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**Drawings:**

REVISION	TITLE	DATE
0	S000 – Cover Sheet	March 01, 2018
0	S100 – Location Map & General Notes	March 01, 2018
0	S101 – Existing Culvert Layout & Demolition Plan	March 01, 2018
0	S102 – Demolition Details Existing End Treatment	March 01, 2018
0	S103 – New Culvert Layout	March 01, 2018
0	S104 – Culvert Backfill Details	March 01, 2018
0	S105 – Precast Culvert Details	March 01, 2018
0	S106 – Culvert Details	March 01, 2018
0	S107 – Culvert Inlet Details	March 01, 2018
0	S108 – Culvert Outlet Details	March 01, 2018
0	S109 – Culvert End Treatment	March 01, 2018
0	S110 – Handrail Details at Culvert Outlet Headwall	March 01, 2018
0	S111 – Inlet & Outlet Riprap Details	March 01, 2018

**Reference Documents:**

- .1 Geotechnical Investigation for Two Culvert Replacements (Kilometres 95.6 and 100.6) along Highway 93S in Kootenay National Park, BC
- .2 Parks Canada National Best Management Practices
- .3 Hydrologic and Hydraulics Analysis for Sinclair Culvert at Parks Gate, Kootenay National Park, BC
- .4 Fish Passage Design for Sinclair Culvert at Parks Gate, Kootenay National Park, BC.
- .5 Pit 16, and Hector Pit Plan - Nov 2017
- .6 Direction for Permitted Users conducting water-related activities in LLYK – Apr 2017
- .7 Basic Impact Analysis for Culvert Replacement – Radium Hot Springs Overflow Parking Lot, Hwy 93S Km 100.6, Highway 93S Kootenay National Park

## Part 1 General

### 1.1 PROJECT LOCATION

- .1 The project is located in Kootenay National Park, British Columbia. Construction work is on Highway 93 South (Hwy 93S) at the following locations: Hwy 93S Km 100.6  
Hwy 93S km 0.0 – Hwy 93S / Trans-Canada Highway (TCH) Intersection  
Hwy 93S km 10.4 – Great Divide/Fireweed/Alberta-British Columbia Border  
Hwy 93S km 57.2 – 4-Mile (Hector) Pit Entrance  
Hwy 93S km 60.7 – Kootenay Crossing  
Hwy 93S km 79.1 – Pit 16  
Hwy 93S km 87.0 – Hwy 93S / Settler’s Pit Intersections  
Hwy 93S km 99.0 – Operations Centre and McKay Pit Access  
Hwy 93S km 100.4 – Iron Gates Tunnel  
Hwy 93S km 100.5 - 100.7 – Red Wall/Upper Parking Lot (Location of Work)  
Hwy 93S km 101.1 – Radium Hot Pools  
Hwy 93S km 102.2 – Sinclair Canyon  
Hwy 93S km 102.8 – Kootenay South Gate  
Hwy 93S km 104.5 – Hwy 93 / 95 Intersection

### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The project work consists of excavation, removal and disposal of the existing 165m length CSPA culvert and associated road and parking lot infrastructure, and installing a new Precast Concrete Box Culvert (PCBC) with a similar alignment for the Sinclair Creek culvert located at Km 100.6 underneath the Red Wall / Upper Parking Lot .
- .2 Major scope items include: Traffic management, clearing and grubbing, stripping, removal of asphalt paving, concrete curb removal, roadway and drainage excavation, saw-cutting existing headwalls and removal of stone works and wood guardrail from headwalls, parking lot closure and temporary signage, water diversion, removal of existing CSPA culvert, supply and installation of precast concrete box culvert, supply and install geotextile, supply and install riprap, supply and install 50mm water pipe encased in 150mm steel pipe, bedding and structural backfill, topsoil placement/ grading, and seeding,.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following:
  - .1 Clearing and Grubbing of the areas at inlet / outlet locations consisting of loading, hauling and disposing of the material outside of the Parks or as directed by the Departmental Representative.
  - .2 Strip organic material as designated in the contract documents, screen and stockpile this material alongside the right-of-way outside the cut / fill slopes, as directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material. Topsoil waste shall be hauled and disposed outside of the Parks or as directed by the Departmental Representative.

- .3 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.
- .4 Remove existing asphalt concrete pavement and concrete curb and gutter by saw-cutting as shown in the Drawings and dispose outside of the Parks, or as directed by the Departmental Representative.
- .5 Excavating materials for the culvert removal and installation and associated road works removal, hauling and placing this material in embankments or in stockpiles at locations specified and as directed by the Departmental Representative, and disposing unsuitable material outside of the Parks or as directed by the Departmental Representative.
- .6 Provide temporary creek diversion as required for completion of the Work of the Project.
- .7 Remove and dispose existing CSPA culvert (3.5m span and 2.3m rise) at Km 100.6 as shown on the drawings and as directed by the Departmental Representative.
- .8 Supply and install 50mm water pipe encased in 150mm steel pipe as shown on the Drawings.
- .9 Design, supply and install Precast Concrete Box Culvert (3.5m span and 2.9m rise) at location shown on the Drawings and as directed by the Departmental Representative. 25mm well graded base (WGB) bedding material and 50mm well graded base (WGB) backfill material to be sourced from outside the Parks.
- .10 Removal of stone work on top of concrete headwalls and stone facing from face of concrete headwalls and stockpiling in Pit 16, or as directed by the Departmental Representative.
- .11 Supply and installation of Cast in Place Concrete as shown on the drawings and use of formliner where specified to create stone facing.
- .12 Supply, load, haul and place rip rap materials. rip rap to be supplied by the contractor as shown on the drawings and directed buy the Departmental Representative
- .13 Placement of screened topsoil and hydraulic seeding on finished slopes as directed by the Departmental Representative
- .14 Supply and/or maintain traffic signage, regulatory signage, construction signage, and traffic control.
- .15 Miscellaneous Additional Work as directed by the Departmental Representative.
- .4 The Contractor will not be permitted to set up crushing plant within the Parks
- .5 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 minimal adverse effects. The Contractor’s EPP must be approved by Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada’s Environmental Surveillance Officer (ESO)

will refer to the approved EPP in determining compliance with the plan and contract specifications. The EPP will form part of the contract.

- .6 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 within Parks can be coordinated through the Departmental Representative and the ESO but will require the Contractor to obtain a Restricted Activity Permit (RAP) and to adhere to all conditions contained therein.

### 1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

### 1.4 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 Km 0.0 to Km 10.8, roadway construction & improvements
  - .2 Km 10.8 to Km 18.0 and Km 55.6 to Km 60.2 roadway construction & improvements
  - .3 Sinclair Canyon infrastructure upgrades – km 100 to km 104
  - .4 Marble Canyon Culvert Replacement – Km 17.1
  - .5 Haffner Creek Bridge Replacement – Km 17.5
  - .6 Other projects and maintenance work may occur along highway 93S in 2018.
- .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 Construction Manager in reviewing their construction schedules and sharing his work space, and shall coordinate his operations with the other Contractors, including traffic management and construction staging. Construction coordination meetings may be required and will be chaired by the Construction Manager at a location to be determined at the time of the pre-construction meeting; key contractor personnel will be required to attend.
- .3 The Contractors shall coordinate all work on this project with other Contractors and maintenance crews, including Site Safety and Traffic Control. No claims for any delays or inconvenience will be entertained.
- .4 The pits mentioned in the Contract Documents are operational pits and are used by many contractors and Parks Canada. The Contractor shall cooperate with the other users of the pits, including co-ordination and identification of a site Prime Contractor.

### 1.5 PRECEDENCE

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

## 1.6 DEFINITIONS

- .1 British Columbia Ministry of Transportation and Infrastructure is referred to as “BC MoTI”.
  - .1 [http://www.th.gov.bc.ca/publications/const\\_maint/contract\\_serv/standard\\_specs.htm](http://www.th.gov.bc.ca/publications/const_maint/contract_serv/standard_specs.htm)
- .2 Alberta Transportation is referred to as “AT”.
  - .1 [http://www.transportation.alberta.ca/images/Standard\\_Specifications\\_for\\_Highway\\_Construction\\_2013.pdf](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 “AT Specifications”:
  - .1 Consultant – The word “Consultant” shall mean Departmental Representative or his duly appointed representative.
  - .2 Department – The word “Department” shall mean Parks Canada Agency.
- .4 KNP means Kootenay National Park of Canada.

## 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 Highway 93S at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.
- .4 **Complete all work by October 31, 2018 (Contract Completion Date).**
- .5 **Commence onsite work on or after July 4<sup>th</sup> 2018.**
- .6 Works may need to be temporally shut down during high flow, heavy rain events, or adverse weather conditions. The works may be stopped by the following processes:
  - .1 The Contractor with approval from the Departmental Representative shall suspend works should the stream water level or adverse weather conditions adversely affect the Contractors ability to achieve the contract specifications for quality of work.
  - .2 The Contractor’s Environmental Monitor with approval from the Departmental Representative may suspend work should they feel it is not be possible to achieve the environmental requirements due to the high flows or adverse weather conditions.
  - .3 The Departmental Representative may suspend instream works should it be felt that it is not possible to achieve the environmental requirements or the contract specifications for quality of work due to the high flows or adverse weather conditions.
- .7 Regardless of who suspends the work, the Contractor will be responsible for maintaining the site and protecting the works throughout the suspension period.
- .8 The Contractor shall account for the possibility of not being able to complete work due to high flows or adverse weather conditions in the construction

schedule and in the unit prices. No payment for temporary work stoppages due to high flows or adverse weather conditions will be made.

- .9 Work within KNP shall only be allowed to start once all required submittals have been approved.
- .10 The Contractor shall not be permitted to close sections of any roadway to the general visiting public during Work operations unless approved by the Departmental Representative.

#### 1.8 **CONTRACTOR USE OF PREMISES**

- .1 The Contractor is not permitted to extract and process native material for the production of granular aggregate anywhere inside the Park.
- .2 Contractor has unrestricted use of site subject to 1.9.1 and 1.9.2 below, Section 01 14 00 – Work Restrictions and Section 01 29 01 – Site Occupancy, until Contract Completion date.
- .3 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
  - .1 Owner occupancy.
  - .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .4 Contractor shall coordinate use of premises under direction of the Departmental Representative.
- .5 Contractor shall obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 The Contractor and any subcontractors shall obtain a business licence and vehicle work passes in accordance with Section 01 35 43 – Environmental Procedures All Contractor's business and private vehicles are required to display a vehicle work pass from Parks Canada.
- .7 The Contractor and each sub – contractor shall purchase a business license from the Parks Canada Administration Office, prior to commencement of the contract.

#### 1.9 **OWNER OCCUPANCY**

- .1 Owner will occupy premises during entire construction periods 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 None.

#### 1.11 **CONSTRUCTION SIGNAGE**

- .1 No signs or advertisements, other than warning signs, are permitted on site.

- .2 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.
- .4 The Contractor shall supply, install and maintain two (2) portable Changeable Message Signs with a minimum of three (3) lines with eight (8) characters per line, for the duration of the project.
- .5 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.
- .6 Signage shall be coordinated with other Contractors.

#### 1.12 SETTING OUT OF WORK

- .1 The Department Representative will identify location of the work site. The contractor will be responsible for all other layout of the work.
- .2 The Contractor is responsible for the accurate layout of all temporary and final lines at the work sites in this contract.
- .3 Any temporary Pavement Markings, including layout and removal shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. **The Contractor will not be permitted to remove the temporary pavement markings until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.**
- .4 Departmental Representatives will establish control points and provide the following at the Sinclair Creek Culvert installation location:
  - .1 Detailed cross-section templates showing design centerline and shoulder grades.
  - .2 Set of construction Drawings.
  - .3 Alignment notes showing curve data and control point coordinates.
  - .4 List of control monuments including coordinates and elevations.
  - .5 Measurements for Payment (Quantity Surveys) and volumes by the average end method.
- .5 Contractors to:
  - .1 Set additional control points as necessary.
  - .2 Set all work stakes necessary to complete work.
  - .3 Allow sufficient time for Departmental Representative to take measurements for payment.
  - .4 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.
- .6 No separate payment will be made for setting out work, unless Departmental Representative adjusts alignment in field and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative to be paid for as part of **Prime Cost Sum**.

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 ACCESS AND EGRESS**

- .1 Provide for safe pedestrian and vehicular traffic for the duration of the construction.

**1.2 USE OF THE SITE AND FACILITIES**

- .1 The Work Site specified in these specifications 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.
- .2 Office-tool trailer for contractor operational requirements may be set up at Red Wall / Upper Parking Lot or locations as directed by the Departmental Representative. See Section 01 35 43 – Environmental Procedures. Trailers may not be used for staff accommodation at any time.
- .3 The Contractor shall not store material or park equipment along the Hwy 93S Right-of-way outside the normal hours of work.
- .4 Contractor shall maintain adequate drainage at the Work Site.
- .5 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 his cost for the performance and inspection of the Work.
- .6 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .7 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.
- .8 The Contractor may work six days per week subject to the following restrictions:
  - .1 Working hours are from 06:00 AM to 6:00 PM, Monday to Saturday. No work on Sunday, or statutory holidays and long weekends as described in subsection 1.2.10 below.
  - .2 During July and August no lane closures are permitted and work, if required, must be requested to take place overnight from 6:00 PM to 6:00 AM following a request to the Department Representative and Field Unit approval.
- .9 No hauling of material during inclement weather.
- .10 The Contractor will not be permitted to work on the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
  - .1 Canada Day long weekend: From 6:00 PM Thursday, June 28, 2018 to 6:00 AM Wednesday, July 4, 2018.

- .2 Heritage Day long weekend: From 6:00 Thursday, August 2, 2018 to 6:00 AM Tuesday, August 7, 2018.
- .3 Labour Day long weekend: From 6:00 PM Thursday, August 30, 2018 to 06:00 AM Tuesday, September 4, 2018.
- .4 Thanksgiving Day Weekend: From 6:00 PM Thursday, October 4, 2018 to 06:00 AM Tuesday, October 9, 2018.
- .11 Pets shall not be brought to or maintained at the construction site.
- .12 The Contractor will not be permitted to adversely impact wildlife or vegetation during critical life stages (breeding, nesting, rearing, and migration) unless prior written approval is granted by the Departmental Representative. The Contractor shall consult with the Departmental Representative and the Parks ESO regarding any localized wildlife concerns.

### 1.3 WORK CONDUCTED OVER AND 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 waterway. 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.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative

### 1.4 UTILITIES

- .1 The Contractor is responsible for notifying all utility companies and complete locates as needed prior to starting the work. All costs for utility locates shall be incidental to the work. The Contractor shall notify the Departmental Representative should utilities be located in areas other than those shown on the drawings, and await instructions from the Departmental Representative before proceeding with work in the vicinity of such encountered services and utilities.
- .2 Existing structures, utilities, and all others structures, services, piping or equipment within the limits of work shall be properly protected from any injury or damage, direct or indirect. Any damage that is caused as a result of the operations of the Contractor shall be repaired and made good at the Contractor's expense to the satisfaction of the Departmental Representative.
- .3 If it is determined by the Departmental Representative that Utilities affected by the permanent Work will be relocated by Other Contractors, the Contractor shall co-operate and coordinate as required with Other Contractors engaged in Utility relocation operations on the Work Site
- .4 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities that may interfere with the Work. The Contractor shall co-operate with them at all times. The Contractor shall keep the

Departmental Representative informed of all communications with the Utility companies and authorities.

- .5 The Contractor shall notify the Departmental Representative and the Utility companies at least **seven days** in advance of any activities that may interfere with the operation of such Utilities.
- .6 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected, 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

### 1.5 SURVEY OF EXISTING PROPERTY 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, 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, 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.

### 1.6 ARCHAEOLOGICAL RESOURCES

- .1 As identified in the Basic Impact Analysis known archaeological sites and others that have high archaeological potential are located near 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 and or as directed by the Departmental Representative.

#### 1.7 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 the Fish Habitat Assessment (FHA).
- .2 Work within a 30 m buffer of watercourses requires the close oversight of a Qualified Environmental Professional (QEP) supplied by the Contractor.
- .3 The period of least risk for instream works is June 1 to August 31. Work outside of the period of least risk will only be conducted if approved by LLYK Field Unit and DFO. These dates supersede dates in the FHA and the BIA. If the Contractor requests instream works outside of this window they shall be responsible for the coordination of approvals with DFO, but may not commence the DFO approval process without written approval by the Departmental Representative.
- .4 No work identified in the FHA, or otherwise, as requiring DFO Request for Review is to occur until such review has been completed by the Departmental Representative.

#### 1.8 PROTECTION OF PERSONS AND PROPERTY

- .1 Comply with Occupational Health and Safety Act British Columbia.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Sites.
- .4 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

#### 1.9 USE OF PUBLIC AREAS

- .1 Off-road construction equipment will not be allowed on the existing Highway 93S except at designated crossing points and loading areas. Steel tracked equipment with cleats will not be allowed on pavement designated for future use. Asphalt, granular, embankment and excavation materials may be hauled on existing highway but this shall be by standard highway trucks not exceeding legal highway load limits.
- .2 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 Parks.
- .3 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.

#### 1.10 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 the Contract Specifications.

#### 1.11 SUPERVISORY PERSONNEL

- .1 Within five days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 The following personnel shall be included in the list:
  - .1 Contractor Manager.
  - .2 Project Superintendent.
  - .3 Health and Safety Representative.
  - .4 Quality Control Representative.
  - .5 Environmental Representative
  - .6 Traffic Control Supervisor.
- .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 and shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work. 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 Health and Safety Representative shall possess safety experience in general construction. 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 implementation and record keeping for all aspects of project quality control. The Quality Control Representative shall be the Departmental Representative's single point of contact for project quality control.
- .6 The Traffic Control Supervisor shall be responsible for the implementation of the approved Traffic Management Plan (TMP) and ensuring general conformance of all traffic control devices.
- .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.

#### 1.12 MEETINGS

- .1 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .2 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of the Owner, Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
- .3 The Contractor will be requested to assemble his site staff and sub-contractors for an environmental briefing to be conducted by Parks Canada. The briefing shall be of approximately 1 hour in duration and held at initial project start-up. **The Contractor shall ensure that all his current project staff is in attendance.** The Departmental Representative and the Contractor will co-operate in setting the most appropriate time and place for the briefing. Subsequent to the initial environmental briefing, additional briefings will be arranged for new project staff and sub-contractors within 48 hours of reporting for duty on the project.
- .4 Cost of attending the above meetings shall be considered incidental to the Unit Price items and no additional payment will be made.

#### 1.13 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside of the Parks. Refer to Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan.
- .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 Waste Disposal shall be completed in accordance with Section 01 35 43 – Environmental Procedures.

**1.14 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.

**Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 PRIME COST SUM**

- .1 Included in Contract Price a total **Prime Cost Sum of \$350,000.00**.
- .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 Such work may include, but not be limited to:
  - .1 Additional clearing, grubbing, trimming, stripping, materials, hydraulic seeding or landscaping, ditching, and shoulder gravelling,
  - .2 Additional excavation, loading, hauling, crushing, stockpiling, and placing of aggregate materials or riprap;
  - .3 Supply and delivery of bituminous materials including asphalt cement, and anti-stripping agent;
  - .4 Earthwork, slope / roadway stabilization including the use of geotextiles.
  - .5 Asphalt concrete paving, including curbs, as directed by the Department Representative.
  - .6 Repair, removal or replacement of existing pavement;
  - .7 Additional relocation or removal and disposal of existing signs, guide posts and other miscellaneous items;
  - .8 Additional removal, disposal, plugging or debris removal of existing culverts;
  - .9 Additional supply and installation of culverts;
  - .10 Additional supply and installation or reinstallation of permanent signs (not construction signs);
  - .11 Supply and installation of raised reflective road markers and barrier reflectors;
  - .12 Supply and / or reinstallation of concrete barriers;
  - .13 Supply and installation of line painting;
  - .14 Supply and installation of wooden and steel posts;
  - .15 Supply and installation of wooden and steel railings;
  - .16 Additional survey resulting from changes made by the Departmental Representative;
  - .17 Additional road structure repairs;
  - .18 Providing additional Traffic Control equipment.
  - .19 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the contract documents;

- .20 The addition of soil amendments or topsoil imported from outside of the Park.
- .21 Rehabilitation work in various pits along Highway 93S;
- .22 Supply and installation of guide posts;
- .23 Sub-drainage not specified in the tender documents;
- .24 Additional minor brushing and tree removal on ROW;
- .25 Additional ditching and drainage improvements;
- .26 Providing facilities for Owner (Office or Lab Trailer)
- .27 Supply and implementation of full depth reclamation additives;
- .28 Spray patching or crackfilling;
- .29 Additional saw-cutting;
- .30 Supply and installation of asphalt concrete pavement;
- .31 Removal and disposal of existing guardrail or precast concrete barrier;
- .32 Work at adjacent day use areas;
- .33 Improvements to approach aprons;
- .34 Supply and installation of wildlife fencing;
- .35 Additional supply and installation of riprap as directed by the Departmental Representative
- .36 Supply and installation of barrier drains;
- .37 Asphalt EPS unit price adjustments;
- .38 Installation of milled rumble strips;
- .39 Supply and installation of guardrails;
- .40 Miscellaneous rock scaling as requested by Departmental Representative
- .41 Relocation of existing structures;
- .42 Relocation/protection of existing utilities, including payment of utility service provider costs;
- .43 Ditch cleaning and maintenance;
- .44 Disposal or reinstallation of existing rock exhibit;
- .45 Supply and placement of borrow material;
- .46 Supply and placement of fillcrete in voids underneath the footing of headwalls;
- .47 Supply and installation of water pipe;
- .48 Miscellaneous work as directed by the Departmental Representative.
- .5 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

## 1.2 MEASUREMENT PROCEDURES

- .1 Payment for Work under the “**Lump Sum Price Item 3 – Prime Cost Sum**” will be made using negotiated rates or by material, labour and equipment rates as per the following:

- .1 Rental rates will be in accordance with current BC Roadbuilders rate schedule, and will be all inclusive and fully operated.
- .2 Vehicles (ie. Pickup trucks) will be paid either at daily rates as per the BC Roadbuilders rate schedule or by milage using National Joint Council (NJC) rates. The Contractor will not be permitted to claim both daily rental and milage 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 will be reimbursed only for equipment used exclusively for additional work.
- .4 PST should be added to any material invoices or Subcontractor invoices.
- .2 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .3 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- .4 A claim for additional payment will not be considered submitted until all required documentation has been received, reviewed and approved by Departmental Representative.
- .5 The Departmental Representative's signature on extra work reports is an agreement to the hours worked that day. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.

**Part 2 Products**

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

**Part 3 Execution**

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

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, 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 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**

## **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 DEFINITION OF OCCUPANCY**

- .1 Occupancy:
  - .1 The Contractor shall be permitted to lease and occupy sites when working in KNP, free of charge from the date of award of the contract up to and including completion date of construction.
  - .2 The Contractor's occupancy of the sites identified in Contract will be deemed to have ended, when all of 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 are 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**

**Part 1 General****1.1 MEASUREMENT 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 The Contractor shall 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 The contractor shall attend weekly project meetings throughout progress of Work and provide information as determined by the Departmental Representative. Meetings shall be chaired by the Departmental representative who will prepare the minutes of the meetings.
- .2 The Contractor shall attend pre-installation meetings, when specified in specifications and when required to coordinate related or affected Work and provide information, as determined by the Departmental Representative.
- .3 The Contractor shall provide physical space and make arrangements for meetings.

**1.5 CONSTRUCTION ORGANIZATION AND START-UP**

- .1 Within seven (7) days after award of Contract, the Contractor shall request a 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 16.07 - 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 Section 01 14 00 – Work Restrictions, Section 01 52 00 – Construction Facilities and Section 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 Section 01 77 00- Closeout Procedures and Section 01 78 00 – Closeout Submittals.
- .11 Insurances and transcript of policies.
- .12 Other business.
- .4 The Contractor shall 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, the Contractor shall 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 The Contractor shall comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .7 The Contractor shall coordinate field engineering and layout work with the Departmental Representative.

## 1.6 ON-SITE DOCUMENTS

- .1 The Contractor shall maintain at job site, one copy of each of the following:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings and mix designs.
  - .5 Change Orders.
  - .6 Other Modifications to Contract.
  - .7 Manufacturer’s installation and Application Instructions.

- .8 Environmental Protection Plan & any relevant environmental documents.
- .9 Quality Control Plan and field test reports.
- .10 Traffic Management Plan.
- .11 Safety Plan.
- .12 WHMIS (MSDS Sheets shall be maintained at location of product use).
- .13 Copy of approved Work schedule and most recent updated schedule.
- .14 Labour conditions and wage schedules.
- .15 Equipment rate schedule and applicable versions of the relevant rate guides
- .16 Applicable current editions of municipal regulations and by-laws.

### 1.7 SUBMITTAL SCHEDULE

- .1 The Contractor shall prepare and submit 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 in accordance with Section 01 33 00 – Submittal Procedures.
- .2 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 The Contractor shall submit preliminary construction progress schedule in accordance with Section 01 32 16.07 – Progress Schedules to Departmental Representative coordinated with Owner's project schedule.
- .2 After review, revise and resubmit schedule to comply with revised project schedule.
- .3 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .4 In addition to the project schedule, submit weekly schedules to the Departmental Representative showing Work planned for the following week on a day by day basis.

### 1.9 CONSTRUCTION PROGRESS MEETINGS

- .1 During course of Work and prior to project completion, the Contractor shall schedule weekly progress meetings.
- .2 The Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance. Meetings shall be chaired by the Departmental representative who will prepare the minutes of the meetings.
- .3 Agenda to include, but not limited to, the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review environmental issues.
  - .3 Review Traffic Control and Emergency response Protocol issues.

- .4 Review site safety and security issues.
- .5 Review issues with Prime Contractor and co-ordination with other contractors.
- .6 Review of Work progress since previous meeting.
- .7 Discuss field observations, problems, and conflicts.
- .8 Review off-site fabrication delivery schedules.
- .9 Review submittal schedules: expedite as required.
- .10 Corrective measures and procedures to regain projected schedule.
- .11 Revisions to construction schedule.
- .12 Review Weekly Progress schedule, during succeeding work period.
- .13 Review of quality reports since previous meeting.
- .14 Review construction budget: Progress payments, variances from contract.
- .15 Other business.

#### 1.10 SUBMITTALS

- .1 The Contractor shall submit product data to Section 01 33 00 – Submittal Procedures for review for compliance with Contract Documents.
- .2 The Contractor shall submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 The Contractor shall submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 The Contractor shall process substitutions through Departmental Representative.
- .5 The Contractor shall process change orders through Departmental Representative.
- .6 The Contractor shall deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

#### 1.11 CLOSEOUT PROCEDURES

- .1 The Contractor shall notify the Departmental Representative when the Work is considered ready for Substantial Performance.
- .2 The Contractor shall accompany the Departmental Representative on a preliminary inspection to determine items listed for completion or correction (deficiencies).
- .3 The Contractor shall comply with the Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
- .4 The Contractor shall notify the Departmental Representative of completion of the deficiencies list when the work as determined in the Departmental Representative's final inspection has been completed.

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

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

**1.2 PRECEDENCE**

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

**1.3 DEFINITIONS**

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, 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 approved plan for Project, plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven 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.

**1.4 REQUIREMENTS**

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.

Parks Canada

- .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 Limit activity durations to maximum of approximately 14 working days, to allow for progress reporting.
- .6 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.
- .7 Include the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

### 1.5 SUBMITTALS

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

### 1.6 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule. Completion of each Stage of Construction:
  - .1 **Completion of all project works: October 31, 2018 (Contract Completion)**

### 1.7 MASTER PLAN

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

### 1.8 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows :
  - .1 Award.
  - .2 Permits.

- .3 Submittals:
  - .1 Project Schedule.
  - .2 List of subcontractors, suppliers and Departmental Representative.
  - .3 Contractor Chain of Command including Sub-Contractors and Departmental Representative.
  - .4 Prime Contractor / co-ordination with other Contractors Plan.
  - .5 Work Plan including temporary creek diversion plan.
  - .6 Environmental Protection Plan.
  - .7 Traffic Management Plan.
  - .8 Site access / Detour Plan.
  - .9 Emergency Response Protocol.
  - .10 Site Specific Health and Safety Plan, incl. MSDS sheets.
  - .11 On site Contingency and Emergency Response Plan.
  - .12 Survey Plan.
  - .13 Quality Control Plan.
  - .14 Shop Drawings.
- .4 Mobilization
- .5 Work Activities:
  - .1 Survey, layout and staging preparation.
  - .2 Traffic Accommodation and detour works.
  - .3 Stripping and asphalt removal.
  - .4 Temporary roadway support (lock blocks, retaining wall, shoring) if required (not anticipated).
  - .5 Excavation for temporary creek diversion & removal of existing culvert.
  - .6 Removal of stonework and stone facing from existing headwalls.
  - .7 Saw-cut exiting headwalls for installation of the concrete box section.
  - .8 Placement of bedding material for culverts with 25mm WGB material.
  - .9 Supply and installation of Precast Concrete Box culvert sections and seals.
  - .10 Installation of reinforcement dowels on headwalls and placement of CIP pigmented concrete with form liner to create rock facing on headwalls.
  - .11 Placement and compaction of Granular backfill around culverts with 50mm WGB material as shown on the drawings.
  - .12 Placement and compaction of common backfill around the culvert.
  - .13 Placement of Riprap where required and as shown on the drawings.
  - .14 Diversion of water through the new bridge culvert.

- .15 Seeding and clean up at inlet / outlet locations.
- .16 Reinstatement of the parking lot to the satisfaction of PCA
- .17 Additional Work as and when requested.
- .6 Quality Control.
- .7 Interim Inspection.
- .8 Site Clean Up / Demobilization.
- .9 Project Substantial Completion and Project Completion dates

### 1.9 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, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

### 1.10 PROJECT MEETINGS

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

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

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

**1.2 REFERENCES**

- .1 Not Used.

**1.3 ADMINISTRATIVE**

- .1 The Contractor shall submit to the Departmental Representative all submittals listed for review. The submissions shall be prompt and in orderly sequence so as to not cause a 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 Work affected by submittals shall not proceed until review is complete and approval has been given by the Departmental Representative.
- .3 The Contractor shall 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 The Contractor shall review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of the 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 The Contractor shall notify the Departmental Representative in writing at the time of submission, identifying any deviations from requirements of the Contract Documents stating reasons for deviations.
- .7 The Contractor shall verify the field measurements and affected adjacent Work is consistent.
- .8 The Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 The Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 The Contractor shall keep one reviewed copy of each submission on site.

**1.4 "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 these specifications and shown on the drawings. "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 engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials properties and Departmental Representative's letter of recommendation.
- .4 The Design must 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 design drawings and specifications.
- .5 The Contractor shall allow for 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 Specification Sections 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 Specification Sections 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 general concept. This review shall not mean that Departmental Representative approves detail 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.

## 1.5 SAMPLES

- .1 Material samples to be provided as outlined in the Contract Documents or as requested by the Departmental Representative.
- .2 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .3 Deliver samples prepaid to Departmental Representative's site office or to a location as directed by the Departmental Representative.
- .4 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

- .5 Where colour, pattern or texture is criterion, submit full range of samples.
- .6 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of work, state such in writing to Departmental Representative prior to proceeding with work.
- .7 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .8 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

#### 1.6 **MOCK-UPS**

- .1 Not used.

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

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

#### 1.8 **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:
  - .1 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 twenty (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 location in order to meet stages specified in Section 01 11 00 – Summary of Work. 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.
    - .1 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers.
    - .2 Plan describing methods the Contractor will have to meet his responsibilities as the Prime Contractor for Traffic Control in the Work zone.
    - .3 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone, cellular telephone and/or pager numbers. The list

- shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
- .4 Work Plan, describing in detail for each activity by location, the Contractor's intended methods of construction, and materials, equipment and manpower he will use to meet stages specified in Section 01 11 00 – Summary of Work. The Work Plan must be linked to the Project Schedule.
  - .5 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
  - .6 Traffic Management Plan, in accordance with the requirements of Section 01 55 26 –Traffic Control.
  - .7 Environmental Protection Plans (EPP) and Environmental Construction Operations Plans (ECO Plans) that shall meet the requirements of Section 01 35 43 – Environmental Procedures.
  - .8 Site Access and Detour Plans. It shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
  - .9 Survey Plan describing the Contractor's intended methods of surveying during this project.
  - .10 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. Parks Canada will supply the Contractor with a template with contact names and numbers to be used for this purpose.
  - .11 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:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 Site specific hazard assessment.
    - .5 General safety rules for project.
    - .6 Job specific safe work procedures.
    - .7 Inspection policy and procedures.
    - .8 Incident reporting and investigation policy and procedures.
    - .9 Occupational Health and Safety meetings.

- .10 Occupational Health and Safety communications and record keeping procedures.
  - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
  - .12 Submit copies of Material Safety Data Sheets (MSDS).
  - .13 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
  - .14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .2 The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
  - .3 The Contractor shall 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 16.07 – 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 location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if proposed Work or a portion thereof, cannot be done due to weather, equipment breakdown, delays in delivery, etc.
    - .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 made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each request for payment.
    - .4 “Design and Build” documents, Shop Drawings, Concrete/Asphalt Mix Designs, Hot/Cold Weather Concreting and Curing Procedures - The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum 14 days prior to fabrication / production.
    - .5 Progress Photographs:
      - .1 Formats: 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 memory stick with 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.
- .8 Submit copies of incident and accident reports.
- .4 Project Completion Submittals
  - .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
  - .2 Quality Control Records – The Contractor shall submit a bound and itemized set of project quality control documentation.
- .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 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**

**Part 1 General****1.1 MEASUREMENT 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 (WHMIS).Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia:
  - .1 Occupational Health and Safety Regulations.

**1.3 SUBMITTALS**

- .1 The Contractor shall make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Contractor shall submit site-specific Health and Safety Plan: Within seven (7) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Contractor's safety policy.
  - .2 Identification of applicable compliance obligations.
  - .3 Definition of responsibilities for project safety / organization chart for project.
  - .4 General safety rules for project.
  - .5 Job specific safe work procedures.
  - .6 Inspection policy and procedures.
  - .7 Incident reporting and investigation policy and procedures.
  - .8 Occupational Health and Safety meetings.
  - .9 Occupational Health and Safety communications and record keeping procedures.
  - .10 Results of site specific safety hazard assessment.
  - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
  - .12 The Contractor shall submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
  - .13 The Contractor shall submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
  - .14 The Contractor shall submit copies of incident and accident reports.

- .15 The Contractor shall submit copies of Material Safety Data Sheets (MSDS) to Departmental Representative.
- .16 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.
- .17 The Departmental Representative's review of Contractor's final Health and Safety plan does not relieve the Contractor of Occupational Health and Safety Prime Contractor responsibilities.
- .18 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .19 The Contractor shall address standard operating procedures to be implemented during emergency situations through an on-site Contingency and Emergency Response Plan.

#### 1.4 FILING OF NOTICE

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

#### 1.5 SAFETY ASSESSMENT

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

#### 1.6 MEETINGS

- .1 The Contractor shall schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .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.
- .3 After contract award and prior to commencement of any work under the contract, the Project Manager will hold a health and safety meeting with the Contractor. 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.
- .4 A copy of the "Attestation and Proof of Compliance with Occupational Health and Safety (OHS)" form is part of the Invitation to Tender package.

**1.7 REGULATORY REQUIREMENTS**

- .1 The contractor shall perform Work in accordance with National Parks Act.

**1.8 PROJECT / SITE CONDITIONS**

- .1 Work at site will involve contact with British Columbia Occupational Health Safety Act.

**1.9 GENERAL REQUIREMENTS**

- .1 The Contractor shall 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 The 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 The Contractor shall 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 The Contractor shall 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 The Contractor shall comply with Occupational Health and Safety Regulations, British Columbia and Alberta depending on work location.
- .2 The Contractor shall 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 The Contractor shall 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 The Contractor shall 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 The Contractor shall immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 The Contractor shall provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**1.16 WORK STOPPAGE**

- .1 The Contractor shall give precedence to safety and health of public and site personnel and protection of the environment over cost and schedule considerations for Work, as shall be included in the Contractor's Health and Safety Plan.

**Part 2 Products**

- .1 Not used.

**Part 3 Execution**

- .1 Not used.

**END OF SECTION**

**Part 1 General****1.1 PRECEDENCE**

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

**1.2 MEASUREMENT PROCEDURES**

- .1 Preparation and implementation of an Environmental Protection Plan (EPP) 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.
- .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.

**1.3 SUBMITTALS**

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures.
- .2 The EPP will include how the Contractor will manage all environmental risks and implement all recommended mitigations identified in the “Basic Impact Assessment” (BIA).

**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 business and private vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from 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 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the problems.
- .3 Refer to the environmental requirements noted in the Basic Impact Analysis (BIA), Direction for Permitted Users conducting water-related activities in BNP, and Direction for Permitted Users conducting water-related activities in KNP

included with this tender. The Contractor's EPP is to include these requirements as a minimum.

## 1.6 **START-UP AND ENVIRONMENTAL BRIEFING**

- .1 All staff employed at the construction site will be subject to an approximately one hour briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Each employee, having received the briefing, will be issued a certification sticker to be displayed on their helmet. 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 monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "Environmental Briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.
- .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 BMPs and 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 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 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. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.
- .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 PROTECTION OF WORK LIMITS

- .1 The Contractor is to prepare an EPP that details 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.

### 1.12 EROSION CONTROL

- .1 Erosion control measures that prevent sediment from entering waterway at the construction site are a critical element of the project and shall be implemented by the Contractor.
- .2 On-site sediment control measures shall be constructed and functional prior to initiating activities required for the work. The Contractor shall prepare an Erosion Control Plan to the satisfaction of the Departmental Representative and the ESO.
- .3 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, remediated, or replaced. The Departmental Representative and ESO will also monitor erosion control performance.
- .4 The site will be secured against erosion during any periods of construction inactivity or shutdown.

### 1.13 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 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 the ESO 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, 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 more 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. The Departmental Representative and the ESO shall be notified immediately of any spill. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .8 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.

#### 1.14 **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 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 to any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.

- .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 provide 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 in # 4 of Pollution Control 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 National Parks.
- .7 All site equipment shall use bio-based or biodegradable hydraulic fluid for works.
- .8 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order. If any equipment is found to have fluid/fuel leaks the leaks are to be contained and cleaned up immediately and the piece of equipment shall be repaired or removed from site.
- .9 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 National Parks. Alternatively, the Contractor may hire a security person employed to prevent vandalism. The access gates to the pits shall be locked at the end of each working day and during extended periods when the pit is not being used. The Contractor is to ensure that workers are briefed on proper 'daisy-chain' use of locks to ensure no other contractor or Parks Canada Highways are locked out.

#### 1.15 OPERATION OF EQUIPMENT

- .1 Equipment and vehicle (including personal) 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. For this project, construction requires working close to watercourses or water bodies 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 The Contractor shall restrict vehicle movements to work limits.
- .5 Workers private vehicles are to remain within the construction footprint, or as directed by the Departmental Representative.

#### 1.16 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 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.

#### 1.17 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 The Contractor shall avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if wildlife including bears, cougars, wolves, deer, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might

attract wildlife (e.g. disposal and storage of lunches and food scraps) must be exercised at all times.

- .3 The Contractor shall 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.

#### 1.18 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 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.

#### 1.19 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 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 parks. 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 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, such as the Overflow Campground, 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.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

#### 1.20 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 Contractor's office, work headquarters, material laydown, equipment parking and storage area will be in locations approved by Parks Canada and the Departmental Representative with the goal of minimizing impacts to visitor experience and safety, motorists, wildlife and water quality.
- .2 The National Park Act regulations prohibit anyone working within the Parks from using public campground facilities.
- .3 Removal and storage of snow shall be arranged with the ESO and 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 control measures for temporary access roads may also have to be initiated.

#### 1.21 NOTIFICATION

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

#### Part 2 Products

- .1 Not Used.

#### Part 3 Execution

##### 3.1 CLEARING AND GRUBBING

- .1 The Contractor shall ensure that the substrate or riparian area of streams, rivers or watercourses, whether open water or frozen over shall not be disturbed by tracked, wheeled or self-propelled equipment, (e.g. a skidder or truck).

- .2 The Contractor shall take all measures to ensure that trees do not fall into streams, rivers, wetlands or water bodies or outside the clearing limits. Generally, work within a 30 metre buffer of watercourses, water bodies or wetland requires the close oversight of the ESO or the Departmental Representative.
- .3 Trees inadvertently felled into streams, rivers, watercourses or outside the clearing limits shall be removed by means 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.
- .4 Logs and other salvage materials are to be transported 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.
- .5 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 being transported for disposal.
- .6 No slash clearing, pickup or grubbing shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .7 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 19.16 – Hydraulic Seeding.

### 3.2 STRIPPING

- .1 A contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need. In the event of a work program shutdown during inclement weather erosion control of bared soils or excavated materials stockpiles will be required. The Contractor's EPP will describe measures to be implemented in such a circumstance.
- .2 Stripping close to any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, are not eroded and do not fall into the water or wetlands. Generally, work within a 30 metre buffer of waterways or wetlands requires the close oversight of the ESO and the Departmental Representative.
- .3 No stripping shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .4 Stripped soil (including fine forest litter) materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. 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.

### 3.3 MATERIAL LOADING, HAULING, PLACEMENT AND GRADE BUILDING

- .1 During grade construction conducted close to any watercourse, water body or wetland methods shall be employed to ensure materials are not pushed, are not eroded and do not fall into the water or wetlands. Generally, work within a 30 metre buffer of waterways or wetlands requires the close oversight of the ESO and the Departmental Representative.
- .2 No grade building shall occur outside of the designated area or within 1 metre of the drip line of existing forest. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location. Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.

### 3.4 EXCAVATING AND PLACEMENT

- .1 Excavation will be undertaken according to the design drawings.
- .2 Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.
- .3 All sediment control measures shall be implemented by the Contractor prior to the commencement of the work in the vicinity of water bodies, watercourses, and wetlands.
- .4 If sediments enter watercourses during any excavation nearby or at its banks, the Contractor shall ensure that sediment levels in the waters of the river or creeks do not exceed specified limits and meet the “desired end result” limits outlined. See 3.10 - Specific Concerns Relative to Erosion Control and Sedimentation and 3.11 - Specific Concerns Relative to Sensitive Sites and Activities of this Section 01 35 43 – Environmental Procedures.
- .5 Placement of riprap and backfill at creeks shall be undertaken without contacting the watercourse or wetted margins of the stream, unless approved by the Departmental Representative.
- .6 Fisheries protection windows shall be observed for any other watercourse in this contract and will guide the timing of the work so that stream disturbance is prevented. See 3.10 - Specific Concerns Relative to Erosion Control and Sedimentation and 3.11 - Specific Concerns Relative to Sensitive Sites and Activities of this Section 01 35 43 – Environmental Procedures.
- .7 If a pump-out sump to dewater excavation sites will be required, the Contractor is to prepare an EPP that details how the dewatering shall be undertaken, to the satisfaction of the Departmental Representative and the ESO. Special attention is to be given to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting and settlement pond reclamation. Water containing suspended materials shall not be pumped into watercourses, drainage systems or on to land, except with the permission of the Departmental Representative and the ESO.

### 3.5 WATER EXTRACTION AND DISTRIBUTORS

- .1 All water related activities are to be conducted in accordance with *Direction for Permitted Users conducting water-related activities in LLYK* and *Direction for Permitted Users conducting water-related activities in BNP*.
- .2 Backflow prevention is required on all water trucks.
- .3 All water trucks and water extraction equipment must be thoroughly cleaned prior to entering any Park. Proof of cleaning may be requested by the Departmental Representative and ESO for verification.
- .4 Extraction of water within any National Park requires a RAP. Should the Contractor require/request a water source the Departmental Representative, in consultation with the ESO may approve a RAP and give direction as to a location to be used. Specific intake measures are required when water is approved to be withdrawn from open watercourses.
- .5 Care must be taken by the Contractor to ensure extracted water does not enter another water body, other than the initial source of extraction.
- .6 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.

### 3.6 CULVERT INSTALLATION

- .1 All culverts shall be installed using best management practices for working in or near water that will result in a minimum amount of sedimentation and damage to the riparian area of the watercourse. The Contractor shall prepare a plan for the installation of each culvert, a minimum one (1) week prior to doing the work for approval by the Departmental Representative and ESO.
- .2 The culverts shall be installed using best management practices for placement, including consideration of aquatic ecology.
- .3 It is preferable to install the culvert during periods of low discharge. The use of sediment control measures may be necessary to ensure that excessive amounts of sediments do not enter watercourses.
- .4 It may be necessary to exclude fish from the immediate construction site while the culvert is being installed. If this practice is necessary, fish shall be salvaged from within the exclusion area, and construction should be carried out expediently to minimize the time spent working in the drainage.

### 3.7 FINE GRADING, TOPSOIL PLACEMENT AND SEEDING

- .1 This contract involves the final shaping of cut slopes, fills and landscapes disturbed in the construction of the Works. These slopes will be covered by stripped soil, chip compost materials and seeded. Environmental concerns related to these activities largely focus on erosion prevention and sediment control. The Contractor is to present a plan for placement, spreading, and stabilization of reclamation materials that controls erosion and prevents sedimentation, to the satisfaction of the Departmental Representative and ESO.

**3.8 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION**

- .1 The Contractor shall prepare an Erosion and Sedimentation Management Plan for this contract due to the proximity to waterbody and riparian environment. This plan shall be to the satisfaction of the Departmental Representative and ESO.
- .2 An important desired end result is to allow 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.

**3.9 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**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

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

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)
- .2 CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete
- .3 BC MoTI – Standard Specifications for Highway Construction Manual (Latest Edition)
- .4 AT - Standard Specifications for Highway Construction (Edition 15, 2013)

**1.3 TESTING BY THE CONTRACTOR**

- .1 The Contractor shall perform all Quality Control testing required to assure that the Work strictly complies with the Contract requirements. This shall include, but not be limited to:
  - .1 All testing specified in the Contract Documents;
  - .2 Any other testing required as a condition for deviation from the specified Contract procedures;
- .2 Testing shall be in accordance with the current edition of BC MoTI Standard Specifications for Highway Construction.
- .3 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 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.
- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5 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.

**1.4 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 Manual. 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 Manual 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 Specification compliance.
- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of his 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.

- .5 The Quality Control Manual 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.

#### 1.5 INSPECTION

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

#### 1.6 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, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. The contractor shall correct defects and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

#### 1.7 ACCESS TO WORK

- .1 The Contractor shall allow inspection / testing agencies access to Work, off-site manufacturing and fabrication plants.

- .2 The Contractor shall co-operate to provide reasonable facilities for such access.

## 1.8 PROCEDURES

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

## 1.9 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.
  - .2 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.
  - .3 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
  - .4 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .3 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.
- .4 The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.

- .5 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.

#### 1.10 REJECTED WORK

- .1 The Contractor shall remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, that has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 The Contractor shall 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 correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

#### 1.11 REPORTS

- .1 The Contractor shall submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 Submittals Procedures.

#### 1.12 TESTS AND MIX DESIGNS

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

#### 1.13 MILL TESTS

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

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 All work of this section shall be incidental to contract and will not be measured for payment.

**1.2 INSTALLATION AND REMOVAL**

- .1 The contractor shall provide construction facilities in order to execute work expeditiously.
- .2 The contractor shall remove from site all such work after use.

**1.3 SITE STORAGE / LOADING**

- .1 The Contractor shall restrict work and operations of employees to those necessitated by the Contract Documents. The Contractor shall not unreasonably encumber the premises with products.
- .2 The Contractor shall 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 The Contractor shall provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 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, the Contractor shall 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.

**1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 The Contractor shall provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 The Contractor shall 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 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations, ordinances and these specifications.

- .2 The Contractor shall post notices and take such precautions as required by local health authorities.
- .3 The Contractor shall keep the worksite and various laydown areas in sanitary condition.

**1.8 CONSTRUCTION SIGNAGE**

- .1 To be in accordance with Section 01 55 26 –Traffic Control.

**Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## Part 1 General

### 1.1 PRECEDENCE

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

### 1.2 MEASUREMENT PROCEDURES

- .1 Cost of Traffic Control, including temporary pavement marking, described in this Section 01 55 26 –Traffic Control, 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. The Contractor will not be permitted to remove the temporary pavement markings until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.
- .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 Accommodation.
- .3 Cost of keeping 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.
- .4 Cost of snow removal for Contractor to do the work identified in the Contract 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. This excludes snow removal on Public roads.

### 1.3 REFERENCES

- .1 The Contractor shall provide traffic control in accordance with current edition of:
  - .1 British Columbia - Traffic Control Manual for Work on Roadways.
  - .2 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada.

### 1.4 QUALITY CONTROL

- .1 All Quality Control shall be performed by the Contractor.

### 1.5 GENERAL

- .1 The Contractor shall develop and implement a Traffic Management Plan (TMP) in accordance with BC MoTI Standard Specifications for Highway Construction (Latest Edition), Section 194 – Traffic Management for Work zones, except where specified otherwise. The TMP will include plans specific to each detour and access point required for this project.

- .2 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.
- .3 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at the same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .4 All speed limits, traffic control and warning signs shall have an “NPC” adhesive sticker added to bottom right-hand corner. These stickers will be supplied by Parks Canada following the acceptance by the Departmental Representative of the Contractor’s traffic management plan.
- .5 Temporary pavement marking used shall be acceptable to the Departmental Representative. These temporary pavement markings shall be in accordance with the current version of the “BC Ministry of Transportation and Highways – Traffic Control Manual for Work on Roadways”.
- .6 All temporary markings and other associated markings will be removed at the contractor’s expense prior to completion of the Contract but not before the final pavement markings have been installed to the satisfaction of the Departmental Representative.
- .7 Contractor shall have appropriate traffic control measures in place so that at least one lane of highway traffic is maintained through the work zone at all times throughout the construction. Lane closures on Highway 93 will require prior approval from the departmental representative.
- .8 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.
- .9 The Contractor shall supply, install and maintain two Changeable Message Signs (CMS) to inform the traffic of construction delays. 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 two CMS will be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**”. Text for the two CMS will be directed by the Departmental Representative. Removal of the two CMS will only be permitted upon completion of the Works.

## 1.6 PROTECTION OF PUBLIC TRAFFIC

- .1 The Contractor shall 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 The Contractor shall carry out traffic regulation in accordance with the current edition of the BC Traffic Control Manual for Work on Roadways, except where specified otherwise.
- .3 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.

- .4 A minimum of one travelling lane 4 m wide shall be maintained by the Contractor at all times to provide for safe movement of traveling public through the work area. The Contractor shall submit a TMP to the Departmental Representative for review and acceptance prior to commencement of work. Short closures may be allowed by the Departmental Representative for some activities as long as the delay to motorists does not exceed 20 minutes.
- .5 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.
- .6 The Contractor shall provide competent, certified and properly equipped flag persons.
- .7 The Contractor shall also provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc. are in proper working order.
- .8 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.
- .9 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.
- .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 Keep travelled way clean, free of pot holes.
- .12 At paved detours (if required) and at access points, Contractor shall:
  - .1 Have posted speed limit at 50 km/hr with appropriate signage, temporary pavement marking and other safety features necessary.
  - .2 Keep areas clean and free of pot holes, failures, and rutting.
  - .3 Provide and maintain temporary markings.
  - .4 Provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc., are in proper working order.
- .13 During July and August no lane closures are permitted and work, if required, must be requested to take place overnight from 07:00 PM to 07:00 AM following a request to the Department Representative and Field Unit approval.

## 1.7 INFORMATIONAL AND WARNING DEVICES

- .1 The Contractor shall 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 The Contractor shall supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the TMP submitted by the Contractor and approved by the Departmental Representative.
- .3 The Contractor shall supply, install and maintain two (2) portable Changeable Message Signs with a minimum of three (3) lines with eight (8) characters per line, for the duration of the project.
- .4 The Contractor shall place signs and other devices to standards and in locations recommended in British Columbia - Traffic Control Manual for Work on Roadways.
- .5 Signs shall be wind resistant.
- .6 As situation on site changes, Contractor to update his Traffic Management Plan outlining signs and other devices required for the project and submit for the approval of the Departmental Representative.
- .7 The Contractor shall continually inspect and maintain traffic control devices in use by:
  - .1 Checking signs daily for legibility, damage, suitability and location.
  - .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.

## 1.8 CONTROL OF PUBLIC TRAFFIC

- .1 The Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in, British Columbia - Traffic Control Manual for Work on Roadways:
  - .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 vehicles are required.
- .2 Delays to public traffic due to Contractor's operators: **maximum 20 minutes.**
- .3 Provide 2-way traffic during non-working hours.
- .4 No stoppage of traffic will be allowed for the periods listed in Section 01 14 00 – Work Restrictions.
- .5 During hours of darkness, (if work is approved), Contractor shall determine requirements but as a minimum, traffic control personnel 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.

### 1.9 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 A schedule for all full work zone closures required must be provided to the Departmental Representative at least two (2) weeks in advance of the planned closure.
  - .2 There may be restrictions to accommodate special events within the National Parks. PCA will provide two (2) weeks' notice of any upcoming restrictions.
  - .3 The Department Representative reserves the right to stop work in the case of excessive traffic delays.
  - .4 Provide the Departmental Representative with construction advisories for posting and update advisories regularly to reflect the current and planned construction activities and highway closures. A minim of 4 days notice is required for changes to the accepted TMP.
- .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**

**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 MEASUREMENT PROCEDURES**

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

**1.3 INSTALLATION AND REMOVAL**

- .1 The Contractor shall provide temporary controls in order to execute Work expeditiously.
- .2 The Contractor shall remove from site all such work after use.

**1.4 HOARDING**

- .1 The Contractor shall provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

**1.5 GUARDRAILS AND BARRICADES**

- .1 The Contractor shall provide secure, rigid guard rails and barricades around deep excavations.

**1.6 WEATHER ENCLOSURES**

- .1 Not used.

**1.7 DUST TIGHT SCREENS**

- .1 Not used.

**1.8 ACCESS TO SITE**

- .1 The Contractor shall provide and maintain access roads, as may be required for access to Work.

**1.9 PUBLIC TRAFFIC FLOW**

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

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

- .1 The Contractor shall protect surrounding public property from damage during performance of Work.
- .2 The Contractor shall be responsible for damage incurred.

**1.11 PROTECTION OF BUILDING FINISHES**

.1 Not used.

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.1 Not Used

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 This work shall be incidental to the 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 The Contractor shall conform to these reference standards, in whole or in part as specifically requested in specifications.
- .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 The 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 The Contractor shall 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 specifications, maintain uniformity of manufacture for any particular or like item throughout building.

**1.4 AVAILABILITY**

- .1 Immediately after signing 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 The Contractor shall handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 The Contractor shall 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 The Contractor shall store products subject to damage from weather in weatherproof enclosures.
- .4 The Contractor shall store cementitious products clear of earth or concrete floors, and away from walls.
- .5 The Contractor shall 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 The Contractor shall store sheet materials, lumber and misc. metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 The Contractor shall 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 The Contractor shall remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 The Contractor shall 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 The Contractor shall pay costs of transportation of products required in performance of Work.

## 1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, the Contractor shall 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 The Contractor shall notify Departmental Representative in writing, of conflicts between specifications 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 The Contractor shall ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 The Contractor shall not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

#### 1.9 **CO-ORDINATION**

- .1 The Contractor shall ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 The Contractor shall 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 The Contractor shall 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 The Contractor shall 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 The Contractor shall provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 The Contractor shall prevent electrolytic action between dissimilar metals and materials.
- .3 The Contractor shall 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 The Contractor shall 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 The Contractor shall 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 The Contractor shall 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 in accordance with BC-MoTI Standard Specifications for Highway Construction (latest edition) or as directed by the Departmental Representative.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

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

**1.2 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, bedding, and backfill.
  - .4 Establishing culverts, invert elevations and locations.
  - .5 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
  - .6 String line or other markings for the alignment or grade control of construction equipment.
- .3 The Contractor's detailed survey layout for construction shall include a complete base-line displaying project stationing at 20 m intervals suitable for referencing test locations and for purposes of measurement for payment.
- .4 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:
    - .1 Horizontal shall be less than  $r = 5(d+0.2)$  where "r" is in cm and "d" is in km
    - .2 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 0.1m of correct elevation.
  - .2 In open ground, all elevations shall be within 0.05 m of correct elevation.
  - .3 On highway surface, all elevations shall be within 0.01 m of correct elevation
- .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.
- .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.

#### 1.5 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points will be provided by the Departmental Representative.
- .2 The Contractor shall locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 The Contractor shall make no changes or relocations without prior written notice to Departmental Representative.
- .4 The Contractor shall report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

#### 1.6 RECORDS

- .1 The Contractor shall maintain a complete, accurate log of control and survey work as it progresses.
- .2 The Contractor shall record locations of maintained, re-routed and abandoned service lines.

#### 1.7 SUBMITTALS

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

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 PRECEDENCE**

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

**1.2 MEASUREMENT PROCEDURES**

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

**1.3 PROJECT CLEANLINESS**

- .1 The Contractor shall maintain the Work in tidy condition, free from accumulation of waste products and debris, including that caused by the Owner, Departmental Representative, or other Contractors.
- .2 The Contractor shall remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. No burning of waste materials on site is permitted.
- .3 The Contractor shall clear snow and ice from access to work areas during active construction periods and when access to environmental protection facilities is required outside active construction times.
- .4 The Contractor shall make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 The Contractor shall provide any on-site bear proof containers required for collection of waste materials and debris.
- .6 The Contractor shall remove waste material and debris from site at end of each working day.
- .7 The Contractor shall dispose of waste materials and debris outside of the National Park at an appropriate landfill or disposal facility.
- .8 The Contractor shall store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 The Contractor shall provide adequate ventilation during use of volatile or noxious substances.
- .10 The Contractor shall use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**1.4 FINAL CLEANING**

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

- .4 The Contractor shall 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 The Contractor shall make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 The Contractor shall inspect finishes, and ensure specified workmanship and operation.
- .7 The Contractor shall remove dirt and other disfiguration from exterior surfaces.
- .8 The Contractor shall sweep and wash clean paved areas.
- .9 The Contractor shall clean drainage systems.
- .10 The Contractor shall ensure machinery, tools and equipment are cleaned as required to prevent movement of invasive plant species within the project area and before leaving for the project area.

**Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## **Part 1 General**

### **1.1 PRECEDENCE**

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

### **1.2 MEASUREMENT PROCEDURES**

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

### **1.3 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 The Contractor shall notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 The Contractor shall then request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform an inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: The Contractor shall submit a written certificate that following have been performed:
  - .1 All work has been completed and inspected for compliance with Contract Documents.
  - .2 All defects have been corrected and deficiencies have been completed.
  - .3 All work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, the contractor shall request a 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**

**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 MEASUREMENT PROCEDURES**

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

**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 Environmental Protection Plan
  - .8 Inspection certificates.
  - .9 Manufacturer's certificates.
- .2 The contractor shall store record documents and samples in field office apart from documents used for construction.
- .3 The contractor shall 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 The contractor shall maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 The contractor shall keep record documents and samples available for inspection by Departmental Representative.

**1.4 RECORDING ACTUAL SITE CONDITIONS**

- .1 The contractor shall record information on set of black line opaque Drawings and in copy of the Project Manual.
- .2 The contractor shall record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: the contractor shall 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 The Contractor shall legibly mark each item to record actual construction in the Specifications including but not limited to:
  - .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 The contractor shall separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 The contractor shall list subcontractors, suppliers, and manufacturers, with name, address, and telephone number of responsible principal.
- .3 The contractor shall 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 The contractor shall verify that documents are in proper form, contain full information, and are notarized.
- .6 The contractor shall co-execute submittals when required.
- .7 The contractor shall retain warranties and bonds until time specified for submittal.

**Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Payment under **“Unit Price Item 1 – Asphalt Pavement and Concrete Curb Removal”** shall be the total compensation for all operations involved in removal of the associated material including but not limited to survey, saw-cutting, sweeping, loading, hauling, stockpiling and cleaning of remaining pavement surface. Payment shall be made as follows:
  - .1 Saw-cutting shall be measured by linear meter in accordance with the Contract documents. Payment for saw-cutting shall be made under **“Unit Price Item 1a - Asphalt Pavement and Concrete Curb Removal – Saw-cutting”** and shall include all labour, equipment and material to satisfactorily complete this item of work.
  - .2 **“Unit Price Item 1b - Asphalt Pavement and Concrete Curb Removal – Full Depth Asphalt Pavement Removal”** will be measured for payment in square metres of asphalt pavement removed and disposed of outside of the National Parks. Removal of the asphalt pavement (approximately 100mm – 150mm thickness’) 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.
  - .3 **“Unit Price Item 1c - Asphalt Pavement and Concrete Curb Removal –Concrete Curb Removal”** will be measured for payment in linear metre of concrete curb removed and disposed of outside of the National Parks. Removal of the concrete curb 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.
  - .4 No overhaul will be paid for this Work.
  - .5 Removal and disposal of catch basins (2) will be considered incidental to the work and no separate 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 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 the work cannot be completed at once.
  - .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 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.
- .2 The Contractor shall dispose of all removed asphalt material outside of the National Parks.

## Part 2 Products

- .1 Not Used.

## 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 55 26 -Traffic Control.

### 3.2 PROTECTION

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

### 3.3 REMOVAL

- .1 Full depth asphalt pavement removal shall be done to the lines shown on the IFC Drawings or as designated by the Departmental Representative.
- .2 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.

### 3.4 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**

## Part 1 General

### 1.1 MEASUREMENT FOR PAYMENT

- .1 Demolition of portion of headwalls by saw-cutting, removal and disposal of stone work from top and face of existing headwalls, and removal of any loose or deteriorated concrete as specified in the drawings or directed by the Departmental Representative. This work shall include all labour, material and equipment required to remove, load, haul and dispose of outside of the Park. Payment for the removal and disposal of the demolition for minor work items will be made under “**Lump Sum Price Item 4- Demolition for Minor Works**”
- .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 shall be incidental to the work, and no additional payment will be made.
- .4 Preparation of site conditions required for this Work shall be incidental to the work, and no separate payment will be made to the Contractor.
- .5 Surface restoration and / or repairs to any infrastructure other than that required in the Contract or under other Unit Price Items shall be incidental to Demolition for Minor works and no additional payment will be made.
- .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 Canadian Standards Association (CSA International)
  - .1 CSA S350 [M1980 (R2003)], Code of Practice for Safety in Demolition of Structures.

### 1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 – Environmental Procedures and Section 01 74 11 – Cleaning.
- .2 Dispose of all waste outside the Park at site obtained by the Contractor.

### 1.4 SITE CONDITIONS

- .1 Notify Departmental Representative before disrupting access or services.

## Part 2 Products

- .1 Not used.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 The Contractor shall inspect the site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities.

#### **3.2 PROTECTION**

- .1 The Contractor shall prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features to remain in place.
  - .1 Provide bracing and shoring as required.
- .2 The Contractor shall keep noise, dust, and inconvenience to occupants to minimum.
- .3 The Contractor shall provide temporary dust screens, covers, railings, supports and other protection as required.

#### **3.3 REMOVALS**

- .1 Remove items as indicated in the Contract Documents or as directed by the Departmental Representative.
- .2 Remove materials to appropriate recycling or waste facilities, except where specified otherwise by Departmental Representative.

**END OF SECTION**

## **Part 1 General**

### **1.1 PRECEDENCE**

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

### **1.2 MEASUREMENT PROCEDURES**

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

### **1.3 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).

### **1.4 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.

### **1.5 SUBMITTALS**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures. Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
- .2 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
  - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
  - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
  - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
  - .4 All explosives (if required) must be mixed outside of the Park and delivered to the site. No storage of explosives shall be allowed within the National Parks.
  - .5 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
  - .6 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
  - .7 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
  - .8 Transfer of flammable and combustible liquids is prohibited within buildings.
  - .9 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
  - .10 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
  - .11 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
  - .12 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .5 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
  - .1 Store hazardous materials and wastes in closed and sealed containers.
  - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.

- .3 Store hazardous materials and wastes in containers compatible with that material or waste.
- .4 Segregate incompatible materials and wastes.
- .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
- .6 Store hazardous materials and wastes in secure storage area with controlled access.
- .6 Maintain clear egress from storage area.
- .7 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .8 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .9 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

## **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. Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .6 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 This work will not be measured for payment and shall be considered incidental to the works.
- .2 Include formwork costs including form liners in items of concrete work in Section 03 30 00 – Cast-in-Place Concrete.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
  - .3 CSA O121-[M1978(R2003)], Douglas Fir Plywood.
  - .4 CSA O151, Canadian Softwood Plywood.
  - .5 CSA O153-[M1980(R2003)], Poplar Plywood.
  - .6 CSA O437 Series-[93(R2006)], Standards for OSB and Waferboard.
  - .7 CSA S269.1-[1975(R2003)], Falsework for Construction Purposes.
  - .8 CAN/CSA-S269.3-[M92(R2003)], Concrete Formwork, National Standard of Canada.
- .2 Council of Forest Industries of British Columbia (COFI)
  - .1 COFI Exterior Plywood for Concrete Formwork.
- .3 BC MoTI Standard Specifications for Highway Construction (latest edition)

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork and falsework.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of British Columbia.
- .4 MSDS in accordance with Section 02 81 01 Hazardous Material.
- .5 Indicate method and schedule of construction, shoring, stripping, and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1 for falsework drawings and CAN/CSA S269.3 for formwork drawings.
- .6 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 The Contractor shall separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.

- .2 The Contractor shall place materials defined as hazardous or toxic waste in designated containers.
- .3 The Contractor shall ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 The Contractor shall use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
- .5 The Contractor shall dispose concrete waste in the roadway embankment as approved by the Departmental Representative.

## Part 2 Products

### 2.1 MATERIALS

- .1 Formwork materials:
  - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
  - .2 Forms for exposed surfaces including the cast in place concrete shall be new material, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
  - .3 All form material for exposed surfaces shall be full-sized sheets, as practical. The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete where the pour height is 1.5 m or less shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Where the pour height is greater than 1.5 m the minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 200 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities that are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in color.
- .7 Form release agent shall be non-toxic, biodegradable, low VOC.
- .8 Falsework materials shall conform to CSA-S269.1.

**Part 3 Execution****3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with Drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1/A23.2.
- .6 Align form joints and make watertight and keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
- .10 Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .11 Clean formwork in accordance with CSA-A23.1/A23.2 before placing concrete.

**3.2 REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 Seven (7) days for cast-in-place culvert box section.
  - .2 Three (3) days for culvert headwalls
- .2 Remove formwork when concrete has reached 50% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Reuse formwork and falsework subject to requirements of CAN/CSA-A23.1.

**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure reinforcing steel in kilograms of steel supplied and incorporated into the Work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Departmental Representative.
  - .1 This work will not be measured for payment but will be considered incidental to Cast-In-Place Concrete item for which the reinforcement is required.
  - .2 No allowance will be made for tie wires, chairs and other material used in fastening the reinforcing steel in place.
  - .3 If bars are substituted at the Contractor's request, and as a result more steel is used than specified, no additional payment will be made.
- .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.
- .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.

### 1.2 REFERENCES

- .1 All standards listed below shall be the latest issue at the time of tender.
- .2 ASTM International
  - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
  - .2 ASTM A1064/A1064M, Standard Specification for Carbon Steel Wire and Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete.
  - .3 ASTM A276/A276M, Standard Specification for Stainless Steel Bars and Shapes
  - .4 ASTM A955/A955M, Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcing
- .3 CSA International
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A23.3, Design of Concrete Structures.
  - .3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
  - .1 Indicate placing of reinforcement and:
    - .1 Bar bending details.
    - .2 Lists.
    - .3 Quantities of reinforcement.
    - .4 Sizes, spacing, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
    - .5 Indicate sizes, spacing and locations of chairs, spacers and hangers.
  - .4 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
    - .1 Provide type B unless otherwise indicated.

### 1.4 QUALITY CONTROL

- .1 Submit in accordance with Section 01 45 00 - Quality Control.
  - .1 Mill Test Report: provide Departmental Representative with certified copy of mill test report of reinforcing steel.
- .2 Submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

### 1.5 DELIVERY, STORAGE AND HANDLING

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

## Part 2 Products

### 2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400W, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

- .2 All steelwork shall be galvanized after complete fabrication to the requirements of ASTM A123/A123M
- .3 For steel not meeting the chemical composition requirements, special galvanizing techniques shall be developed by the galvanizer to ensure that the specified coating thickness and adherence is achieved. A detailed description of the special techniques shall be submitted to the Departmental Representative for review two (2) weeks prior to galvanizing.
- .4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M for black reinforcing.
- .5 Stainless steel wire ties to UNS standards identified above.
- .6 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .7 Mechanical splices: subject to approval of Departmental Representative.

## 2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.
- .2 All hooks and bends shall be bent using the pin diameters and dimensions as recommended in the Reinforcing Steel Institute of Canada (RSIC), Manual of Standard Practice.
- .3 Obtain the Departmental Representative's approval for locations of reinforcement splices other than those shown on placing Drawings.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

## 2.3 SOURCE QUALITY CONTROL

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

## Part 3 Execution

### 3.1 FIELD BENDING

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

### 3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.

- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 All lifting and handling shall be done using devices that do not mark, mar, damage or distort the galvanized members and assemblies in any way.
- .5 Galvanized material shall be stacked or bundled and stored to prevent wet storage stain as per American Hot Dip Galvanizers Association (AHDGA) publication "Wet Storage Stain".
- .6 Delivery of a damaged product will be cause for rejection.
- .7 Ensure cover to reinforcement is maintained during concrete pour.
- .8 Protect coated portions of bars with covering during transportation and handling.
- .9 Plain reinforcing steel shall be electrically isolated from the galvanized reinforcing steel.
- .10 Metal accessories such as anchor bolts, coverplates and electrical boxes that are exposed to the atmosphere shall be electrically isolated from the steel reinforcement.
- .11 Repair of galvanizing shall only be done if bare areas are infrequent, small and suitable for repair as determined by the Departmental Representative.
- .12 Repair of galvanized surfaces shall be in accordance with ASTM 780, Method A3 Metallizing. The thickness of the metallizing shall be a minimum of 180  $\mu\text{m}$ , and the repair tested for adhesion. Alternatively, the galvanizing may be repaired using two coats of a one component zinc-rich coating containing >95% non-toxic electrolytic zinc powder (pure to 99.995%) in a non-toxic solvent.

### 3.3 CLEANING

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

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Payment under “**Unit Price Item 2 – CIP Culvert End Section & End Treatment of Culvert Headwalls**” will be measured in cubic meters of cast-in-place concrete placed and accepted by the Departmental Representative and shall include full compensation for all costs of labour, materials, equipment, tools, formwork, falsework, embedded metallic and non-metallic materials, access, environmental requirements, safety requirements, submittals, and associated Works required for the construction of all cast-in-place concrete.
  - .1 Concrete placed beyond dimensions indicated will not be measured for payment.
  - .2 Supply and installation of steel reinforcing bars, joint sealers, anchors rods, nuts, washers, and anchor rod grouting will not be measured but considered incidental to work.
  - .3 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, ducts, voids, fillets scoring and chamfers.
  - .4 No deductions will be made for volume of concrete less than 0.1 m<sup>2</sup> in cross sectional area displaced by individual drainage openings
- .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.
- .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.

**1.2 REFERENCES**

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

- .3 Type CH - with CaO greater than 20%.
- .9 GGBFS - Ground, granulated blast-furnace slag.
- .2 Reference Standards
  - .1 ASTM International.
    - .1 ASTM C260 Specification for Air-Entraining Admixtures for Concrete.
    - .2 ASTM C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
    - .3 ASTM C494 Specification for Chemical Admixtures for Concrete.
    - .4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
    - .5 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
    - .6 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
    - .7 ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness
    - .8 ASTM D1751 Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
    - .9 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
    - .10 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
  - .2 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .3 CSA International
    - .1 CAN/CSA-A3000, Cementitious Materials Compendium. (Consists of A3001, A3002, A3003, A3004 and A3005)
    - .2 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction.
    - .3 CAN/CSA-G40.20/G20.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 32 16.07 – Construction Progress Schedules, convene pre-installation meeting one (1) week prior to beginning concrete works.
  - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality Contractor - finishing, forming, concrete producer and testing laboratories attend to verify project requirements.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature, and test samples taken as per the PART 3 – FIELD QUALITY CONTROL.
- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.
- .4 MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements and Section 01 35 43 – Environmental Procedures.

**1.5 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative with valid and recognized certificate from plant delivering concrete, in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
  - .2 Ensure testing laboratory and personnel are certified to CSA A283.
- .3 In accordance with Section 01 33 00 – Submittal Procedures, provide proposed quality control procedures for review by Departmental Representative on following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.
- .4 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes' maximum after batching.
- .3 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
- .4 Deviations to be submitted for review by Departmental Representative.
- .5 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.Products

**Part 2 Products****2.1 DESIGN CRITERIA**

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

**2.2 PERFORMANCE CRITERIA**

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

**2.3 MATERIALS**

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUb to CSA A3001.
- .3 Supplementary cementing materials: with maximum 25% fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
  - .1 Air entraining admixture: to ASTM C260.
  - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
  - .1 Compressive strength: 20 MPa at 48 hours, 45 MPa at 28 days.
  - .2 Net shrinkage at 28 days: maximum 0.01 %.
- .8 Curing compound: to CSA A23.1/A23.2.
- .9 Premoulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .10 Epoxy Grout: as indicated.
- .11 Elastomer: as indicated.
- .12 Steel Laminae: as indicated.
- .13 Anchor Rods and Anchor Bolts: as indicated.
- .14 Concrete sealers:
  - .1 Sikagard SN-40 Lo-VOC (or approved equivalent)

**2.4 MIXES**

- .1 Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.

- .2 Provide concrete mix to meet following plastic state requirements:
  - .1 Uniformity: as required by CSA A23.1/A23.2.
  - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
- .3 Provide concrete mix to meet following hard state requirements:
  - .1 Durability and class of exposure: C-XL.
  - .2 Compressive strength at 28 days age: 45 MPa minimum.
  - .3 Intended application: CIP culvert section, culvert collars, portion of headwalls and new concrete facing for headwalls (using form liners)
  - .4 Aggregate size 20 mm maximum.
- .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .5 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 Obtain the Departmental Representative's acceptance before placing concrete.
  - .1 Provide 24 hours' notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after acceptance of equipment and mix by Departmental Representative.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain the Departmental Representative's acceptance of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
  - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Departmental Representative.

### 3.2 INSTALLATION/APPLICATION

- .1 Cast-in-place concrete work in accordance with CAN/CSA-A23.1/A23.2.
- .2 Sleeves and inserts.
  - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
  - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
  - .3 Sleeves and openings greater than 100 x 100 mm not indicated must be reviewed by Departmental Representative.
  - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
  - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
  - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor rods:
  - .1 Set anchor rods to templates in co-ordination with appropriate trade prior to placing concrete.
  - .2 Grout anchor rods in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
    - .1 Formed holes: 100 mm minimum diameter.
    - .2 Drilled holes: 25 mm minimum diameter larger than bolts used.
  - .3 Protect anchor rod holes from water accumulations, snow and ice build-ups.
  - .4 Set rods and fill holes with shrinkage compensating grout.
- .4 Grout using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .5 Finishing and Curing.
  - .1 Finish concrete to CSA A23.1/A23.2 unless noted otherwise.
  - .2 Schedule:
    - .1 Culvert End Section and Portions of Headwalls not using form liners– smooth form finish.
    - .2 Top surface of Headwalls and Concrete Collars - ordinary surface finish.
  - .3 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
- .6 Joint fillers:
  - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.

- .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .3 Locate and form construction and expansion joints as indicated.
- .4 Install joint filler.

### 3.3 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in Sub-Section 1.4 - Action And Informational Submittals.
  - .1 Concrete pours.
  - .2 Slump.
  - .3 Air content.
  - .4 Compressive strength at 7 and 28 days.
  - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Contractor to CSA A23.1/A23.2.
  - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and departmental representative.
- .4 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-destructive methods for testing concrete: to CSA A23.1/A23.2.
- .6 Inspection or testing by the Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of their contractual responsibility.

### 3.4 PROTECTION

- .1 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2.
  - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
  - .2 Do not let walls of shelter touch formwork.
  - .3 Provide sufficient space for removal of formwork for finishing.
  - .4 Use heating equipment approved by Departmental Representative.
  - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
- .2 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
- .3 For concrete headwalls and footings: cure at 10 degrees C for additional 4 days.
  - .1 Keep concrete surfaces continually moist while protected.
- .4 Unformed surfaces: cure with burlap and water.

- .1 Place two layers of damp burlap on surface of concrete.
- .2 Overlap each strip by minimum 75 mm and secure against displacement by wind.
- .3 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .5 Formed surfaces:
  - .1 No additional curing will be required if formwork is left in place for seven days or more.
  - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven (7) day period.
- .6 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

### 3.5 **CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for the supply and installation of galvanized steel plates/ brackets, threaded anchor rods, bolts, nuts and washers required for installation of the wood guard rail at the culvert outlet as installed and accepted, and will be made under **“Unit Price Item 3 – Prime Cost Sum”** shall be accepted as full compensation for everything furnished and done, including, but not limited to: quality control, shop drawings, fabrication, galvanizing, supply and installation of anchor bolts, connection brackets, misc. hardware, grout, sealant and shims as required.
- .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.
- .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.

### 1.2 REFERENCES

- .1 ASTM International
  - .1 ASTM A123 / A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM A143, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3 ASTM A780 / A780M-09 (2015), Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
  - .4 ASTM F3125 / F3125M - 15a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
- .2 CSA International
  - .1 CSA W59, Welded Steel Construction (Metal Arc Welding).
  - .2 CAN/CSA-G.40.20-13 / G.40.21-13, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
  - .3 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
  - .4 CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel.
  - .5 CAN/CSA S6-14, Canadian Highway Bridge Design Code.

**1.3 DESIGN REQUIREMENTS**

- .1 Design Miscellaneous steel units, lifting devices, and connections to CSA-G.40.20-13 / G40.21-13 and all other applicable standards to safely carry loads due to handling, transportation and erection.
- .2 All steel, except where shown otherwise on Drawings, shall conform to CAN/CSA G-40.21, Grade 300W or better.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 All submittals shall be made in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the following items:
  - .1 Written evidence of the fabricator's qualifications for steel fabrication meet the requirements of CSA W47.1, Division 3 or better approved by Canadian Welding Bureau (CWB).
  - .2 Written procedures for handling and installation of steel.
  - .3 Steel shop drawings which clearly indicate pertinent dimensions, quantities, weights, material grades, fabrication details, connection details, lifting and erection devices, sleeves, openings, inserts, unit identification marks, finishes and erection details.
  - .4 Fabricator's letters of certification and guarantee.
- .3 All submittals shall bear the stamp and signature of qualified professional engineer registered or licensed to practice in the Province of British Columbia .

**1.5 QUALIFICATIONS**

- .1 Welding companies shall be certified to CSA-W47.1.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 During all aspects of miscellaneous steel work, separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.
- .2 Prevent paints and other coating chemicals from entering drinking water supplies or streams. Using appropriate safety precautions collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

**1.7 CERTIFICATIONS AND GUARANTEES**

- .1 In accordance with Section 01 78 00 Closeout Submittals.
- .2 Upon completion of the work, certify in writing (under the seal and signature of the fabricator's Professional Engineer registered to practice in the Province of British Columbia) that all miscellaneous steel components have been fabricated and installed in accordance with the Contract documents.
- .3 Upon completion of the work, provide a written guarantee (against material defects and workmanship) that the miscellaneous steel work will perform satisfactorily within the project specifications, design range of movements, and

under the design loads for a period of five years after the work has been completed and accepted.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Miscellaneous Steel: to CAN/CSA G40.21 Type 300W; hot-dipped galvanized
- .2 Welding Electrodes and Related Materials: to CSA-W48.1
- .3 ASTM A123 / A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

### **2.2 MANUFACTURED UNITS**

- .1 Manufacture units in accordance with CSA W47.1.
- .2 Galvanize steel embedments after fabrication and touch up damaged areas where necessary by zinc metallizing in accordance with ASTM A780 using multiple coats to a dry film thickness of 0.20 mm.
- .3 Tolerances of various steel plates and elements shall be as per CAN/CSA S6-14.

### **2.3 SOURCE QUALITY CONTROL**

- .1 Quality Control in accordance with Section 01 45 00 Quality Control.
- .2 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA G40.21.
- .3 Provide records from in-house quality control programme based upon plant certification requirements to the Departmental Representative for inspection and review.
- .4 Fabricator shall keep complete records of supply source of steel and provide to the Departmental Representative for review upon request.

## **Part 3 Execution**

### **3.1 FABRICATION AND INSTALLATION**

- .1 All miscellaneous steel including railings, armour plate etc. shall be supplied, fabricated and installed as shown on the Drawings and in accordance with SS 422. All steelwork shall be galvanized after fabrication.
- .2 Railing shall be adjusted to produce uniform height and smooth alignment as accepted by the Departmental Representative.
- .3 All the material shall be stored above ground.

### **3.2 CLEAN-UP**

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 At completion of the Contract, all miscellaneous steel shall be cleaned of concrete spatter, mud oil, shop markings if visible to public and other foreign materials.

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**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

- .1 Parks Canada Exterior Signage Standards and Guidelines (March 2007)
- .2 ASTM A276-91a, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- .3 ASTM B209M-92a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 ASTM B210M-92a, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .5 ASTM B211M-92a, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.
- .6 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .7 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CAN/CSA-O80 Series-M89, Wood Preservation.
- .9 CSA O121-M1978, Douglas Fir Plywood.
- .10 CSA W47.2-M1987, Certification of Companies for Fusion Welding of Aluminum.
- .11 CGSB1-GP-12c-65, Standard Paint Colours:
- .12 CAN/CGSB-1.28-M89, Alkyd, Exterior House Paint.
- .13 CAN/CGSB-1.59-M89, 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.

### 1.2 MEASUREMENT PROCEDURES

- .1 Measurement for payment for supply and installation of signs, posts, and bases will be based on each complete unit installed according to these specifications, and shall include all labour, equipment and materials to satisfactorily complete this item of work.
- .2 Payment for the supply and installation and/or re-installation of signs and utility markers will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”** if requested by the Departmental Representative.

- .3 Payment for the removal and disposal of existing signs and posts including filling holes and other will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”** if requested by the Department Representative.
- .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 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 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 approved by Departmental Representative.
- .3 Damaged signs and posts from any removals to be transported to recycling facility approved by the Departmental Representative.

## Part 2 Products

### 2.1 MATERIALS

- .1 Traffic signs, posts, and bases shall be supplied and installed in accordance with the BC MoTI Standard Specification for Highway Construction (Latest Edition) Section 635.

## Part 3 Execution

### 3.1 INSTALLATION

- .1 The Contractor shall load, haul and install Contractor supplied single post and aluminum signs (see detail sheet for typical sign) 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 Drawings and as directed by the Departmental Representative.
  - .3 Concrete bases: Excavate one hole for the concrete base at the location and depth provided by the Departmental Representative. 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 1" above finished grade.

- .4 Adjust the post height by using a pipe cutter or cut off saw. All post cuts will be determined in the field by the Contractor. The Contractor will measure existing elevations at each site and calculate the cuts needed.
- .5 Assemble the signs on the forks on the ground. Slide forks onto posts and place the cap.
- .6 Drill 1 hole in base sleeves and posts for ½ " bolts, as shown in the detail sheet and as verified by the Departmental Representative, and shim to plumb if necessary.
- .7 Bases must be perfectly plumbed. 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.
- .8 The Contractor is responsible for hauling all materials to and from each work site.
- .9 Landscape so the top of the base is flush or 25 mm above finished grade.
- .10 Remove all excess material from site, including boulders larger than 100 mm.
- .11 All signs are to be covered until the Departmental Representative advises to uncover.
- .12 The Contractor is to place NPC/PNC stickers (provided by the Departmental Representative) on all signs as indicated by the Departmental Representative.

### 3.2 REMOVAL AND SALVAGE

- .1 The Contractor shall carefully dismantle and salvage posts, and aluminum signs where possible.
- .2 Deliver salvaged materials to Pit 16 or other locations as directed by Departmental Representative.
- .3 Damaged signs and posts shall be hauled to recycling facility approved by the Departmental Representative.
- .4 Fill holes with gravel and compact

### 3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**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-[04], Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
  - .2 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .3 ASTM D1557-[02e1], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - .4 ASTM D4253-[00], 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/m<sup>3</sup>.
  - .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/m<sup>3</sup> of material passing 19mm sieve determined in accordance with Method A of ASTM D1557.
  - .7 D2 = bulk density, kg/m<sup>3</sup>, 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.

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**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT PROCEDURES

- .1 Quantities for payment for clearing and grubbing will be paid under **“Unit Price Item 3a – Clearing and Grubbing – Clearing and Grubbing”** and will be measured based on the area in horizontal (2D) hectares of land acceptably cleared, grubbed, processed, and debris disposed of, according to these specifications, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 The extent of grubbing shall be in accordance with the Drawings and as directed by the Departmental Representative. The Contractor shall not commence work on this activity until approval to proceed has been granted.
- .3 Clearing and grubbing waste shall be removed from the Park and disposed of at an appropriate facility. Loading, hauling and all tipping fees shall be considered incidental to the applicable bid item and shall not be considered for payment.
- .4 No overhaul will be paid for 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

### 1.2 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 as described in Section 200, Clearing and Grubbing of the latest edition of BC MoTI Standard Specifications for Highway Construction.
- .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.

**1.3 QUALITY CONTROL**

- .1 All Quality Control testing by the Contractor.

**1.4 PROTECTION**

- .1 The contractor shall prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees that are to remain.
- .2 The contractor shall repair any damaged items to approval of Departmental Representative.
- .3 The contractor shall replace any trees designated to remain, if damaged, as directed by Departmental Representative.

**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 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 to not less than 200 mm below 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 grubbed wood materials shall be hauled and disposed of outside of Park, or as directed by the Departmental Representative.

**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.

**END OF SECTION**

**Part 1      General****1.1      DESCRIPTION**

- .1      This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimension indicated on the drawings and as directed by the Departmental Representative and includes:
  - .1      Stripping of organic material.
  - .2      Roadway, culvert and borrow excavation.
  - .3      Construction of roadway ditches, embankments, permanent access and connecting roads, entrances, day use area, berms, approved haul roads and other earthworks necessary for the construction of the road.
  - .4      Removal and disposal of unsuitable materials from excavation, embankment and borrow areas.
  - .5      Transportation of excavated materials.
  - .6      Finishing of top surfaces and slopes.
  - .7      Removal and storage of existing rock exhibits
  - .8      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.

**1.2      MEASUREMENT 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 taken before and after stripping. Payment will be made under **“Unit Price Item 4a – Roadway and Drainage Excavation – Stripping and Placement in Stockpiles”**.
  - .2      Stripped materials shall not be contaminated by other materials. If contamination does occur the Department Representative at his discretion may require clean topsoil be imported from an approved source and contaminated materials be disposed of at the contractor’s expense.
  - .3      Stripping material is to be stockpiled within the limits of the Work, or other location (s) as directed by the Departmental Representative. Hauling and stockpiling is incidental to the work and no additional payment will be made.
  - .4      No overhaul will be paid for this Work.
- .2      Roadway and Drainage Excavation:
  - .1      The Quantity of Excavation Common for which payment will be made shall 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 4b –**

**Roadway and Drainage Excavation – Type D Excavation**” and shall include cost of excavating, hauling, temporary stockpiling, placing and compacting material within the limits of construction.

- .2 The quantity of Waste Excavation of material deemed by the Departmental Representative as waste 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 4c – Roadway and Drainage Excavation – Type D haul to Waste”** and shall include cost of excavation, loading, hauling, temporary stockpiling, and disposal of material outside of the Parks or as directed by the Departmental Representative.
- .3 Backfilling and compacting of construction will not be measured for payment directly, rather it shall be considered incidental to **“Unit Price Item 4 – Roadway and Drainage Excavation”**.
- .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 surplus materials with waste materials. Waste materials shall be disposed of outside of the Parks.
- .6 Written approval to proceed must be given by the Departmental Representative prior to sub-excavation for the removal of waste material(s).
- .7 No overhaul will be paid for this Work.
- .8 Only material acceptable to the Department Representative shall be used in the construction of backfilling and incorporated into 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 Payment for Borrow material if deemed necessary by the Departmental Representative will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**
- .6 Payment for Type ‘A’ Excavation of material deemed by the Departmental Representative as rock will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
- .7 Removal and storage of existing rock exhibits within the site shall be incidental to **“Unit Price Item 4 – Roadway and Drainage Excavation”** and no separate payment will be made to the Contractor

- .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
- .9 No separate measurement payment will be made for:
  - .1 Excavating unnecessarily beyond 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 1.5 m<sup>3</sup> into large embankments.
  - .4 Scarifying or benching existing slopes or surfaces.
  - .5 Removing unsuitable material from embankment attributable to negligence.
  - .6 Watering, drying or compacting.
  - .7 Proof rolling.
  - .8 Compaction of material (150 mm) below subgrade horizon in areas of cut.
  - .9 Finishing.

### 1.3 REFERENCES

- .1 BC MoTI Standard Specifications for Highway Construction (Latest Edition).
- .2 American Society for Testing and Materials International, (ASTM).
- .3 ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).

### 1.4 DEFINITIONS

- .1 Type A – Solid Rock:
  - .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 m<sup>3</sup> or more.
- .2 Type D - Common: excavation of materials that are not of Type - A Excavation or Stripping.
- .3 Borrow: Suitable material obtained from locations outside the limits of construction cut and placed as embankment material or for other portions of work.
- .4 Stripping: excavation of organic material covering original ground.
- .5 Embankment: material derived from useable excavation and placed above original ground, excavated /trenched location or stripped surface.
- .6 Waste Material: material unsuitable for embankment, embankment foundation or 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.

## 1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 The Contractor shall separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Waste shall be disposed of at suitable offsite disposal facility, or stockpiled within the Parks if directed by the Department Representative.

## Part 2 Products

### 2.1 MATERIALS

- .1 Embankment materials require acceptance by Departmental Representative.
- .2 Embankment fill materials must meet the BC MoTI Standard Specification for Highway Construction Section 201 – Latest Edition.
- .3 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.
- .4 Borrow material:
  - .1 No borrow sources are available to the Contractor within the Parks.
  - .2 The Contractor shall provide material testing certificates to the Department Representative for consideration.

## Part 3 Execution

### 3.1 SITE PREPARTATION/PROTECTION

- .1 Ensure all work is in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements, Health and Safety Act for the Province of British Columbia.
- .3 Remove obstructions from surfaces to be excavated within limits indicated.
- .4 Protect natural and man-made features that are required to be salvaged or remain undisturbed.

- .5 Ensure excavation will be protected against flooding and damage due to surface runoff.
- .6 Keep excavations free of water while Work is in Progress. Dispose of water to approved collection, or runoff areas and in a manner not detrimental to PCA property or portion of the Work completed or under construction.

### 3.2 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 is estimated to be on average 100 mm.
- .3 Contractor to screen stripping material to 100 mm max size prior to placement in stockpile. Stockpile on site as directed by the Departmental Representative and protect from erosion. Load, haul and dispose screen waste material outside the Parks, or as directed by the Departmental Representative.

### 3.3 EXCAVATION

- .1 Advise Departmental Representative at least seven days in advance of excavation operations for initial cross sections to be taken
- .2 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent as approved by the Departmental Representative. Dispose of such material outside of the Park or as directed by departmental Representative.
- .3 The dimensions of the excavations shall be, in accordance with the Drawings, but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.
- .4 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative. Compact top 300 mm below final subgrade elevation to minimum 100% Standard Proctor Density, ASTM D698-12e2 (AASHTO T99). Replace with acceptable embankment material and compact.
- .5 Contractor is responsible to ensure all OH&S regulations are satisfied.
- .6 Rock excavation:
  - .1 Notify the Departmental Representative when material appearing to conform to classification for rock is encountered, to enable measurements to be made to determine volume of rock. Provide 24 hour notification.
  - .2 Rocks shall be excavated either by manual scaling, machine scaling or using hydraulic splitter. Subgrade shall be constructed to a true and uniform surface as to line and grade preparatory to application of culvert bedding material.

### 3.4 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Departmental Representative has inspected and approved installations.
  - .2 Departmental Representative has inspected and approved construction of below finish grade.
  - .3 Departmental Representative has monitored the proof roll, inspected the subgrade, and approved the subgrade prior to backfill placement.
- .2 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .3 Embankment material shall be placed in successive uniform layers not exceeding 150 mm in compacted thickness up to the grades indicated.
- .4 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.
- .5 Use hand operated plate type vibratory or other suitable hand tampers in areas not accessible to rollers or compactors.
- .6 Compact each layer to minimum 98% SPD (Standard Proctor Density), ASTM D698-12e2 within  $\pm 2\%$  of the OMC
- .7 Add water or dry as required to bring moisture content of materials to the specified level required to achieve specified compaction.
- .8 Backfilling around installations:
  - .1 Place bedding and structural backfill material as specified in the Drawings.
  - .2 Do not backfill around or over cast-in-place concrete immediately after placing of concrete. Permit concrete to cure until it has sufficient strength to withstand earth and compaction pressure and approval has been obtained from the Departmental Representative to proceed with backfilling operation.
  - .3 Place layers simultaneously on both sides of the installed Work to equalize loading. Difference not to exceed 150mm.
  - .4 Do not use heavy equipment within 600 mm of the structures.

### 3.5 PROOF ROLLING

- .1 Proof rolling shall be completed while the subgrade or fill being tested is unfrozen.
- .2 Proof rolling shall be performed in the presence of Department Representative.
- .3 Use a 15 to 60 tonne smooth-drum compactor with pneumatic wheels or a truck loaded at approximately 10 tonnes per axle and a minimum tire pressure of 550 kPa.
- .4 Ground speed: 4 km/hr (recommended); 8 km/hr (maximum).
- .5 Completely cover the work with proof rolling equipment. One coverage means that every point of the proof rolled surface has been subjected to the tire pressure of a loaded wheel.

- .6 Less Rigorous procedure may be acceptable under certain conditions subject to acceptance by the Department Representative.
- .7 The Surface of the grade under the action of proof roller shall be observed, noting visible deflection and rebound of the surface, and formation of crack pattern in the prepared subgrade/compacted surface.
- .8 Subgrade Failure:
  - .1 Subgrade shall be considered failed under the following conditions:
    - .1 Permanent rutting of 25 mm or greater;
    - .2 Elastic rebound in excess of 25 mm with cracking greater than 5 mm.
    - .3 Lateral movement greater than 20 mm.
    - .4 Unsatisfactory inspection as determined by Department Representative.
  - .2 If any part of the area indicates more distress than other parts, the cause shall be investigated by the Department Representative.
  - .3 Areas of soft, rutted or displaced materials detected shall be repaired and proof rolled again in the presence of Department Representative. The repair may include:
    - .1 Subcut the soft/wet soils, replace with suitable fill material and compact to 98 % of the SPD within  $\pm 2$  % of the OMC at Contractor's expense;
    - .2 Bridging with non-woven geotextile and bi-axial geogrid at Contractor's expense, subject to approval by the Department Representative, if subcut is deeper than 1 m.

### 3.6 FINISHING

- .1 Shape top of backfill to ensure that no low points exist and to provide drainage
- .2 Remove rocks over 150 mm in dimension from final surface elevation.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 The supply and installation of Geotextiles including but not limited to woven and non-woven geotextiles, 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 D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - .2 ASTM D4595-86(2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
  - .3 ASTM D4716-01, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
  - .4 ASTM D4751-99a, 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.
- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-4.2 No. 11.2-M89(April 1997), 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.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .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 to Departmental Representative following samples in accordance with Section 01 33 00 – Submittal Procedures for each type of geotextile used on the project:
- .3 Minimum length of 2 m of roll width of geotextile.
- .4 Minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.
- .5 Submit to Departmental Representative 4 copies of mill test data and certificate 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 Both Woven and Non-woven geotextiles shall meet or exceed the requirements specified in the design drawings. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.

## Part 3 Execution

### 3.1 INSTALLATION

- .1 Geotextile Requirements for Culvert installation and Riprap placement:
  - .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 **CLEANING**

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 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.

### 3.3 **PROTECTION**

- .1 Vehicular traffic not permitted directly on geotextile.

**END OF SECTION**

## 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 placed Riprap that will be measured for payment shall be the number of cubic metres measured in place and accepted in the completed work, and shall include all labour, equipment and material to satisfactorily complete this item as specified.
- .2 Payment for the supply and placement of BC MoTI Class 250 Riprap will be made under “**Unit Price Item 5a – Supply and Install Riprap – BC MoTI Class 250**”. Riprap Material to be placed in accordance with the Drawings and to the satisfaction of the Departmental Representative.
- .3 Excavation, preparation of Riprap base, geotextiles, and any other related materials will be considered incidental to the work.
- .4 Testing of Riprap is considered incidental to the Work and no additional payment will be made.
- .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.

### 1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.
- .2 Remove materials defined as hazardous or toxic and dispose of outside of the Parks.
- .3 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 MATERIAL

- .1 Hard, dense with relative density not less than 2.65, 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 suitable onsite rock excavation locations or sourced from outside the Parks. The Contractor will be responsible for sorting of riprap and delivering to the sites where riprap is required.
- .3 Riprap for Culvert inlet / outlet, energy dissipation pool and downstream weir:
  - .1 BC MoTI Class 250 Riprap

## 2.2 GEOTEXTILE FILTER

- .1 Geotextile: in accordance with Section 31 32 19.01 - 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 19.01 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.

**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT PROCEDURES

- .1 Quantity of structural backfill for which payment will be made shall be the number of tonnes incorporated into Work and accepted by Departmental Representative, and shall include all labour, equipment and material required to satisfactorily complete this item of work. If no weigh scales are available, the end area method of volumetric calculation will be used with a conversion factor of 2.2 tonnes/m<sup>3</sup>. Payment will be under **“Unit Price Item 6b – Bedding and Structural Backfill – Crushed 50mm WGB”**.
- .2 Supplying, loading, hauling, placing, compacting, and conditioning by wetting or drying will be incidental to the Work.
- .3 No overhaul will be paid for this Work.
- .4 Supply, installation and maintenance and calibration of weight scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment.
- .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 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.
  - .5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).

- .7 ASTM D1883-14, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
- .8 ASTM D4318-00, 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
- .4 AT – Standard Specifications for Highway Construction (latest edition)

### 1.3 QUALITY CONTROL AND QUALITY ASSURANCE

- .1 All Quality Control and quality assurance testing by the Contractor.

### 1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Divert unused structural backfill material as directed by Departmental Representative.

## Part 2 Products

### 2.1 MATERIALS

- .1 Crushed 50mm WGB material to be supplied by the Contractor from outside the Park. AT Designation 2 Class 40 base aggregate is considered a suitable replacement for the 50mm WGB specified.

## Part 3 Execution

### 3.1 PLACING

- .1 Load, haul and place material after concrete bedding has achieved the requirements of this specification.
- .2 Construct granular sub-base to depth and grade in areas indicated on the drawings.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean compacted surface, free debris.
- .5 Begin spreading material on crown line or high side of one-way slope.
- .6 Place granular 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 150 mm compacted thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .9 Shape each layer to smooth contour and compact to 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 98% maximum dry density in accordance with ASTM D1557.
- .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 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

### 3.3 **SITE TOLERANCES**

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

### 3.4 **PROTECTION**

- .1 Maintain finished surface in condition conforming to this section until succeeding base is constructed, or until granular subbase is accepted by Departmental Representative.

**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Quantity of bedding for which payment will be made shall be the number of tonnes incorporated into Work and accepted by Departmental Representative, and shall include all labour, equipment and material required to satisfactorily complete this item of work. If no weigh scales are available, the end area method of volumetric calculation will be used with a conversion factor of 2.2 tonnes/m<sup>3</sup>. Payment will be under “**Unit Price Item 6a – Bedding and Structural Backfill – Crushed 25mm WGB**”.
- .2 Supplying, loading, hauling, placing, compacting, and conditioning by wetting or drying will be incidental to the Work.
- .3 No overhaul will be paid for this Work.
- .4 Supply, installation and maintenance and calibration of weight scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment.
- .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 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
  - .6 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

- .7 ASTM D4318-00, 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)
- .4 AT - 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 Remove unused granular material from the National Parks.

## **Part 2 Products**

### 2.1 **MATERIALS**

- .1 Crushed 25mm WGB material to be supplied by the Contractor from outside the Park. AT Designation 2 Class 25 base aggregate is considered a suitable replacement for the 25mm WGB specified.

## **Part 3 Execution**

### 3.1 **PLACING**

- .1 Load, haul and place base aggregate after sub-grade surface (box culvert bedding) 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.
  - .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 98% Standard Proctor density in accordance with ASTM D1557.
- .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 Base Course 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 Base Course. 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 Base Course / Gravel fill or subgrade:
  - .1 Remove Base Course and subgrade material to depth and extent as directed by Departmental Representative.
  - .2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
  - .3 Replace Base Course 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.

3.5 **PROTECTION**

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

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 Payment for Supply, Delivery and Application of asphalt prime will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
- .2 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.
- .3 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.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM D140-01, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
  - .2 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

**1.3 SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two 1 L samples of asphalt prime proposed for use in new, clean, air tight sealed, wide mouth, bottles made with plastic, to Departmental Representative, at least 2 weeks prior to commencing work.
- .3 Sample asphalt prime coat materials in accordance with 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 ASSURANCE**

- .1 Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials to ASTM D140.
- .2 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 MATERIAL**

- .1 Asphalt material: to CAN/CGSB-16.1 grade: RM-20, MC-30, MC-250.  
CAN/CGSB-16.2 grade: SS-1.
- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter.

**2.2 EQUIPMENT**

- .1 Pressure distributor to be:
  - .1 Designed, equipped, maintained and operated so that asphalt material can be:
  - .2 Maintained at even temperature.
  - .3 Applied uniformly on variable widths of surface up to 5 m.
  - .4 Applied at controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
  - .5 Distributed in uniform spray without atomization at temperature required.
  - .6 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.
  - .7 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.
  - .8 Equipped with easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
  - .9 Equipped with accurate volume measuring device or calibrated tank.
  - .10 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
  - .11 Equipped with nozzle spray bar, with operational height adjustment.
  - .12 Cleaned if previously used with incompatible asphalt material.

**Part 3 Execution****3.1 APPLICATION**

- .1 Obtain Departmental Representative's acceptance of granular base surface and authorization to apply before applying asphalt prime.
- .2 Cutback asphalt:
  - .1 Heat asphalt prime to a temperature for pumping and spraying as recommended by the supplier.

- .2 Apply asphalt prime to granular base at rate recommended by the supplier and accepted by the Departmental Representative.
- .3 Apply on dry surface unless otherwise directed by Departmental Representative.
- .3 Anionic emulsified asphalt:
  - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
  - .2 Mix thoroughly by pumping or other method approved by Departmental Representative.
  - .3 Apply diluted asphalt emulsion at rate recommended by the supplier and approved by the Departmental Representative.
  - .4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Departmental Representative.
- .4 Apply asphalt prime only on unfrozen surface.
- .5 Do not apply prime when air temperature is less than 10 degrees C or when rain is forecast within 2 hours.
- .6 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .7 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .8 Prevent overlap at junction of applications.
- .9 Do not prime surfaces that will be visible when paving is complete.
- .10 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .11 Keep traffic off primed areas until asphalt prime has set.
- .12 Permit prime to set before placing asphalt paving.

### 3.2 USE OF SAND BLOTTER

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.
- .3 Apply second application of sand blotter as required.

**END OF SECTION**

## Part 1 General

### 1.1 MATERIAL SUPPLIED BY DEPARTMENTAL REPRESENTATIVE

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

### 1.2 MEASUREMENT PROCEDURES

- .1 Measure placing of topsoil in cubic metres of material removed from stockpile.
  - .1 Stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by average end area method.
  - .2 Includes preparation of sub-grade for placing of topsoil.
  - .3 Includes finish grading.
- .2 Measure supply and application of soil amendments, including fertilizer, in standard commercial units of weight/volume as determined by Departmental Representative.
  - .1 Measure applied in cubic metres of soil amendment supplied.

### 1.3 PAYMENT PROCEDURES

- .1 Payment for stripping will be made in accordance with Section 31 24 13 - Roadway and Drainage Excavation.
- .2 Topsoil placement and grading will be paid under “**Lump Sum Item 3 – Prime Cost Sum**”.
- .3 Payment for testing of topsoil to be paid under “**Lump Sum Price Item 3 - Prime Cost Sum**”.
- .4 Payment for supply and application of soil amendments, including fertilizer will be paid under “**Lump Sum Price Item 3 – Prime Cost Sum**”.
- .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.

### 1.4 REFERENCES

- .1 Agriculture and Agri-Food Canada
- .2 The Canadian System of Soil Classification, Third Edition, 1998.
- .3 Canadian Council of Ministers of the Environment
- .4 PN1340-[2005], Guidelines for Compost Quality.
- .5 Canadian Green Building Council (CaGBC)
- .6 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.
- .7 U.S. Environmental Protection Agency (EPA)/Office of Water

- .8 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

## 1.5 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).

## 1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.

## 1.7 QUALITY ASSURANCE

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 00 - Project Managing and Coordination and Section - 01 32 16.07 – Progress Schedules.

## 1.8 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 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 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 SOIL AMENDMENTS

- .1 Fertilizer:
  - .1 Fertility: major soil nutrients present in following amounts:
    - .1 Nitrogen (N): 45 micrograms of available N per gram of topsoil.
    - .2 Phosphorus (P): 25 micrograms of phosphate per gram of topsoil.
    - .3 Potassium (K): 20 micrograms of potassium per gram of topsoil.
    - .4 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  - .2 Ph value: 6.5 to 8.0
  - .3 Revise fertilizer blend as directed by Departmental Representative to comply with soil test analysis.
  - .4 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

## 2.3 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 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.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.2 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush weeds and grasses and removed from site.
- .2 Strip topsoil to depths as directed by Departmental Representative.
- .3 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .4 Stockpile in locations as directed by Departmental Representative.
- .5 Protect stockpiles from contamination and compaction.

### 3.3 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 100mm.
  - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

### 3.4 PLACING AND SPREADING OF TOPSOIL / PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 100 mm.
- .3 Spread topsoil as indicated to following minimum depths after settlement or as directed by the Departmental Representative.
  - .1 100mm for seeded areas.
  - .2 600mm for shrub beds.
- .4 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.
  - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
  - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

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 as directed by Departmental Representative.

**END OF SECTION**

## Part 1 General

### 1.1 DESCRIPTION OF WORK

- .1 The work covered by this specification shall consist of: hydraulically seeding and fertilizing in the areas within the limits of construction, or as designated by the Departmental Representative.

### 1.2 MEASUREMENT FOR PAYMENT

- .1 Hydraulic Seeding will be measured by the square meter acceptably installed, complete with fertilizer, and resulting in full grass growth, 75% germination and growth of specified seed mixture, within the dimensions indicated on the Drawings 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 Specifications, Drawings and direction of the Departmental Representative. Payment shall be paid under **“Unit Price Item 7a – Seeding – Hydraulic Seeding”**
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 Maintenance is incidental and will not be paid for separately.
- .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.

### 1.3 SUBMITTALS

- .1 Product Data
  - .1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
  - .2 Provide product data for:
    - .5 Seed
    - .6 Mulch
    - .7 Tackifier/Soil Stabilizer
    - .8 Fertilizer
  - .3 Submit in writing to Departmental Representative 14 days prior to commencing work:
    - .1 Volume capacity of hydraulic seeder in litres.
    - .2 Amount of material to be used per tank based on volume.

- .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

#### 1.4 **QUALITY ASSURANCE**

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

#### 1.5 **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 Fertilizer shall be packaged in waterproof bags labelled clearly, indicating net mass, analysis and manufacturer. Store on pallets and protect from weather.
- .3 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 South Slopes to be the following, by species:
  - 40 % Tickle Grass
  - 40% Fringed Brome
  - 20% Awned Wheat Grass
- .3 Seed mix for North Slopes to be the following, by species:
  - 45 % Rocky Mountain Fescue
  - 45% June Grass
  - 10% Awned Wheat Grass
- .4 Seeding rate to be 35 kg/ha for mechanical seeding and 100 kg/ha for hydraulic seeding.
- .5 Seed tags to be retained and given to the Landscape Architect.
- .6 Seed mix shall be free of Scentless Chamomile, Downy Brome and Canada Thistle.

**2.2 FERTILIZER**

- .1 Fertilizer 1 shall be a 45-25-20 mixture. This fertilizer shall be applied at the time of seeding at a rate of 125kg/ha.
- .2 Contractor to verify fertilizer blend and application rate following testing of topsoil.

**2.3 WATER**

- .1 Water shall be free of impurities that would inhibit germination and growth.

**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. Supplier: Target Products, Phone: 1-800-575-7700.

**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. Supplier: Professional Gardener, Phone: (403) 263-4200.

**Part 3 Execution****3.1 GENERAL SEEDING**

- .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 shown on Drawings or, as directed by Departmental Representative: Seeding shall be done as follows:
- .1 Hydraulic Seeding: grades between 3:1 and 1.5:1 slopes.

### 3.2 HYDRAULIC SEEDING

- .1 The following application rates are the minimum required for hydraulic seeding:
- |    |   |                  |
|----|---|------------------|
| .1 | Canada Parks Blend Seed:                  | 100 kg/hectare   |
| .2 | Fertilizer 1: 45-25-20                    | 125 kg/hectare   |
| .3 | Mulch:                                    | 500 kg/hectare   |
| .4 | Soil Stabilizer/tackifier: Soil Master WR | 1300 L/hectare   |
| .5 | Water:                                    | 30,000 L minimum |
- .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.

### 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 these specifications to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, that is not attributable to Contractor negligence, 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 these specifications to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, that is not

attributable to Contractor negligence, 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 25mm 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.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

- .1 BC- Standard Specifications for Highway Construction Manual (latest edition)
- .2 CSA-G401-01 Corrugated Steel Pipe Products.
- .3 CSA-B182.8-02 Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings.

### 1.2 MEASUREMENT AND PAYMENT

- .1 Remove and Dispose of the Corrugated Steel Pipe (CSPA) culvert (3.5m span and 2.3m rise):
  - .1 The quantity of the CSPA culvert that will be measured for payment shall be the number of linear metres removed and disposed of outside of the National Parks, regardless of the culvert depth. Payment will be made under “**Unit Price Item 8a– Pipe Arch Culvert - Remove and Dispose Existing CSPA Culvert**” and shall include all labour, equipment, and material to the satisfactorily complete the work.
  - .2 All Works including, but not limited to; trench slope stabilization, necessary backfilling, loading, hauling and unloading the CSPA Culvert to disposal location will not be measured directly for payment but shall be considered incidental to “**Unit Price Item 8a– Pipe Arch Culvert - Remove and Dispose Existing CSPA Culvert**”.
- .2 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.
- .3 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.
- .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.

### 1.3 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required.

### 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 National Parks.

- .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative, outside of the National Parks.

**Part 2 Materials**

- .1 Not Used.

**Part 3 Execution**

**3.1 METHODOLOGY**

- .1 Contractor to verify site conditions and safety requirements prior to starting work.
- .2 Traffic control and staging to be in accordance with Section 01 55 26 Traffic Control.
- .3 Pipe culvert works cannot commence until approved by the Departmental Representative.
- .4 If required, additional permits for pipe culvert works will be provided by Parks Canada at the request of the Contractor.

**3.2 CULVERT / STRUCTURE REMOVAL**

- .1 Culvert removal shall be as indicated on IFC Drawings and shall include disposal of sections to a suitable disposal facility outside of the National Parks.

**END OF SECTION**

## Part 1 General

### 1.1 WORK LOCATION

- .1 Special Procedures to “Design and Build” one (1) Precast Concrete Box Culvert (PCBC) as shown on the design drawings, at Sinclair Creek km100.6.

### 1.2 WORK INCLUDES

- .1 Survey, layout and staging preparation.
- .2 Traffic Accommodation and detour works.
- .3 Stripping, curb and asphalt removal where required.
- .4 Temporary roadway support (lock blocks, retaining wall, shoring) if required (not anticipated).
- .5 Excavation for temporary creek diversion & removal of existing culvert.
- .6 Removal of stonework and stone facing from existing headwalls.
- .7 Saw-cut exiting headwalls for installation of the concrete box section.
- .8 Placement of bedding material for culverts with 25mm WGB material.
- .9 Supply, delivery and installation of Precast Concrete Box culvert sections and seals.
- .10 Installation of reinforcement dowels on headwalls and placement of CIP pigmented concrete with form liner to create rock facing on headwalls.
- .11 Placement and compaction of Granular backfill around culverts with 50mm WGB material as shown on the drawings.
- .12 Placement and compaction of common backfill around the culvert.
- .13 Placement of Riprap where required and as shown on the drawings.
- .14 Diversion of water through the new bridge culvert.
- .15 Seeding and clean up at inlet / outlet locations.
- .16 Reinstatement of the parking lot to the satisfaction of PCA.

### 1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Design, supply and installation of Precast Concrete box culvert:
  - .1 The precast concrete box culverts Design Build payment will be on a unit rate basis as noted below.
  - .2 The quantity of precast concrete box culverts which will be measured for payment shall be the number of linear metres of the type and size delivered to site and installed, in accordance to the plans and specifications to the satisfaction of the Departmental Representative. Payment will be made under “**Unit Price Item 9a – Design-Build Precast Concrete Box Culvert-Supply and Install 3500mm x 2900mm**”.

- .3 Detailed design and shop drawing submittal of the Precast Concrete Box Culvert will not be paid for separately and is considered incidental to **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”**.
- .4 Survey and layout of the Precast Concrete Box Culvert will not be paid for separately and is considered incidental to **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”**.
- .5 The supply and installation of seals and ancillary materials will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”**.
- .6 The survey, design, layout, supply, installation and removal of temporary roadway support, and access for the culvert installation, including shoring or trench stabilization will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”**.
- .7 Excavation for temporary creek diversion, diversion method (water diversion pipes), removal / capping of diversion method, and diversion of water through the new culvert is considered incidental to **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”**. All other work (labour, material, equipment) is considered incidental to the work.  
Diversion pipes will be used to temporarily accommodate the flow of the Sinclair Creek through the Project area. The pipe sizes will be specified by the Contractor, and will accommodate flow from the 1:20 year peak flow.
- .8 Work considered incidental to Precast Concrete Box culvert installation to be paid under **“Unit Price Item 9 – Design-Build Precast Concrete Box Culvert”** including but not limited to: backfilling with excavated material, dewatering, placing of road base aggregates, and all other items identified on the relevant culvert preliminary design drawings.
- .2 Temporary stockpiling of excavation for reuse as backfill will be incidental to the Work and no additional payment will be made.
- .3 Work required as part of the Precast Concrete Box culvert installation to be paid under the following items include but not limited to below.
- .1 Clearing and Grubbing will be paid under **“Unit Price Item 3 – Clearing and Grubbing”** in accordance with Section 31 11 00 – Clearing and Grubbing.
- .2 Saw-cutting, curb, and asphalt removal will be paid under **“Unit Price Item 1 – Asphalt Pavement and Concrete Curb Removal”** in accordance with Section 02 41 13.14 – Asphalt Concrete Pavement Removal.
- .3 Stripping, excavation, foundation preparation, and haul of waste material will be paid under **“Unit Price Item 4 – Roadway and Drainage Excavation”** in accordance with Section 31 24 13 – Roadway and Drainage Excavation. Backfill and compaction to existing grades are considered incidental to the work.

- .4 Supply and preparation of bedding material for culvert in accordance with envelope shown on drawings will be paid under **“Unit Price Item 6 – Bedding and Structural Backfill”** in accordance with Section 32 11 20 – 50 mm Granular Sub-Base Course and Section 32 11 24 – 25 mm Granular Base Course.
- .5 All Cast-In-Place project requirements will be paid under **“Unit Price Item 2 – CIP Culvert End Section and End Treatment of Culverts Headwalls”** in accordance with Section 03 30 00 – Cast in Place Concrete.
- .6 Supply and installation of Riprap will be paid under **“Unit Price Item 5 – Supply and install Riprap”** in accordance with Section 31 37 00 - Riprap.
- .7 Hydraulic seeding will be paid under **“Unit Price Item 7 – Seeding”** accordance with Section 32 92 19.16 – Hydraulic Seeding.
- .4 Traffic Control, including all necessary detour design, construction, maintenance and removal, during the survey, layout, and construction of the culvert shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .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 Re-installation of wooden railing, use of Fillcrete for potential voids underneath the footing, and potential supply / installation of 50mm water pipe encased in 150mm steel pipe will be paid under **“Lump Sum Price Item 3 – Prime Cost Sum”** and shall include all labour, equipment, and material to the satisfactorily complete the work.
- .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 shall be made to the Contractor.

#### 1.4 SCHEDULE

- .1 The Contractor is prohibited from conducting work that will contradict timing restrictions under Section 01 14 00 – Work Restrictions.

#### 1.5 STAGED CONSTRUCTION

- .1 Provisions for staged construction shall be shown in the Contractor’s Traffic Management Plan / detour drawings, including any temporary support required, until culvert is complete.

#### 1.6 TRAFFIC CONTROL REQUIREMENTS

- .1 The Contractor shall provide traffic control in accordance with Section 01 55 26 –Traffic Control.

#### 1.7 REFERENCES

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

- .2 ASTM C1433M-16b.
- .3 ASTM C990M-09 for Joint

## 1.8 DESIGN CRITERIA

- .1 Design code: CAN/CSA S6 -14

## 1.9 DESIGN REVIEW

- .1 Provide Departmental Representative with one (1) electronic copy of complete working Drawings, and one (1) electronic copy of detailed design calculations, for review in accordance with Section 01 33 00 – Submittal Procedures, prior to beginning construction. Drawings shall also show Levelling Pad requirements. Drawings and design calculations to bear signature and stamp of qualified Professional Engineer registered or licensed in Province of British Columbia.
- .2 Verify existing site conditions and ground elevations before preparing working Drawings. Contractor to note indicated cover over culverts and to verify.
- .3 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures, and in accordance with CSA-A23.3 and CSA-A23.4
  - .2 Ensure each drawing submitted bears stamp and signature of qualified professional engineer registered or licensed in Province of British Columbia.

## 1.10 PERFORMANCE REQUIREMENTS

- .1 Tolerances of precast elements to CSA-A23.4, Section 10.
- .2 Length of precast elements not to vary from design length by more than plus or minus 20 mm.
- .3 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 5mm.
- .4 Deviations from straight lines not to exceed 2mm in 3 m.
- .5 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.

## 1.11 QUALIFICATIONS

- .1 Contractor shall not require pre-qualification of precast plant for supply of concrete box culverts. However, all box culverts and concrete drainage products comply with the requirements of the latest editions of CSA standards for concrete pipe, CAN/CSA A257.1, A257.2, A257.3, A257.4, A23.4 and ASTM C507M, and Canadian Highway Bridge Design Code, CAN/CSA S6-14. Contractor shall provide evidence of conformance with the herein referenced standards prior to acceptance of any reinforced concrete box culverts.
- .2 Contractor shall disclose the proposed precast concrete supplier in the pre-construction submittals and shall require a mandatory pre-plant inspection prior to Departmental Representative's acceptance of the Contractor's proposed supplier.

- .3 The contractor shall allow the Departmental Representative full access to their proposed precast plant facilities and shall exempt the Departmental Representative of any nondisclosure requirements.
- .4 Welding companies certified to CSA-W47.1.

#### 1.12 STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 Common Product Requirements.
- .2 Follow storage and handling instructions of supplier of Precast Box Culverts.
- .3 Prevent chipping and cracking of Precast Concrete Sections. Replace damaged sections as directed by Departmental Representative.

#### 1.13 QUALITY CONTROL - TESTING

- .1 All Quality Control testing by the Contractor
- .2 Testing as per accepted Contractor's Quality Control Plan and Section 01 45 00 – Quality Control.

#### 1.14 WARRANTY

- .1 All precast concrete box culvert material shall be under warranty for five (5) years after the date of Substantial Performance Certificate. All workmanship shall be under warranty for two (2) years after the date of the issuance of the Certificate of Substantial Performance.

### Part 2 Products

#### 2.1 MATERIALS

- .1 Cement, aggregates, water, admixtures: to CAN/CSA-A23.1 and CSA-A23.4.
- .2 Reinforcing steel: to CAN/CSA-G30.18.
- .3 Forms: to CSA-A23.4.

#### 2.2 MIXES

- .1 Concrete:
  - .1 Precast concrete fabricator is responsible for proportioning concrete mixes using normal density concrete in accordance with CAN/CSA-A23.1. Type 50 Portland cement shall be used.
  - .2 Type 50 equivalent may be submitted for review and approval.

#### 2.3 MANUFACTURED UNITS

- .1 Manufacture units in accordance with CSA-A23.4, and CSA-A251.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast.
- .3 Provide hardware suitable for handling elements.

## 2.4 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CSA-A23.4 and CSA-A251.
- .2 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.
- .3 Provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .4 Precast plants should keep complete records of supply source of concrete material steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

## 2.5 GRANULAR PIPE BEDDING AND BACKFILL MATERIAL

- .1 Bedding and structural backfill, to be supplied by Contractor as per Section 32 11 20 – 50mm Granular Sub-Base Course and Section 32 11 24 – 25mm Granular Base Course and as shown on the design drawings, for use as culvert bedding, and granular structural backfill.
- .2 Backfill 600mm above culvert overt and 1000mm beyond the sides of the culvert may be native/excavated material approved by the Departmental Representative

## 2.6 RIPRAP

- .1 Riprap shall be installed in accordance with Section 31 37 00 - Riprap.

## Part 3 Execution

### 3.1 EXCAVATION AND FOUNDATION PREPARATION

- .1 Excavate, and prepare soil foundation for Box Culvert, as per Contractor's Drawings and in accordance with Section 31 24 13 - Roadway and Drainage Excavation. Foundation of culvert shall be inspected by Departmental Representative prior to assembly of the culvert.
- .2 Culvert removal shall be as indicated on drawings and shall include disposal of sections to a site outside of the National Parks.

### 3.2 TECHNICAL ASSISTANCE

- .1 Technical assistance is considered incidental to the unit price items and no additional payment will be made.
- .2 Arrange for qualified and experienced technical representative of supplier of box culverts to be on site for initial stage of installation to ensure correct installation procedures. Arrange for a minimum of 3 additional visits during installation as directed by Departmental Representative. Field report for each visit to be submitted to Departmental Representative.

### 3.3 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of bedding in the dry.

- .2 Place minimum thickness of 300 mm of bedding granular on bottom of excavation and compact to minimum 98% Standard Proctor density in compliance with ASTM D698.
- .3 Bedding requirements in accordance with the Contract Documents.
- .4 Place bedding in unfrozen condition.

### 3.4 JOINTS: CONCRETE BOX CULVERTS

- .1 Joints shall be made with preformed flexible joint sealants- bitumen sealants or rubber sealants as per the manufacturer's recommendation. For bitumen sealants make joint with excess fill to form continuous bead around outside of box and finish smooth on inside

### 3.5 BACKFILL

- .1 Backfill around and over culverts as shown on drawings or as directed by Departmental Representative.
- .2 Place specified granular backfill material in 150mm layers to the width shown on the drawings, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to minimum 98% Standard Proctor density Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross.
- .4 Backfill 600mm above culvert top and 1000mm beyond the sides of the culvert may be native/excavated material approved by the Departmental Representative compacted to minimum 98% Standard Proctor density.

### 3.6 PRECAST CONCRETE BOX CULVERT ASSEMBLY

- .1 Assemble precast sections in accordance with Contractor's Drawings and in accordance with instructions of supplier of box culvert. Construct to lines, grades and elevations as indicated.

**END OF SECTION**

## Part 1 General

### 1.1 MEASUREMENT PROCEDURES

- .1 Preservation and care of water within the project limit throughout the duration of construction will be paid under **“Lump Sum Price Item 5 – Preservation of Water Course”**. The payment will include meeting all environmental and contractual obligations as noted in this document and engineering drawings.
- .2 50% of Lump Sum payment to be paid when erosion protection plan has been implemented, and accepted by the ESO and the Departmental Representative.
- .3 The remainder of the Lump Sum to be paid when work is complete erosion protection measures 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.

### 1.2 ENVIRONMENTAL REQUIREMENTS

- .1 Activities which involve Work within or near waterways should first be coordinated with the Departmental Representative and must always follow applicable legislation/regulations and the Contractor’s Environmental Protection Plan (EPP) which is outline in Section 01 35 43 – Environmental Procedures.
- .2 Design temporary care of water measures as described in the Work Plan including cofferdams, sumps, pumping systems, pipelines, channels, flumes, drains and other protective and dewatering and water diversion works to permit construction of the Work in the dry.
- .3 Ensure water diversion is capable of handling a 1:20 year peak flow.
- .4 Ensure the work plan includes handling of groundwater rainstorm runoff, snow, snowmelt, and ice that may enter the Work areas.
- .5 Ensure a dewatered condition for operation of equipment within watercourses.
- .6 Install stabilized entrances at equipment access points to dewatered watercourses.
- .7 All site equipment shall use bio-based or biodegradable hydraulic fluid for works.
- .8 Use rubber tracked machinery when working on watercourse bed material.
- .9 Keep all approved activities within the wetted perimeters to an absolute minimum
- .10 Use borrow material from watercourse beds only after receipt of written approval from Departmental Representative.
- .11 Design and construct temporary crossings to minimize environmental impact to watercourse.
- .12 Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited.

### 1.3 SUBMITTALS

- .1 Provide temporary creek diversion plan in accordance with Section 01 33 00-Submittal Procedures and 01 32 16.07 Construction Progress Schedules Bar (GANTT) Chart.

## Part 2 Products

### 2.1 MATERIALS

- .1 Silt Fencing:
  - .1 Consisting of non-woven geotextile with manufactured seams as resistant as the geotextile material itself. The geotextile shall be in one piece.
  - .2 Stakes to be natural wood, minimum 1.5m in length, sized to withstand peak flows.
- .2 Turbidity or Floating Silt Curtain:
  - .1 Consisting of a heavy duty woven fabric with top loops connected to floats and bottom loops woven through a 5mm diameter heavy metal chain.
  - .2 Length of silt curtain to be sufficient to fully contain the work area.
  - .3 Height of silt curtain to be sufficient to adjust to variable water levels while maintaining continuous contact with the watercourse bed.
  - .4 Mark floating surface of curtain with yellow buoys as determined by Departmental Representative.
- .3 Pumps:
  - .1 The inlet and outlet of pumps and hoses for use in-water to be screened to prevent aquatic fauna from entering the equipment.
  - .2 Have at Site at all times, at least one standby pump for each category of pump being used for dewatering and water diversion activities.
  - .3 Provide standby power sufficient for operation of all required dewatering and water diversion equipment

## Part 3 Execution

### 3.1 GENERAL

- .1 Provide, operate, and maintain all necessary cofferdams, channels, flumes, drains, well points, wells, sumps, pumps, pipelines, and other temporary diversion and protection works.
- .2 Provide, operate, and maintain all cold weather protective works including enclosures, insulation, and heating systems.
- .3 Have at the Site at all times, at least one standby pump for each category of pump being used for care of water.
- .4 Provide standby power sufficient for operation of all required care of water equipment.

- .5 Inspect care of water pump and pipeline systems at regular intervals not exceeding 12 hours and verify that the pumps are operating, there is sufficient fuel, and cold weather protection is adequate. If required, decrease the time interval between inspection check to correspond with the type and nature of weather and the work in progress, to the satisfaction of the Departmental Representative.
- .6 Repair damage to any part of the Work caused by water, snow, or ice due to failure of the care of water measures. Perform additional excavations and fill placement made necessary by water, snow, or ice.
- .7 When no longer required, remove cofferdams, sumps, channels, drains, and other protective, dewatering, and temporary diversion works and finish to a leveled and neat condition as directed by the Departmental Representative.

### 3.2 EXISTING CONDITIONS

- .1 Maintain existing flow pattern in natural watercourse systems.
- .2 In natural systems maintain existing riffle pool and step pool patterns.

### 3.3 SITE CLEARING AND PLANT PROTECTION

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to approved Erosion and Sedimentation Management Plan.
  - .2 Inspect, repair, maintain and report weekly on condition of erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls once disturbed areas have been restored and stabilized.
- .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
- .3 Existing saturated logs along base of shoreline to be disturbed to be collected and secured within a floating boom system. Logs to remain saturated at all times. Upon completion of watercourse alterations, reinstate logs along base of slope in a manner similar to existing conditions.
- .4 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
- .5 Protect roots of designated trees to dripline or as instructed Departmental Representative during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .6 Leave roots mass and stumps in place.
- .7 Maintain temporary erosion and pollution control features installed under this contract.

### 3.4 RECOVERY OF AQUATIC FAUNA

- .1 To minimize impacts on aquatic fauna, during installation of water isolation techniques, use a combination of netting and loud noises or vibrations to scare any trapped fish, reptiles or amphibians towards a temporary opening. Once completed, close off the opening.
- .2 Once the aquatic work area is secured, the isolated area of water is to be electrofished to remove any remaining aquatic fauna.
- .3 Captured aquatic fauna to be placed back in the active river flow or moved to a similar habitat outside the work area.
- .4 Protect edges of work area to prevent the reintroduction of reptiles and amphibians to the work area.

### 3.5 DRAINAGE

- .1 Inspect, repair and maintain all dewatering and water diversion equipment and systems during construction until completion of the Works.
- .2 Repair damage to any part of the Work caused by water, snow, or ice due to failure of dewatering and water diversion measures. Perform additional excavations and fill placement made necessary by water, snow, or ice.
- .3 Pumping water containing suspended materials into watercourse is prohibited.
- .4 Establish rock chute spillways to accommodate safe surface water entry to watercourse as directed by Departmental Representative.
- .5 Install drop pipe inlet system as directed by Departmental Representative.

### 3.6 REMOVAL OF SEDIMENT CONTROL MEASURES

- .1 Sediment control measures to remain in place at all times during the work in order to catch and filter any run-off from the worksite before it reaches the watercourse.
- .2 Measures to remain in place until the growth of seed, sod or other surface cover is sufficient to retain sediments from being mobilized in runoff.
- .3 Method of removal of sediment control measures to be submitted for approval by Departmental Representative.
- .4 For in-water sediment control measures, allow minimum 1 day for settlement of suspended sediments before removal.

### 3.7 SITE RESTORATION

- .1 Restore the original watercourse bed grades and materials upon completion of in-water works.
- .2 Establish vegetated buffer zones with suitable vegetation to minimum 3m along edge of watercourse banks as determined by Departmental Representative.
- .3 Plant non-invasive, locally native or naturalized vegetation natural to area, suitable for application without requirement for fertilizers, pesticides and other chemicals.

- .4 Control stream bank erosion in lower section of watercourse with irregular shaped rip rap underlain with filter fabric as specified in Section 31 32 19.01 - Geotextiles .
- .5 Control stream bank erosion in upper section of watercourse by planting suitable vegetation as directed by Departmental Representative.
  - .1 Ensure stabilization of exposed soils occurs within 5 days of completion of watercourse works.

**END OF SECTION**