representative. Do not mix topsoil with subsoil. Stripping depth will vary.
- .3 Stockpile stripped materials at Glacier Stations directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material.
 - .1 Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of each stripping pile.

3.5 EXCAVATING

- .1 General:
 - .1 Notify the Departmental Representative when unsuitable materials are encountered and remove to depth and extent as approved by the Departmental Representative. This material shall be hauled to and stockpile at the designated pit locations.
 - .2 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact. Compact top 300 mm below final subgrade elevation to minimum 100% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.

- .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with the Contract Documents.
- .4 The dimensions of the excavations and embankments shall be, in accordance with the typical sections accompanying these specifications.
 - .1 The dimensions of any excavations and / or embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances warrant.
- .2 Drainage:
 - .1 Maintain profiles, crowns and cross slopes to provide positive surface drainage at all times.
 - .2 Provide ditches as work progresses for positive drainage.
- .3 Type A excavation:
 - .1 Notify the Departmental Representative if material appearing to conform to classification for rock is encountered, to enable measurements to be made to determine volume of rock. Allow at least 24 hours, for Departmental Representative's site review of excavation.
 - .2 The Contractor shall submit statement of qualifications and experience of all personnel assigned to drilling and blasting duties. The driller and the blaster shall have a minimum of 5 consecutive years demonstrated experience in drilling and controlled blasting work on projects involving rock cuts over 8 m height on transportation corridors.
 - .3 The Contractor shall retain a blasting consultant, acceptable to the Departmental Representative, to provide a blast design and quality control. The blast consultant shall not be an employee of the Contractor, explosive manufacturer or explosive distributor. Prior to the pre-construction meeting, the Contractor shall provide the name and qualifications of the blasting consultant. The consultant shall have a minimum of 5 consecutive years demonstrated experience in preparation of successful blast designs along transportation corridors.
 - .4 Submit a Rock Blast Design in accordance with Section 01 33 00 – Submittal Procedures and Section 204.04.07 of the BC MoTI Standard Specification for Highway Construction (latest edition).
 - .5 Shatter rock to 300 mm below subgrade elevation.
 - .6 Contractor shall be responsible for safety of all blasting. Particular attention should be paid to control of rock falls from excavation slopes so there is no hazard to Park users and wildlife during construction. Contractor shall advise Departmental Representative 24 hours prior to blasting operations. Contractor shall control blasting so there is no flyrock damaging existing trees and vegetation.
 - .7 All rock on cut face that is loose, hanging or that creates a potentially dangerous situation shall be removed or stabilized during or upon completion of excavation of each lift. Drilling of next lift will not be allowed until this work has been completed. Other methods such as machine scaling, hydraulic splitters or light blasting may be used in lieu of, or to supplement hand scaling.
 - .8 Controlled Blasting:

- .1 The purpose of controlled blasting is to minimize damage to rock back slope and to help ensure long-term stability.
 - .2 Controlled blasting will involve controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes to produce a free surface or shear plane in rock along specific excavation backs slope. Controlled blasting techniques will be used for this project.
 - .3 The slopes of the cut shall be scaled of all loose material and ditches shall be formed and cleaned.
 - .4 Subgrade shall be constructed to a true and uniform surface as to line and grade preparatory to application of sub-base material.
- .4 Borrow Excavation:
- .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
 - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
 - .3 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
 - .4 Remove waste and stripping material from borrow pits to designated locations.
 - .5 Slope edges of borrow areas to minimum 3:1 and provide drainage as directed.
 - .6 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

3.6 EMBANKMENTS

- .1 This item consists of the construction of the subgrade in embankments and cuts to the lines, grades, cross-sections and dimensions as per the Contract Documents.
- .2 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of the Departmental Representative.
- .3 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
 - .1 Place and compact to full width in layers not exceeding 200 mm loose thickness. The Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .6 Rock Embankments:
 - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 0.7 m.
 - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.

- .3 Fill surface voids at design elevation with rock spalls or selected material to form earth-tight surface.
- .4 The Contractor may place rock embankments during freezing conditions provided compaction equipment of sufficient size to break large rock particles is used and all snow and ice is removed from fill surface.
- .7 Deductions from excavation will be made for overbuild of embankments.
- .8 Excess Excavation placed in stockpile in the designated pits:
 - .1 Material in the quantities specified shall be placed in the designated pits or as otherwise directed by the Departmental Representative.
 - .2 The Contractor shall place, grade and track pack the material in stockpile as necessary to allow for construction access and the movement of equipment.
 - .3 The Contractor shall maintain access to the stockpile area and allow for access to the stockpiled material by others.
 - .4 Materials placed in the designated pits, once accepted by the Departmental Representative, are the property of PCA.

3.7 SUBGRADE COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Embankment material shall be placed in successive uniform layers over the entire area as follows:
 - .1 Material containing less than 25 percent by volume of stones larger than 100 mm shall be constructed in successive horizontal layers not exceeding 200 mm in loose thickness except that the top 500 mm shall be constructed in layers not exceeding 100 mm in loose thickness
 - .2 Material containing 25 percent or more by volume of stones larger than 100 mm shall be placed in layers not exceeding the maximum size of the stones. Stones larger than 100 mm shall not be placed within 150 mm of the subgrade elevation.
 - .3 In embankments composed principally of material obtained from rock cuts, the larger stones shall be carefully distributed and the interstices filled with smaller stones and other material to form a compact mass. Such embankments shall be constructed in layers not exceeding 1 metre. The placing of individual rocks and boulders exceeding 1.0 metres in least dimension will be permitted provided they are carefully distributed and the interstices filled with finer material to form a dense and compact mass. Each layer, before starting the next, shall be levelled and smoothed with suitable equipment. Hauling and spreading equipment shall be operated over the full width of each layer.
- .9 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.
- .10 Compact each layer to minimum 95% Standard Proctor density, ASTM D698 (AASHTO T99). Top 300 mm of subgrade to be compacted to 100% Standard Proctor density, ASTM D698 (AASHTO T99).
- .11 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

- .12 For rock placed as fill, compact with large steel wheeled or tracked equipment of sufficient size to break larger particles. Compact until rock fill is stable under compaction equipment and all voids are filled.

3.8 PROOF ROLLING

- .1 Finished subgrade must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. The prepared subgrade shall receive one complete coverage by the tires of a truck as specified.
- .2 Proof roll subgrade. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective subgrade:
- .1 Remove subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Type D material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Replace subgrade material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.

3.9 FINISHING

- .1 Shape entire subgrade to within ± 15 mm of design elevations but not to be uniformly high or low.
- .2 Round top of back slope as shown on the Drawings.
- .3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.
- .4 Trim between constructed slopes and edge of clearing to provide drainage.

3.10 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by the Departmental Representative.

END OF SECTION

31 32 19 GEOTEXTILES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 The supply and installation of Geotextiles including but not limited to non-woven geotextile, geo-grid, silt fences, and geosynthetic berms will not be measured directly for payment and shall be considered incidental to the unit price items.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D4716, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .5 ASTM A123 / A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-M89(R2013), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .3 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .4 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .5 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .6 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .7 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 BC MoTI - Standard Specifications for Highway Construction (latest edition)
- .5 BC MoTI - Standard Specifications for Bridge Construction (latest edition)

1.3 SUBMITTALS

- .1 Submit samples in accordance with 01 33 00 – Submittal Procedures for each type of geotextile used.
- .2 Submit copies of mill test data and certificates in accordance with Section 01 33 00 – Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

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

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with the EPP.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products**2.1 MATERIAL**

- .1 Nonwoven geotextile shall meet or exceed the specifications of Nilex 4552 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
- .2 Geotextiles required for construction of Retaining Walls to be as per Section 32 32 34 – Reinforced Soil Retaining Walls.

Part 3 Execution**3.1 INSTALLATION**

- .1 Filter Fabric for Riprap area requirements:
 - .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with Pins.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
 - .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .5 Pin successive strips of geotextile with securing pins at 3m intervals.
 - .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .8 Place and compact Riprap in accordance with Section 31 37 00 - Riprap.
- .9 Install as per manufacturers specifications.

3.2 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

3.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with the EPP.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

3.4 CLEANING

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 Unused geotextiles to be removed from the Park at the Contractor's expense.
- .3 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner and in accordance with Section 01 35 43 - Environmental Procedures.

END OF SECTION

31 37 00 RIPRAP**Part 1 General****1.1 REFERENCES**

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The quantity of Owner supplied placed Riprap that will be measured for payment, shall be the number of neatline cubic metres installed and accepted in the completed Work. Payment will be made under **“Unit Price Item 5 – Load, Haul and Place Riprap – Class 25”** and shall include all labour, equipment and material to satisfactorily complete this item as specified.
- .2 Riprap to be installed in accordance with the Contract Documents and to the satisfaction of the Departmental Representative.
- .3 No overhaul will be paid for this Work.
- .4 Suitable Riprap material to be loaded and hauled from the East Gate Landslide and delivered to the sites where Riprap material is required. Surplus Riprap not required on site is to be hauled back to the East Gate Landslide at the Contractor’s cost.
- .5 Processing of rock / boulders at East Gate Landslide if required to produce suitable Riprap material shall be paid under **“Lump Sum Item 3 – Prime Cost Sum.”**
- .6 Sorting processed rock materials to produce suitable Riprap product will not be measured for payment and shall be considered incidental to the Work.
- .7 Excavation, preparation of Riprap base, geotextiles, and any other related materials will be considered incidental to the work.
- .8 Testing of Riprap is considered incidental to the Work and no additional payment will be made.
- .9 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .10 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .1 Remove materials defined as hazardous or toxic and dispose of outside of the Parks.
- .2 Divert leftover geotextiles to recycling facility as approved by Departmental Representative. Disposal and/or recycling, including hauling, is incidental to the Work.

Part 2 Products**2.1 STONE**

- .1 Hard, dense with specific gravity not less than 2.60, free from seams, cracks or other structural defects, to meet following Class for use intended:
 - .1 Only non-acid generating and non-metal leaching rock is suitable.
 - .2 Riprap will be obtained from the East Gate Landslide. The Contractor will be responsible for sorting of Riprap, delivering to the sites and placing where Riprap is required.
 - .3 Riprap for Culverts inlet / outlet, spillways and barrier drains:
 - .1 BC MoTI Class 25 Riprap
 - .4 Riprap for spillways and barrier drains:
 - .1 BC MoTI Class 10 Riprap

2.2 GEOTEXTILE FILTER

- .1 Geotextile: in accordance with Section 31 32 19 - Geotextiles.

Part 3 Execution**3.1 INSTALLATION OF RIPRAP**

- .1 Contractor shall do the layout for placement of Riprap.
- .2 Where Riprap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .3 Place Geotextile, as applicable, in accordance with Section 31 32 19 - Geotextiles.
- .4 Fine grade area where Riprap is to be placed, to a uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .5 Place Riprap (by machine or by hand) to thickness and details as indicated or as agreed to by the Departmental Representative.
- .6 Place stones in manner accepted by Departmental Representative to secure surface and create a stable mass or to match existing Streambed. On slopes, place larger stones at bottom of slopes.
- .7 Hand placing Riprap:
 - .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

32 01 11 ASPHALT PAVEMENT CRACK SEALING**Part 1 General****1.1 REFERENCES**

- .1 BC MoTI - Standard Specifications for Highway Construction (latest edition)
- .2 BC MoTI Asphalt Pavement Maintenance:
<https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/highway-bridge-maintenance/pavement-marking/asphaltpavementmaintenance.pdf>

1.2 WORK DESCRIPTION

- .1 The purpose of crack sealing is to prolong the life of existing pavements by preventing moisture from penetrating the roadway structure, and by preventing the spalling of material from the edges of the cracks. The work shall consist of sealing cracks with crack sealant between the limits shown on the Drawings or as directed by the Departmental Representative.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for **“Unit Price Item 6 – Asphalt Pavement Crack Sealing”** will be measured by linear meter crack sealant product applied in areas designated by the Departmental Representative. Payment shall be compensation in full all materials, labour and equipment to complete the Work in accordance with the Contract Documents.
- .2 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.
- .4 Environmental mitigations required in accordance with Section 01 35 43 –Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.

1.4 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 33 00 – Submittal Procedures.
- .2 The Contractor shall provide the Departmental Representative with the following information in accordance with 01 33 00 – Submittal Procedures, prior to commencing the Work:
 - .1 Name and mailing address of crack sealant supplier and manufacturer.
 - .2 Name of crack sealant product to be supplied.
 - .3 Written confirmation from the manufacturer that the crack sealant to be supplied meets all specified requirements along with test results that demonstrate that the product meets all specified requirements.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures
- .2 The Contractor shall submit to the Departmental Representative two 4L containers of filler proposed for use at least two weeks prior to beginning work and prior to any change in product or Manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 – Common Product Requirements 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect pavement sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products**2.1 MATERIALS**

- .1 The Contractor must use a seal product from the current BC MoTI Recognized Products List.

2.2 EQUIPMENT

- .1 Pressure applicator capable of applying sealant at 100kpa by means of hose and wand fitted with size of tip suitable for cracks.
- .2 Manual Pouring cones.
- .3 Hand tools.
- .4 All Equipment necessary to complete the crack sealing Work outlined in the Contract.

Part 3 Execution**3.1 QUALITY CONTROL**

- .1 Contractor is responsible for all Quality Control required in accordance with Section 01 45 00 – Quality Control.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pavement sealant application in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation after unacceptable conditions have been fixed and an "Approval to Proceed" from the Departmental Representative has been issued.

3.3 PREPARATION

- .1 Clean all cracks before any sealant is used.
- .2 Remove existing sealer and loose materials
 - .1 From spalled edges and pavement surface.
 - .2 To minimum depth of 50mm.
- .3 Clean loose material from cracks with oil free compressed air applied at pressure not less than 600 kPa.
- .4 Dispose of material removed from the cracks to a location outside the National Parks.

3.4 CRACK SEALING

- .1 Ensure cracks are clean and dry immediately before filling.
- .2 Fill cracks as per the manufacturers instructions.
- .3 Fill cracks specified in the Contract documents or cracks that have been designated and accepted by the Departmental Representative.
- .4 Fill cracks when air temperature is above 10°C, when daily low temperature does not fall below 5°C, and when no rain is forecasted for the day.
- .5 Fill and tamp cracks with sufficient applications to ensure cured fill material is level with pavement surface.
- .6 Cracks wider than 50 mm, within a section of road designated for overlay, must be filled with hot mix asphalt concrete and tamped, immediately prior to placement of asphalt concrete overlay, where accepted by the Departmental Representative.
- .7 Cracks wider than 50 mm, within a section of road not designated for overlay, shall be repaired by asphalt pavement spray patching.
- .8 Remove and dispose of excess sealing material as directed by the Departmental Representative.
- .9 Overlay paving will not be permitted over the repaired areas for two (2) months after crack sealing.
 - .1 This time may be reduced based on the seal manufacturer's recommendations.
- .10 Keep traffic off newly filled cracks for two (2) hours or as specified by the manufacturer.

3.5 CLEANING

- .1 Cleaning shall be in accordance with Section 01 74 11 - Cleaning

END SECTION

32 01 12 ASPHALT PAVEMENT SPRAY PATCHING**Part 1 General****1.1 REFERENCES**

- .1 BC MoTI - Standard Specifications for Highway Construction (latest edition)
- .2 BC MoTI Asphalt Pavement Maintenance:
<https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/highway-bridge-maintenance/pavement-marking/asphaltpavementmaintenance.pdf>

1.2 WORK DESCRIPTION

- .1 The Work consists of repairing transverse and longitudinal cracks by cleaning the defect of all rock, dirt, sand and other objectionable material, applying crack sealant as a tack material, filling with a mixture of crack sealant and crushed aggregate and compacting the mix.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for **“Unit Price Item 7 – Asphalt Pavement Spray Patching”** will be at the Unit Price bid per Litre of asphalt binder incorporated into the Work. Measurement will be based on the supplier’s delivery slips and the actual amount applied. Payment shall be compensation in full all materials, labour and equipment to complete the Work in accordance with the Contract Documents. Production and supply of spray patch aggregate will not be measured for payment and shall be considered incidental to the Work.
- .2 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.
- .4 Environmental mitigations required in accordance with Section 01 35 43 –Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.

1.4 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 33 00 – Submittal Procedures.
- .2 The Contractor shall provide the Departmental Representative with the following information in accordance with 01 33 00 – Submittal Procedures, prior to commencing the Work:
 - .1 Name and mailing address of crack sealant product Supplier and Manufacturer.
 - .2 Name of crack sealant product to be supplied.
 - .3 Written confirmation from the Manufacturer that the crack sealant to be supplied meets all specified requirements along with test results that demonstrate that the product meets all specified requirements.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures
- .2 The Contractor shall submit to the Departmental Representative two 4L containers of crack sealant proposed for use at least two weeks prior to beginning work and prior to any change in product or Manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 – Common Product Requirements 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect pavement sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products**2.1 MATERIALS**

- .1 Spray Patch Crack Sealant
 - .1 The Contractor must use a product from the BC MoTI Recognized Products List.
- .2 Aggregate
 - .1 Aggregate to be supplied by the Contractor in accordance with BC MoTI - Standard Specifications for Highway Construction (latest edition) Section 536 Pavement Crack Sealing, Blinding Sand.

2.2 EQUIPMENT

- .1 All Equipment necessary to complete the spray patching Work including but not limited to:
 - .1 A compressor for high pressure air with a minimum rated capacity of 5.2 cubic metres per minute (185 CFM) cable of blowing the crack clean of all dirt, sand, rock, or other objectionable material.
 - .2 A proprietary or prototype machine capable of spraying the crack sealant in to crack, and then combining crushed aggregate and asphalt and spraying the mixture into the crack.
 - .3 Appropriate compaction equipment.

Part 3 Execution**3.1 QUALITY CONTROL**

- .1 Contractor is responsible for all Quality Control required in accordance with Section 01 45 00 – Quality Control.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pavement filler application in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation after unacceptable conditions have been fixed and an "Approval to Proceed" from the Departmental Representative has been issued.
- .2 Generally, cracks less than 5 mm width will not require repair. Potholes or other surface defects that are contiguous with cracks are considered to be 'crack related' and are to be repaired by spray patching.

3.3 PREPARATION

- .1 All objectionable material shall be removed from the open crack and surrounding area by blowing with high pressure air streams or other means acceptable to the Departmental Representative.
- .2 Snow removal, if required, shall be the responsibility of the Contractor.

3.4 SPRAY PATCHING

- .1 Fill cracks when air temperature is above 10°C, when daily low temperature does not fall below 5°C, and when no rain is forecasted for the day.
- .2 Ensure cracks are clean and dry immediately before filling.
- .3 Spray cleaned cracks first with the crack sealant, and then spray with the combined crack sealant and aggregate.
- .4 Cracks wider than 50 mm, within a section of road designated for overlay, must be filled with hot mix asphalt concrete and tamped, immediately prior to placement of asphalt concrete overlay, where accepted by the Departmental Representative.
- .5 Cracks wider than 50 mm, within a section of road not designated for overlay, will follow the same procedure as cracks that are narrower than 50 mm.
- .6 Compact the repaired area to ensure adequate embedment of the crack sealant and aggregate mixture into and over the crack.
- .7 All loose aggregate and debris shall be swept or removed from the pavement surface and disposed of to the satisfaction of the Departmental Representative.
- .8 Overlay paving will not be permitted over the repaired areas for two (2) weeks after spray patching.
- .9 Keep traffic off newly filled cracks for two (2) hours or as specified by the manufacturer.

3.5 CLEANING

- .1 Cleaning shall be in accordance with Section 01 74 11 - Cleaning

END SECTION

32 11 20 SUB-BASE AGGREGATES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Quantity of BC MoTI Select Granular Sub-base (SGSB) shall be measured by neatline cubic meter volumes calculated from the Design cross sections for work completed and accepted by Departmental Representative. Payment shall be made under **“Unit Price Item 8 – Sub-base Aggregates”** and shall include supply, loading, hauling, placing, compacting, water for compaction and drying of material.
- .2 No overhaul will be paid for this Work.
- .3 Any temporary stockpiling of aggregates onsite is considered incidental to the Work and no additional payment will be made.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 BC MoTI Standard Specifications for Highway Construction (latest edition)

1.3 QUALITY CONTROL AND QUALITY ASSURANCE

- .1 All Quality Control testing by the Contractor in accordance with Section 01 45 00 – Quality Control.
- .2 Contractor to provide material samples to the Departmental Representative prior to works commencing for Quality Assurance purposes.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Unused Select Granular Sub-base to be hauled outside of the Park at the Contractor's expense.

Part 2 Products

2.1 MATERIALS

- .1 Materials as per BC MoTI Standard Specifications for Highway Construction (latest edition), Section 202.
- .2 BC MoTI Select Granular Sub-base is to be supplied by the Contractor from outside the Park.

Part 3 Execution

3.1 PLACING

- .1 Sub-base Aggregates
 - .1 Load, haul and place Sub-Base Aggregates after subgrade has achieved the requirements of the Contract Documents.
 - .2 Construct Sub-Base Aggregates to depth and grade in areas indicated in the Contract Documents.
 - .3 Ensure no frozen material is placed.
 - .4 Place material only on clean unfrozen surface, free from snow or ice. For each lift, material shall be placed on crown line using a Tonne / metre Spread Sheet. Contractor shall have a checker to indicate spread distance when material is being placed.
 - .5 Begin spreading Sub-Base Aggregates material on crown line or high side of one-way slope.
 - .6 Place granular Sub-Base Aggregates materials using methods that do not lead to segregation or degradation.

- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.
- .8 Place material to full width in uniform layers not exceeding 200 mm loose thickness.
- .9 Shape each layer to smooth contour and compact to the specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 100% Standard Proctor density in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 Dry as necessary to obtain specified density.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .7 Heavy earth compacting equipment or other heavy construction equipment shall not be used within 3.0m of the abutments or wing walls.
- .8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 PROOF ROLLING

- .1 Sub-base Aggregates must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. Each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck as specified.
- .2 Proof roll granular Sub-base Aggregates. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective Sub-base Aggregates:
 - .1 Remove Sub-base Aggregates material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Type D material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Replace Sub-base Aggregates material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.

3.4 SITE TOLERANCES

- .1 Finished Sub-base Aggregates surface to be within $\pm 15\text{mm}$ of elevation as indicated but not uniformly high or low.

3.5 PROTECTION

- .1 Maintain finished subgrade in condition conforming to this section until succeeding base is constructed.

END OF SECTION

32 11 24 CRUSHED BASE COURSE AGGREGATE**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Quantity of BC MoTI Crushed Base Course Aggregate shall be measured by neatline cubic meter volumes calculated from the Design cross sections for work completed and accepted by Departmental Representative. Payment shall be made under the applicable item of **“Unit Price Item 9 – Crushed Base Course Aggregate”** and shall include supply, loading, hauling, placing, compacting, finishing and conditioning by wetting or drying will be incidental to the Work.
- .2 Any temporary stockpiling of aggregates onsite is considered incidental to the Work and no additional payment will be made.
- .3 No overhaul will be paid for this Work.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

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

1.3 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor in accordance with Section 01 45 00 – Quality Control.
- .2 Contractor to provide material samples to the Departmental Representative prior to works commencing for Quality Assurance purposes.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Unused Crushed Base Course Aggregate to be hauled outside of the Park at the Contractor's expense.

Part 2 Products

2.1 MATERIALS

- .1 Materials as per BC Standard Specifications for Highway Construction Section 202 (latest edition).
 - .1 BC MoTI 25mm Well-Graded Base Material to be supplied by the Contractor from outside the Park.
 - .2 BC MoTI 50mm Well-Graded Base Material to be supplied by the Contractor from outside the Park.

Part 3 Execution

3.1 PLACING

- .1 Load, haul and place base aggregate after sub-base aggregate surface is inspected and accepted by Departmental Representative.
- .2 Placing
 - .1 Construct base aggregate to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice. For each lift, material shall be placed on crown line using a Tonne / metre spreadsheet. Contractor shall have a checker to indicate spread distance when material is being placed.
 - .4 Begin spreading base aggregate on crown line or on high side of one-way slope.
 - .5 Place material using methods that do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.

- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to the specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density not less than 100% Standard Proctor density in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .4 Apply water as necessary during compacting to obtain specified density.
- .5 Dry as necessary to obtain specified compaction.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 PROOF ROLLING

- .1 Crushed Base Course Aggregate must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. Each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck as specified.
- .2 Proof roll Crushed Base Course Aggregate. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective Crushed Base Course Aggregate, Sub-base Aggregates or subgrade:
 - .1 Remove Sub-base Aggregates and subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Type D material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Replace Sub-base Aggregates and/or Crushed Base Course Aggregate material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.

3.4 SITE TOLERANCES

- .1 Finished base surface to be within +/- 10 mm of established grade and cross section but not uniformly high or low.
- .1 Finished sub-base surface to be within +/- 15 mm of elevation as indicated but not uniformly high or low.

3.5 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied.

END OF SECTION

32 12 14 ASPHALT TACK COAT**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Supply, delivery and application of tack coat will not be measured separately and will be incidental to **“Unit Price Item 10 – Asphalt Concrete Pavement - EPS”**.

1.2 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)

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.
- .3 Sample asphalt tack coat material to: ASTM D140.
- .4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.4 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.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with ASTM D140.
- .3 Provide, maintain and restore asphalt storage area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused asphalt materials to facility capable of recycling materials.

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.
- .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

32 12 16 ASPHALT CONCRETE PAVEMENT (EPS)**Part 1 General****1.1 REFERENCES**

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

1.2 WORK DESCRIPTION

- .1 Work shall consist of supplying, loading, hauling and placing BC MoTI Medium Mix Class 1 – 16mm 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 16mm 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 BC MoTI Standard Specifications for Highway Construction (latest edition), Section 502 – Use of Reclaimed Asphalt Pavement in Asphalt Pavement Construction (latest edition).
- .5 Perform 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 Milled Rumble Strips to be installed as detailed herein and as directed by the Departmental Representative.
- .7 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 on the IFC Drawings or as directed by the Departmental Representative. Payment for this Work to be incidental to asphalt Unit Price items.
- .8 Acceptance and/or rejection of all placed Asphalt Concrete Pavement shall be determined in accordance with the EPS. The Contractor shall be fully responsible for the removal and replacement of rejected materials.

1.3 MEASUREMENT AND PAYMENT PROCEDURES AND UNIT PRICE ADJUSTMENTS

- .1 Accepted asphalt concrete pavement will be measured in tonnes by scale ticket and paid under “**Unit Price Item 10a - Asphalt Concrete Pavement (EPS) – BC MoTI Medium Mix Class 1 - 16mm**”. Payment shall be compensation in full for supply of asphalt concrete mix including all materials, supply of asphalt cement and aggregate, labour and equipment to complete the Work in accordance with the Contract Documents.

- .2 Applicable 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), and any current Special Provisions. Payments shall be under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
- .1 Smoothness testing to be arranged by the Departmental Representative.
- .3 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor shall be considered incidental to **“Unit Price Item 10 - Asphalt Concrete Pavement (EPS)”** and no additional payment will be made. Contractor shall provide a scale person, as required, at their cost.
- .4 Preparing asphalt mix designs (including anti-stripping test), in accordance with Section 01 45 00 Quality Control and Section 01 33 00 Submittal Procedures, shall be considered incidental to **“Unit Price Item 10 – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
- .5 The movement of equipment and crew, shall be considered incidental to the Work for the type of asphalt placed. 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.
- .6 Cleaning of existing pavement prior to paving is incidental to the Works and no additional payment will be made.
- .7 No overhaul will be considered for payment under this Contract.
- .8 Supply and delivery of asphalt cement shall be incidental to **“Unit Price Item 10 - Asphalt Concrete Pavement (EPS)”**.
- .9 Anti-stripping agent(s) and other additives, if required and accepted by the Departmental Representative, shall be considered incidental to **“Unit Price Item 10 – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
- .10 Measurement for the installation of Milled Rumble Strips shall be measured per lineal kilometer installed as per the Contract Documents, including layout, as accepted by the Departmental Representative. Payment shall be made under **“Unit Price Item 10b – Asphalt Concrete Pavement (EPS) - Milled Rumble Strips”**
- .11 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 15% in accordance with BC MoTI Section 505 (latest edition) and as approved by the Departmental Representative. Any costs associated with this process including labour, equipment or materials shall be considered incidental to **“Unit Price Item 10 – Asphalt Concrete Pavement – EPS”**.
- .12 Asphalt Concrete Pavement placing at milled tie-in location is considered incidental to the Work and no additional payment will be made.
- .13 Cleaning of existing pavement shoulder, whether via sweeping or other methods, is considered incidental to the Work and no additional payment will be made.
- .14 Adjustment of existing catch basin grates and manhole lids as accepted by the Departmental Representative shall be incidental to the Work.
- .15 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.

- .16 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .17 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

Part 2 Products

2.1 MATERIALS

- .1 Owner supplied materials:
 - .1 1,500 cubic meters of unprocessed millings will be made available to the Contractor.
- .2 Contractor supplied materials:
 - .1 PG 58-37 Asphalt Cement shall be used on the TCH.
 - .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 All additives (including anti-stripping agents) to be in accordance with the current Approved Products List as published by BC MoTI.

Part 3 Execution

3.1 QUALITY CONTROL

- .1 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.
- .2 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).
- .3 The Road Checker’s Summary shall be provided to the Departmental Representative no less than 24 hrs after the relevant shift end.
- .4 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.

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 Milled Rumble Strips shall be installed in accordance with BC MoTI – Supplement to TAC Geometric Design Guide Section 650 – Rumble Strips. The Milled Rumble Strips shall be continuous SRS and are to be installed at various locations along the TCH or as directed by the Departmental Representative.
 - .1 Contractor to provide layout of rumble strips, including starts and ends, in accordance with the Contract Documents.
 - .2 Contractor's Quality Control to be present during all stages of this Work.
- .3 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

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 an Asphalt Plant within the Park for this Project.
- .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

32 17 23 PAVEMENT MARKING**Part 1 General****1.1 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)

1.2 DESCRIPTION

- .1 As detailed here and in the Contract Documents, the Contractor is to supply and install pavement markings in the areas adjacent to and impacted by the Works.
- .2 The Contractor shall complete a survey of the pre-existing pavement markings prior to their disturbance so as to ensure their ability to re-instate them accurately.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Temporary Pavement Marking in accordance with Section 01 35 31 - Special Procedures for Traffic Control shall be considered incidental to the Contract and will not be measured for payment.
- .2 Final line painting shall be measured in linear metres along the centre of the paint line regardless of width or line-gap ratio. Double center lines are to be measured as one line. Payment shall be considered full compensation for all equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 11a – Pavement Marking - Line Painting”**.
- .3 Payment for final pavement gore and hatching markings as per the Contract Documents or as requested by the Departmental Representative will be made under **“Unit Price Item 11b – Pavement Markings - Gore Areas, Hatching and Stop Bars”** and shall be measured in square metres of paint work accepted and will include all labour, equipment and material to satisfactorily complete this item of work.
- .4 Gore area boundary lines shall be measured and paid for under **“Unit Price Item 11a - Pavement Marking – Line Painting”**.
- .5 Stop bars shall be paid for as though they formed painted gore markings (square metres).
- .6 Payment for final pavement turning arrow markings as per the Contract Documents or as requested by the Departmental Representative will be made under **“Unit Price Item 11c – Pavement Marking – Arrows”** will be measured per unit regardless of specific

type and shall include all labour, equipment and material to satisfactorily complete this item of work.

- .7 Removal of existing paint lines shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, in accordance with Section 01 35 31 – Special Procedures for Traffic Control, and no separate payment will be made to the Contractor.
- .8 Repair or removal and replace incorrect pavement markings as directed by the Departmental Representative shall be completed at the Contractor’s cost.
- .9 Final design Pavement Marking layout shall be by string line, surveyor or other methods accepted by the Departmental Representative. Pavement Marking layout methods shall be incidental to the Work and no separate payment will be made.
- .10 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made.
- .11 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .12 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.
- .3 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.

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 SUPPLY, 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.
- .6 Paint shall be protected from freezing.
- .7 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 If applicable, pavement markings for traffic detours shall be in accordance with Part 2 Products.

3.2 PERMANENT MARKINGS

- .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 on the IFC drawings 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 $\pm 10\text{mm}$.

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 $\pm 100\text{ mm}$ 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 $\pm 100\text{ mm}$ 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 TRAFFIC CONTROL

- .1 In accordance with Section 01 35 31 – Special Procedures for Traffic Control and Contractor's accepted Traffic Management Plan.

3.7 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.

3.8 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.

3.9 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 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.
- .4 The Contractor shall maintain records of QCIP data, complaints from the public, and other details relevant to the Work and shall provide these records to the Departmental Representative daily.

3.10 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 35 31 - Special Procedures for 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.

.1 Operation of Companion Vehicles

- .1 When the roadway to be painted is open to public traffic, the Contractor shall operate a crash attenuator vehicle and a pilot vehicle in conjunction with the painting truck during the painting of all longitudinal lines. Companion vehicle operators shall not attempt to control traffic from inside the vehicle.
- .2 The actual operating parameters of the companion vehicles will be determined by the Contractor to safely accommodate traffic and will be based on site specific conditions such as sight distances, highway geometrics and traffic patterns and volumes. Typical operating parameters are as follows:
 - .1 The crash attenuator vehicle shall be equipped with a crash attenuator that meets National Cooperative Highway Research Program, Report 350 Test Criterion. Test Level 3 for 100 km/hr. The vehicle shall follow behind the painting truck at a distance of 50 to 400 m.
 - .2 The pilot vehicle shall be driven in the same travel lane as the paint machine, following it at a constant distance of approximately two kilometres.
 - .3 The crash attenuator vehicle, pilot truck and the painting truck are to display the same message at all times. The painting truck and the companion vehicles shall be equipped with a two-way radio for communication and overhead revolving beacon with an amber lens of a minimum 180 mm high and 180 mm wide.

3.11 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.

3.12 RUMBLE STRIPS

- .1 If applicable, centre line painting to be completed following centre line rumble strip installation. Additional payment will be made for repainting of centre line paint following rumble strip installation.
- .2 If applicable, shoulder line painting to be completed prior to shoulder rumble strip installation.

END OF SECTION

32 17 31 GUIDE POSTS**Part 1 General****1.1 REFERENCES**

- .1 BC MoTI - Standard Specifications for Highway Construction (latest edition)
- .2 Canadian General Standards Board (CGSB)
 - .2 CAN/CGSB-1.28-98, Exterior Alkyd House Paint.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment Procedures for supply and installation of plastic Guide Posts will be based on each post installed according to the Contract Documents, and shall include all labour, equipment and material to satisfactorily complete this item of work. Payment will be made under **“Unit Price Item 12 – Guide Posts - Supply and Install”**.
- .2 Removal, disposal and/or storage of existing guide posts being replaced will be incidental to the Work.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .4 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.3 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Notify Departmental Representative at least 4 weeks prior to installation of proposed source of guide posts and provide access for inspection.

1.4 QUALITY CONTROL

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

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Protection:
 - .1 Stockpile guide posts as recommended by the Supplier.
 - .2 If required, stockpile guide posts at location determined by the Departmental Representative.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused metal and/or plastic materials to recycling facility approved by Departmental Representative.
- .3 Damaged posts from the removal of existing posts to recycling facility, outside of the National Parks, accepted by the Departmental Representative.

Part 2 Materials

2.1 ROUND PLASTIC POSTS

- .1 The flexible guide posts shall return to upright positions following repeated impacts and passages of vehicles over them. Such collisions shall not cause serious damage to the post or vehicle. Failure to conform to the requirements specified herein shall be cause for rejection.
- .2 General
 - .1 The posts shall be of uniform quality and workmanship and be free from defects.
 - .2 The Contractor shall provide a complete report of the physical properties of the post to the Departmental Representative. This report shall include properties such as low temperature impact resistance, after-impact recoverability and weather resistance.
- .3 Specifications - Dimensions, Colour and Construction
 - .1 The round posts shall have a minimum outer diameter of 90 mm and an overall length of 1970 mm.
 - .2 The top 250 mm of the post length shall be black and the remainder shall be white.
 - .3 The post shall be straight. Straight is defined as having no point along the length of the post any more than 6 mm removed from a perfectly straight edge placed parallel to any side of the post.
 - .4 Round posts shall be open at the top and bottom.
 - .5 The surface of the post shall be smooth and free from irregularities or defects. The surface of the post shall not be affected by cleaning using scrapers, detergent and water, or solvent.
 - .6 The black portion of the post shall accept and hold securely high-intensity reflectorized sheeting applied to its surface area with heavy-duty stainless steel staples, glue or other adhesives deemed suitable by the manufacturer.
 - .7 If one piece construction is not used, then the connections between the pieces shall be at least as strong as if constructed of a single piece. The strength shall exist at temperatures ranging from -50°C to 50°C.
 - .8 The reflective portion of round posts shall be visible from all directions and shall be of sufficient size so as to be recognizable in the dark as a guide post reflector. The reflective portion of semi-flat posts shall be visible to traffic.

- .4 Weather Resistance and Durability
 - .1 The post shall not be seriously affected by ozone, exhaust fumes, asphalt or road oils, dirt, vegetation, de-icing salts or any other types of air contamination or materials likely to be encountered after installation.
 - .2 The post shall withstand without serious damage all elements likely to be encountered after installation including hot (50°C) or cold (-50°C) temperatures, rain, snow, hail, abrasion and physical abuse.
- .5 Strength and Flexibility
 - .1 The posts shall resist, without breaking, tearing, shattering or other serious damage, one highway vehicle impact at a speed of 100 km/h at a test temperature of -33°C.
 - .2 The post shall not bend, warp or distort when installed at temperatures up to 50°C or installed in wind velocities up to 120 km/h.
- .6 High-Intensity ReflectORIZED Sheeting
 - .1 Each post shall have a 50 mm wide reflective sheeting material fastened between 100 mm and 150 mm from the top of the post. The reflective sheeting shall be green when the Guide Post is used to mark the edges of approaches located on curves, and white in all other instances. When green is required, white sheeting shall be screen printed green using a process recommended by the sheeting manufacturer.
 - .2 The reflective sheeting material shall be high-intensity encapsulated glass bead reflective sheeting meeting or exceeding the minimum requirements as specified in ASTM-D4956, performance requirement Type III and Class I pressure sensitive adhesive backing requirements.

Part 3 Execution

3.1 INSTALLATION

- .1 Install posts to details as straight and plumbed vertically to a uniform depth of 0.6 m below finished grade.
- .2 Excavate post holes to minimum diameter of 150 mm and compact bottom of hole to provide firm foundation. Set post plumb and backfill with competent material in 150 mm layers. Compact each layer before placing succeeding layer.
- .3 Remove existing posts. Non-damaged posts to be stored at Niblock Pit. Damaged posts to be hauled to recycling facility outside the Parks.

3.2 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

32 32 34 REINFORCED SOIL RETAINING WALL**Part 1 General****1.1 REFERENCES**

- .1 BC MoTI - Standard Specifications for Highway Construction (latest edition)
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - .2 ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
 - .3 ASTM D1785, Specification for Polyvinyl Chloride (PVC) Plastic Pipe.
- .3 Final Geotechnical Report – Illecillewaet GNP- July 27, 2016
- .4 Illecillewaet Curve Retaining Wall Design Review – Golder - May 11 2017
- .5 Illecillewaet Curve Slope Stability Review – Golder August 10 2017
- .6 Lock + Load Retaining Wall Product Guide – Armttec
- .7 Glacier Station Storage Area Plan – Oct. 15 2017

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The installation of the retaining wall system shall include the retrieval of the stored owner supplied materials from Glacier Station, transportation of the materials to site, and the installation of the retaining wall system and will be measure by square metre of wall face installed and accepted in accordance with the Contract Documents. Payment shall be made under **“Unit Price Item 13a - Retaining Wall – Install Owner Supplied Retaining Wall”** and shall include all labour, equipment, consumables, and incidentals required to complete the Work in accordance with the Contract Documents.
- .2 Excavation of existing embankment material for the wall construction shall be measured and completed in accordance with Section 31 24 13 - Roadway and Drainage Excavation. Payment shall be made under **“Unit Price Item 4 – Roadway and Drainage Excavation”**.
- .3 The supply, placement and compaction of suitable Granular Fill material within the Retaining Wall Engineered Fill zone will not be measured for payment and will be considered incidental to **“Unit Price Item 13 – Retaining Wall”**.
 - .1 Granular Fill material placed within the Engineered Fill zone shall meet all requirements specified in the Contract Documents.
 - .2 The Contractor shall provide the Departmental Representative with all required Granular Fill material test information from each material source for review and acceptance a minimum of two weeks prior to commencing wall construction.
- .4 The supply and installation of imported Drain Rock, geotextiles, geogrids, surface and sub-surface drainage systems, leveling pads and any other materials / elements required

for the Retaining Wall construction, will not be measured for payment and shall be considered incidental to **“Unit Price Item 13 – Retaining Wall”**

- .1 See Section 01 11 00 – Summary of Work for available Owner Furnished Items at no cost to the Contractor.
- .2 Materials required in addition to the available Owner Furnished Items shall be incidental to **“Unit Price Item 13 – Retaining Wall”**
- .5 The supply and placement of Crushed Base Course Aggregate for the road base will be paid under **“Unit Price Item 9 – Crushed Base Course Aggregate”** in accordance with Section 32 11 24 – Crushed Base Course Aggregate.
- .6 Asphalt concrete pavement will be paid under **“Unit Price Item 10 - Asphalt Concrete Pavement – EPS”** in accordance with Section 32 12 16 - Asphalt Concrete Pavement.
- .7 Precast Concrete Barrier at Retaining Walls to be as per Section 33 71 13 – Precast Concrete Barrier.
- .8 Sawcutting or milling of existing asphalt pavement for construction of the Retaining Walls is considered incidental to the Work and no additional payment will be made.
- .9 The supply, installation and use of shoring systems to complete the excavation shall be considered incidental to the Work.
- .10 Traffic Control required for this Work shall be incidental to **“Lump Sum Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
 - .1 Detours required for the wall construction shall be completed in accordance with Section 01 25 32 - Special Procedures for Traffic Detours.
- .11 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 Mobilization/ Demobilization”** and no additional payment will be made.
- .12 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.
- .13 The preparation of construction staging plans and any supplemental geotechnical investigations specified in the Contract Documents are incidental to retaining wall construction and no additional payment will be made for this item.

1.3 STAGED CONSTRUCTION

- .1 Provisions for staged construction, if required, shall be the responsibility of the Contractor, who shall provide design drawings showing any temporary supports / shoring required, until retaining wall is complete.

1.4 STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 The Contractor shall follow the manufacturer's storage and handling instructions for the reinforced soil type retaining wall system.
- .3 The Contractor shall prevent chipping and cracking of precast concrete facing panels and damaged components to embedded connectors for reinforcing elements.

- .4 The Contractor shall prevent damage to galvanized coating of steel reinforcing elements or polymer geogrid reinforcement. Repair or replace as directed by Departmental Representative.
- .5 The Contractor shall prevent staining or other defacement of front surfaces of facing panels during storage and handling. Repair or replace as directed by Departmental Representative.
- .6 The Contractor shall store geotextiles at temperature above minus 10°C and rolled materials may be laid flat or stood on end.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 All waste materials and construction debris shall be hauled out of the Park to an approved location for disposal.
- .3 Any unused materials shall be either disposed of outside of the Park, or retained by PCA at the discretion of the Departmental Representative.

Part 2 Products

2.1 REINFORCED SOIL WALL SYSTEMS FOR RETAINING WALLS

- .1 The Owner supplied Retaining Wall Systems is the Lock and Load modular reinforced-concrete system by Armttec.
- .2 The Contractor's Geotechnical Engineer / Surveyor shall verify existing site conditions, soil characteristics/properties required for wall construction and ground elevations before prior to construction of the Retaining Walls.
 - .1 Verification of existing site conditions by the Contractor's Geotechnical Engineer is considered incidental to the Work and no additional payment will be made.
- .3 The Contractor shall not substitute for any component normally supplied by supplier of proprietary wall system. The Contractor shall not use more than one type of soil reinforcing element on each structure.

2.2 MATERIALS

- .1 Granular Fill material to be used for the Engineered Fill zone and shall be supplied by the Contractor from outside the Park.
 - .1 Granular Fill material placed within the Engineered Fill zone shall meet all requirements specified in the Contract Documents.
- .2 Refer to Section 01 11 00 – Summary of Work for Owner Furnished Items.
 - .1 Contractor is responsible for confirming quantities of materials required for Retaining Wall construction.
 - .2 The Supply of any materials required in addition to available Owner Furnished Items shall be incidental to **“Unit Price Item 13 – Retaining Wall”**
- .3 Drain Rock material shall meet the requirements set out in the Contract Documents.

- .4 Native material meeting the wall system manufacturer's specifications may be used as backfill outside of the Engineered Fill zone.
- .5 Polymer geogrid soil reinforcing elements: high density polyethylene, and uniaxial geogrid material used shall be in accordance with the Contract Documents and Ministry of Transportation and Infrastructure, Recognized Product List, December 1, 2017 Edition only.
- .6 Connectors - facing panels to soil reinforcing elements: to specifications of wall system manufacturer.
- .7 Levelling pads for facing elements: to specifications of wall system manufacturer.

2.3 TECHNICAL ASSISTANCE

- .1 Technical assistance is considered incidental to the unit price items and no additional payment will be made.
- .2 The Contractor shall arrange for technical representative of the wall system manufacturer to be on site at 25%, 50%, 75% and 100% completion, at a minimum, of wall construction to ensure correct installation procedures. The Contractor shall arrange for subsequent visits as directed by Departmental Representative.
- .3 Technical representative to provide field report to Departmental Representative for each visit.

Part 3 Execution

3.1 GEOTECHNICAL INFORMATION

- .1 The Contractor shall consider all the information provided in the Geotechnical Report in implementing the design and construction techniques.

3.2 EXCAVATION AND FOUNDATION PREPARATION

- .1 The Contractor shall excavate, and prepare soil foundation for the retaining wall system in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

3.3 LEVELLING PAD

- .1 The Contractor shall construct a leveling pad as part of the retaining wall system in accordance with the design drawings and manufacturer's recommendations.

3.4 ERECTION OF FACING PANEL WALL

- .1 Erect facing panels and coping in accordance with instructions of supplier of wall system. Construct to lines, grades and elevations as shown in the Contract Documents.
- .2 The Contractor shall provide temporary clamps, hardwood wedges or other means to properly align and level facing panels, and to allow for rotation of panels as backfilling operations proceed.
- .3 The Contractor shall brace at least first row of facing panels externally as directed by the system supplier.

- .4 The Contractor shall install permeable joint fillers, geotextile filters, and other means, as indicated by wall system supplier, to prevent washing of backfill particles through joints.

3.5 SOIL REINFORCING ELEMENTS

- .1 Install reinforcing elements as indicated and to requirements of supplier of wall system.
- .2 Place reinforcing elements perpendicular to facing panels, except where indicated otherwise.
- .3 Lay reinforcing elements horizontally, on compacted backfill. Connect to facing panels as indicated and as instructed by supplier of wall system. For geogrids, pull and anchor taut before placing overlying backfill and ensure that slack in connections to facing panels is removed.

3.6 SUB-DRAINS

- .1 The Contractor shall construct perforated pipe sub-drains in accordance with the wall design drawings to lines, grades, and elevations as indicated.

3.7 BACKFILLING

- .1 The Contractor shall backfill behind facing panels in accordance with system specifications and to following requirements:
 - .1 Place backfill by closely following erection of each lift of facing panels and to requirements of supplier of wall system.
 - .2 At each level of soil reinforcing elements, grade and compact backfill to same elevation as connections with facing panels, before placing reinforcing.
 - .3 Place backfill so as not to displace or buckle reinforcing elements. Avoid sudden braking and sharp turning of tracked and rubber-tired equipment on backfill. Place backfill in direction away from facing panels. Before operating tracked vehicles over soil reinforcement, place minimum fill thickness of 200 mm above any level of soil reinforcing.
 - .4 Place and compact backfill without causing displacement or rotation of facing panels beyond supplier tolerances. Use only hand-held or hand-guided compacting equipment within 1 m of facing panels.
 - .5 Compact backfill at moisture content not exceeding optimum value in accordance with system supplier's specifications.
 - .6 Ensure that backfill is in contact with soil reinforcing elements for full length of each element. Ensure that backfill occupies open spaces between solid components of wire mesh and geogrids.
 - .7 Backfill excavation in front of wall as soon as required alignment of modular blocks is assured and when approved by Departmental Representative.

3.8 TOLERANCES

- .1 Manufacturing and installation shall meet manufacturer's specifications and / or drawings.

- .2 Tolerances of precast elements to CSA-A23.4, Section 10.
- .3 Length of precast elements not to vary from design length by more than plus or minus 20 mm.
- .4 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 5mm.
- .5 Deviations from straight lines not to exceed 10mm in 3 m
- .6 Precast elements not to vary by more than plus or minus 5 mm from true overall cross sectional shape as measured by difference in diagonal dimensions.

END OF SECTION

33 46 19 PERFORATED PIPE DRAINS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Supply and installation of pipe sub-drains shall be considered incidental to **“Unit Price Item 13 – Retaining Wall”**.
 - .1 See Section 01 11 00 – Summary of Work for available Owner Furnished Items at no cost to the Contractor.
 - .2 Materials required in addition to available Owner Furnished Items shall be incidental to **“Unit Price Item 13 – Retaining Wall”**
- .2 Supply, placement and compaction of imported granular backfill material for pipe bedding or drain rock shall not be measured for payment and will be considered incidental to **“Unit Price Item 13 – Retaining Wall”**.
 - .1 See Section 01 11 00 – Summary of Work for available Owner Furnished Items at no cost to the Contractor.
 - .2 Materials required in addition to available Owner Furnished Items shall be incidental to **“Unit Price Item 13 – Retaining Wall”**
- .3 Traffic Control during survey, layout, Construction of the Perforated Pipe drains shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no additional payment will be made.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 Mobilization/ Demobilization”** and no additional payment will be made.
- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made.

1.2 REFERENCES

- .1 BC Ministry of Transportation and Infrastructure Standard Specifications for Highway Construction (latest edition) – Section 318
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³)).
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .4 Canadian Standards Association (CSA International)

- .1 CSA B1800-11, Thermoplastic NonPressure Piping Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
- .2 CAN/CSA-B182.11 Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings
- .3 CSA-G401-14, Corrugated Steel Pipe Products.

1.3 SUBMITTALS

- .1 The Contractor shall submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Contractor shall submit to the Departmental Representative for testing, samples of materials proposed for use at least 4 weeks prior to commencing work.
- .3 The Contractor shall submit manufacturer's test data and certification that drain pipe materials meet requirements of this Section at least 4 weeks prior to beginning Work.
- .4 Certification to be marked on pipe.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities outside of the Parks.
- .3 The Contractor shall collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Section 01 35 43 – Environmental Procedures.
- .5 Divert unused metal materials from landfill to metal recycling facility, outside of the Parks, as approved by Departmental Representative.
- .6 Divert unused aggregate materials to disposal location outside of the Parks as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Perforated PVC Plastic Drainage Pipe and fittings in accordance with British Columbia MoTI Standard Specifications for Highway Construction Section 318. Nominal pipe sizes 150mm.
- .2 Geotextile filter: In accordance with Section 31 32 19 - Geotextiles.

Part 3 Execution**3.1 TRENCHING**

- .1 The Contractor shall excavate and backfill in accordance with Section 31 24 13 – Roadway Excavation, Embankment and Compaction.
- .2 The Contractor shall place bedding material after approval of Departmental Representative.
- .3 The Contractor shall place filter fabric (geotextile) on bottom and walls of trench.

3.2 BEDDING

- .1 Place 100 mm layer of 25 mm Well-Graded Base bedding material to full trench width and compact to minimum 98% of Standard Proctor density to ASTM D698.

3.3 INSTALLATION OF PIPE SUB-DRAINS

- .1 The Contractor shall lay pipe drains on prepared bed, true to line and grade with inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with bed throughout full length
- .2 The Contractor shall begin laying at outlet and proceed in upstream direction.
- .3 The Contractor shall lay perforated pipes with perforations at 4 o'clock and 8 o'clock positions.
- .4 The Contractor shall make joints tight in accordance with manufacturer's instructions.
- .5 The Contractor shall plug open upstream ends of pipes with watertight bulkheads.
- .6 The Contractor shall surround, and cover drain with filter material in uniform 150 mm layers to an elevation of at least 150 mm above top of drain and compact to at least 98% Standard Proctor density to ASTM D698.
- .7 The Contractor shall wrap or sleeve perforated pipe with geotextile filter as indicated.
- .8 Backfill remainder of trench to Section 31 24 13 – Roadway and Drainage Excavation, as directed by Departmental Representative and as indicated.
- .9 The Contractor shall not place bedding surround and backfill materials in frozen condition.
- .10 The Contractor shall protect sub-drains against flotation during installation.
- .11 The Contractor shall install "Y" connections to surface as indicated for flushing.

END OF SECTION

32 91 19 **TOPSOIL PLACEMENT AND GRADING**

Part 1 General

1.1 DESCRIPTION

- .1 Topsoil to be native organic soils stripped and screened from the Contract Work area and stockpiled at Glacier Station as directed by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Topsoil placement and finishing will be measured by the cubic metre as measure in original position (from stockpiles) acceptably installed within the areas indicated in the Contract Documents or as approved by the Departmental Representative. Payment for topsoil placement shall be full compensation for all labour, equipment, prepare the finished grade, load, haul from stockpiles, place, fine grade, and prepare the topsoil materials for planting in accordance with the requirements of the Contract Documents and direction of the Departmental Representative. Payment will be made under “**Unit Price Item 14 – Topsoil Placement and Grading**”.
- .2 Screened stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by surface to surface prismatic method.
- .3 Payment for stripping will be made in accordance with Section 31 24 13 - Roadway and Drainage Excavation.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.
- .5 Payment for testing of topsoil to be paid under “**Lump Sum Price Item 3 - Prime Cost Sum**”.
- .6 Payment for supply and application of soil amendments will be paid under “**Lump Sum Price Item 3 – Prime Cost Sum**”.
- .7 Traffic Control shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no additional payment will be made.
- .8 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 Mobilization/ Demobilization**” and no additional payment will be made.

1.3 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 Canadian Green Building Council (CaGBC)

- .1 LEED Canada-NC Version 1.0-[December 2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.
- .4 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.
- .5 BC MoTI Standard Specifications for Highway Construction (latest edition)

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 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 LEED Submittals:
 - .1 Submit erosion and sedimentation control plan for Credit SSp1 in accordance with LEED Canada-NC.
- .3 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

1.6 QUALITY CONTROL

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

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling 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 2,500 m3 of screened topsoil is available to the contractor from stockpiles in the Glacier Station storage area for use on this project.

- .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 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 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 SEDIMENTATION 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 SCREENING OF STRIPPING MATERIAL

- .1 Contractor to screen stripping material to 50 mm max size prior to placement in stockpile. Load, haul and place screen waste material in the designated area, as directed by the Departmental Representative.
- .2 Screening waste shall be disposed of outside of the Park at a Contractor determined location.

3.4 PLACING AND SPREADING OF TOPSOIL / PLANTING SOIL

- .3 Place topsoil after Departmental Representative has accepted subgrade.
- .4 Spread topsoil in uniform layers not exceeding 100 mm.
- .5 Spread topsoil as indicated to following minimum depths after settlement.
 - .1 100 mm for seeded areas.
 - .2 600 mm for shrub beds.
- .6 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 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 foot-printing.

3.6 ACCEPTANCE

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

3.7 SURPLUS MATERIAL

- .1 Dispose of materials, except topsoil not required, where directed by Departmental Representative off site.

END OF SECTION

32 92 22 HYDRAULIC SEEDING**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Hydraulic Seeding will be measured by the hectare acceptably installed resulting in full grass growth, 75% germination and growth of specified seed mixture, within the dimensions indicated in the Contract Documents or as approved by the Departmental Representative. Payment for hydraulic seeding shall be full compensation for all labour, equipment, materials and incidentals required to place the materials in accordance with the requirements of the Contract Documents and direction of the Departmental Representative. Payment shall be paid under **“Unit Price Item 15 – Hydraulic Seeding”**
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 No mechanical seeding will be allowed for this project.
- .4 Maintenance is incidental and will not be paid for separately.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

1.2 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.

1.3 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.

1.4 MATERIAL DELIVERY, HANDLING AND STORAGE

- .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:
 - 8% Canada Bluegrass
 - 10% CRF
 - 10% Rocky Mountain Fescue
 - 12% Sheep Fescue
 - 10% Tufted Hairgrass
 - 25% Slender Wheatgrass
 - 25% Dahurian Wildrye
- .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 FERTILIZER

- .1 No fertilizers to be used for this Project.

2.3 WATER

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

2.4 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.

2.5 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 Contractor shall advise Departmental Representative prior to the start of seeding operations.
- .2 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.
- .3 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous project to prevent site contamination.
- .4 Seeding shall be done upon completion of stripped soil material/chip compost placement.
- .5 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.
- .6 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.
- .7 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.
- .8 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 150m 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 35 31 – Special Procedures for 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.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

33 42 13 PIPE CULVERTS**Part 1 General****1.1 REFERENCES**

- .1 BC MoTI Standard Specifications for Highway Construction (latest edition)
- .2 CSA-G401, Corrugated Steel Pipe Products.
- .3 CSA-B182.8, Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings.

1.2 MEASUREMENT AND PAYMENT

- .1 Remove and Dispose of Corrugated Steel Pipe (CSP) culverts:
 - .1 The quantity of CSP culverts that will be measured for payment shall be the number of linear metres of the types and sizes removed and disposed of outside of the National Parks, regardless of the culvert depth. Payment will be made under **“Unit Price Item 16a – Pipe Culverts - Remove and Dispose CSP Culverts”**. All Works including, but not limited to; sawcutting, asphalt removal, excavation, loading, hauling and unloading CSP Culverts and excavated material to disposal location will not be measured directly for payment but shall be considered incidental to the Work.
- .2 Installation of CSP Culvert Extensions
 - .1 The quantity of CSP culverts extensions that will be measured for payment shall be the number of linear metres of the types and sizes retrieved from storage, assembled, installed and accepted by the Departmental Representative, and shall be inclusive of all costs of labour, materials, equipment to satisfactorily complete the work. Payment will be made under **“Unit Price Item 16c – Pipe Culverts – Install CSP Culvert Extensions”**.
 - .2 The survey and layout of the CSP Culverts as per requirements identified in the Contract Documents, will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 16c – Pipe Culverts – Install CSP Culvert Extensions”**.
 - .3 At locations of extensions to existing culverts, thoroughly cleaning and flushing the existing culvert ends and barrel, excavating up to 2m from present exposed end or as directed by the Departmental Representative, cutting off damaged sections of exposed end and painting remaining end with a high zinc dust oxide paint and supplying and placing a joint sealant shall be considered incidental to **“Unit Price Item 16c – Pipe Culverts – Install CSP Culvert Extensions”**. Includes all equipment, labour and materials required to complete the Work.
 - .4 The supply of bolt-type corrugated couplers and ancillary materials will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 16 – Pipe Culverts”**.
- .3 Installation of CSP Culverts
 - .1 The quantity of CSP culverts that will be measured for payment shall be the number of linear metres of the types and sizes retrieved from storage, assembled,

installed and accepted by the Departmental Representative, and shall be inclusive of all costs of labour, materials, equipment to satisfactorily complete this item as specified, regardless of the culvert depth. Payment will be made under **“Unit Price Item 16b – Pipe Culverts – Install CSP Culverts”**.

- .4 All Work required as part of the installation of CSP Culverts and extensions, including excavation, sawcutting, asphalt removal, hauling and disposal of unsuitable material shall be considered incidental to the Work and no additional payment to be made.
- .5 Payment for backfill Works, including but not limited to; supply, placement and compaction of all backfill materials, will be incidental to the Work and no additional payment will be made.
- .6 Dewatering as required to complete the Work shall be considered incidental to the Work.
- .7 Asphalt concrete pavement will be paid under **“Unit Price Item 10 - Asphalt Concrete Pavement – EPS”** in accordance with Section 32 12 16 - Asphalt Concrete Pavement.
- .8 Placing Riprap will be paid in accordance with Section 31 37 00 – Riprap.
- .9 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .10 Traffic Control during the survey, layout and Construction of the culverts shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.
- .12 No separate measurement will be made for couplings, fittings or end sections for CSP.
- .13 Payment for plugging of existing culverts will be made under **“Lump Sum Price Item 3 - Prime Cost Sum”** in metres of invert length for each size, type and class of pipe.
- .14 Culvert installation must be coordinated with embankment construction. No payment will be made for re-excavation of embankment material required to install culverts.

1.3 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit manufacturer's test data and certification.
- .3 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required.
- .4 Certification to be marked on pipe.

1.4 STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 Handle and store pipe products in a manner to avoid damage, alteration, deterioration and soiling.
- .3 Store pipes on a clean and flat surface at Glacier Station or other location as directed by the Departmental Representative.

- .4 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection. Culvert material designated by the Departmental Representative as unacceptable, due to damage or failure to meet specified requirements, shall be immediately repaired or replaced by the Contractor.
- .5 No separate measurement will be made for couplings, fittings or end sections for pipe culverts, regardless of type.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities, outside of the National Parks.
- .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative, outside of the National Parks.
- .4 Fold up metal banding, flatten and recycle at appropriate facilities, outside of the National Parks.

Part 2 Products

2.1 MATERIALS

- .1 See Section 01 11 00 – Summary of Work for Owner Furnished Items.

2.2 CORRUGATED STEEL PIPE

- .2 Corrugated steel pipe: to CSA-G401.
- .3 Culverts to be annular or spiral with annular ends. Coupling bands to be two piece annular bolted with minimum width of nine corrugations.
- .4 Minimum wall thickness to be 2.0 mm.
 - .1 Or greater in accordance with manufactures recommendations in the specific installed conditions.
- .5 Corrugations to be 68 mm x 13 mm.
- .6 For all exposed culvert ends, 4:1 mitred end sections will be required.
- .7 Design Code CHBDC S6-06.
- .8 Design Live Load CL-800.

2.3 GRANULAR BEDDING AND BACKFILL

- .1 BC MoTI 25mm Well-Graded Base Material for pipe bedding to be supplied by the Contractor from outside the Park.
- .2 BC MoTI 50mm Well-Graded Base Material for backfill to be supplied by the Contractor from outside the Park.

Part 3 Execution**3.1 METHODOLOGY**

- .1 **Contractor to verify all culvert quantities, sizes, length and types in field prior to starting Works.**
- .2 Traffic control and staging to be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.
- .3 Pipe culvert works cannot commence until approved by the Departmental Representative.
- .4 Existing culverts within the construction limits, that remain in service must be thoroughly cleaned and flushed; all sediments and bedload must be removed to the satisfaction of the Departmental Representative.
- .5 If required, additional permits for pipe culvert works will be provided by Parks Canada at the request of the Contractor.

3.2 CUT ENDS

- .1 All exposed ends of CSP culverts to have sloped end sections conforming to roadside slope, by cutting culvert with mechanical saw.
- .2 All cut edges shall be made smooth by grinding so that all the burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.
- .3 Where an existing culvert is extended, up to 2 m of the existing culvert end shall be removed as directed by the Departmental Representative.
- .4 Cutting of culvert ends to the satisfaction of the Departmental Representative is considered incidental to the Work and no additional payment will be made.

3.3 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place minimum thickness of 300 mm of approved granular material on bottom of excavation and compact to minimum 98% Standard Proctor density to ASTM D698.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.4 LAYING CORRUGATED STEEL PIPE CULVERTS

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.5 JOINTS: CORRUGATED STEEL CULVERTS

- .1 Match corrugations of coupler with pipe sections before tightening.
- .2 Insert and tighten bolts.
- .3 Tap couplers firmly with a rubber mallet or similar non-marring tool as they are being tightened, to take up slack and ensure snug fit.
- .4 Repair spots where damage has occurred to coating in the field by applying two coats of zinc rich paint approved by the CSP supplier. Allow each coat to dry before placing second coat, bedding or backfill.

3.6 BACKFILLING

- .1 Backfill around and over culverts as indicated in the Contract Documents or as directed by Departmental Representative.
- .2 Place granular backfill material, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 98% Standard Proctor density to ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction.
- .4 Protect installed culvert with minimum 900 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 2H:1V.
- .5 Place backfill in unfrozen condition.
- .6 Place Riprap in accordance with Section 31 37 00 – Riprap.

3.7 TRENCHING EXISTING PAVEMENT STRUCTURES

- .1 Where trenches are cut into existing pavement structures, backfill will match the existing materials and thickness.

3.8 CLEANING OF CULVERTS

- .1 Remove and dispose of material from the culvert barrels and/or ends to restore proper drainage, as directed by the Departmental Representative.
- .2 Removed material to be disposed of outside of the Parks. Disposal, including hauling, is considered incidental to the Work.

3.9 CULVERT EXTENSIONS

- .1 Extensions to existing culverts shall be as noted in the Contract Documents. Payment for installation shall include all hardware and necessary features to attach new sections.

3.10 CULVERT / STRUCTURE REMOVAL

- .1 Culvert removal shall be as indicated in the Contract Documents and shall include disposal of sections to a suitable disposal facility outside of the National Parks. Disposal, including hauling, is incidental to the Works.

3.11 STREAM AND CHANNEL DIVERSIONS

- .1 Temporary stream and channel diversions shall be in accordance with Section 01 35 43 – Environmental Procedures.

END OF SECTION

33 71 13 PRECAST CONCRETE BARRIER

Part 1 General

1.1 DESCRIPTION

- .1 Supply and installation of precast concrete barriers in accordance to this section. Precast Concrete barrier shall be supplied and installed 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**.
- .2 Barrier drain pipes shall be supplied and installed in accordance with the Contract Documents at locations specified by the Departmental Representative. Payment will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Remove and Dispose Concrete Barrier:
 - .1 Removal and disposal of concrete barrier shall be measured by the number of lineal metres of precast concrete barrier including end treatments loaded, hauled and disposed of outside of the Park, in accordance with the Contract Documents. Payment will be made under **“Unit Price Item 17a –Precast Concrete Barrier – Remove and Dispose”**.
 - .2 No additional payment will be made for temporarily stockpiling or disposal fees.
 - .3 Cleaning of shoulders, by methods accepted by the Departmental Representative, in front and behind barrier locations shall be considered incidental to the Work. Shoulders must be cleaned prior to placing new barrier.
- .2 Supply and Install Precast Concrete Barrier:
 - .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. Payment will be made per the applicable component under **“Unit Price Item 17b – Precast Concrete Barrier – Supply and Install Concrete Barrier”** and shall include all labour, equipment and material to satisfactorily complete this item of work.
 - .2 Temporary stockpiling of barrier is considered incidental to the Works and no additional payment will be made.
- .3 Supply and Install of Crash Attenuator:
 - .1 Supply and installation of Crash Attenuators in accordance with the Contract Documents and manufacturer’s requirements. The measure for payment shall be by each crash attenuator supplied, assembled, installed and accepted by the Departmental Representative, and will be inclusive of all costs of labour, materials, tools and equipment to satisfactorily complete this work. Payment will be made under **“Unit Price Item 17c – Precast Concrete Barrier – Supply and Install Crash Attenuator”**.

- .4 Barrier costs shall be inclusive of all costs of labour, materials, and equipment to satisfactorily complete this item as specified and in accordance with this Section.
- .5 The supply and installation of barrier mounted reflectors shall not be measured directly and shall be considered incidental to the unit price items.
- .6 The placement and removal of Precast Concrete Barriers for use as temporary barricades during construction will not be measured for payment and shall be considered incidental to the Contract.
- .7 The survey and layout of the Precast Concrete Barriers as per requirements identified in this Section and the plans, will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 17 – Precast Concrete Barrier”**.
- .8 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .9 Traffic Control for survey, installation, removal or relocation of Precast Concrete Barriers shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .10 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor

Part 2 Products

2.1 MATERIALS

- .1 Precast Concrete barrier 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.
- .2 810mm Special Drainage Barrier to be per manufactured as per the Contract Documents and as directed by Departmental Representative.
- .3 Crash attenuator devices shall meet or exceed NCHRP 350 TL-3 crash requirements and be approved for use in the current Recognized Products List as published by BC MoTI.
- .4 Barrier reflectors to be hard plastic type raised pavement markers mounted with fast cure construction adhesive.
 - .1 Reflectors to be placed at 25m intervals mounted as per the Drawings or as directed by the Departmental Representative.
 - .2 Acceptable products include:
 - .1 3M Raised Pavement Marker (RPM)
 - .2 Stimsonite Raised Pavement Marker (RPM)
 - .3 Or equivalent as approved by the Departmental Representative

2.2 PRECAST CONCRETE BARRIER

- .1 Concrete Quality: to CAN/CSA-A23.1 except where amended below.
- .2 Compressive Strength: Compressive strength test result is equal to or exceeds 30 MPa and no individual cylinder strength is less than 27 MPa.
- .3 Calcium chloride or admixtures containing calcium chloride are not to be used in concrete.
- .4 Cement Content: minimum of 320 kg/m³.
- .5 Water/Cement Ratio: maximum of 0.45.
- .6 Coarse Aggregate: nominal maximum size not exceeding 28mm.
- .7 Slump: 50 mm plus or minus 20mm.
- .8 Entrainment Air: 5 to 8%.
- .9 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 Additional 10M rebar shall be installed for drainage barriers as indicated in the Contract Documents.
- .10 Concrete Placing and Consolidation:
 - .1 To CAN/CSA-A23.4, Clause 19.
- .11 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.
- .12 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.
- .13 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.
- .14 Patching, if authorized, to be completed as follows:
 - .1 Defective are saturated with water and defect prepared with cement paste and filled with mortar.
 - .2 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.
 - .3 Patching mortar to be well tooled in, finished flush and smooth and are covered to cure adequately.
- .15 Surface tolerance to be +/- 3 mm unless otherwise directed by the Departmental Representative.
- .16 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.
- .17 Welded Steel Wire Mesh Reinforcement:
 - .1 Welded wire mesh reinforcement will not be permitted.
- .18 Reinforcing Steel for Bent and Hooked Connections:
 - .1 To CAN/CSA-G40.21-M, Grade 260W.
- .19 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.
- .20 Surface Treatment:
 - .1 Treatment of exposed surfaces not required.
- .21 Pick-up Points:
 - .1 Form with accurately placed rigid PVC pipe recessed 15 mm from both finished surfaces as indicated in the Contract Documents.
- .22 Drainage Slots:

- .1 Drainage slots to be cast-in as indicated in the Contract Documents.

Part 3 Execution

3.1 DELIVERY

- .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.

3.2 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 The Departmental Representative will determine location of barriers with drainage opening for drainage and for small animal crossings. Some of the roadside drainage barriers will require the installation of drain pipe to control runoff. The drain shall be supplied installed at locations and as directed by the Departmental Representative.
 - .1 Drainage barriers are typically installed at 50m intervals.

3.3 FIELD QUALITY CONTROL

- .1 Contractor shall carry out all the necessary quality control to ensure the barrier work complies with the Contract Documents.

3.4 CLEANING

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

END OF SECTION