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SHEET NO.	DRAWING NO. and REVISION	TITLE
1	1	Overview
2	2	Summit Area Detail

Reference Documents:

1. Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure - May 2015
2. Pratiques exemplaires nationales de gestion de Parcs Canada - Routes, autoroutes, promenades et infrastructure connexe – Mai 2015
3. Whirling Disease in Lake Louise, Yoho, Kootenay Field Unit – Direction for Permitted Users conducting water-related activities in LLYK – April 2017.
4. Tournis des truites – Unité de gestion du secteur de Lake Louise et des parcs nationaux Yoho et Kootenay – avril 2017
5. Standard CMS Translations July 2018
6. Construction Signage Translation July 2018
7. BGC Geotechnical Report – January 25, 2019
8. Mt. Stephen Avalanche Berm Staging Area
9. Local 2 year Weather Data

Project photos:

Photos of the site conditions included in the attached Photo Atlas.

Photos are provided for reference and to prompt responsible investigations by potential Contractors. They were taken at a specific time and do not represent the current condition for any time other than the specific time that they were taken. Potential Contractors are advised that the conditions depicted in the photos are very likely to have changed since the time of the photos and that they are wholly responsible for familiarizing themselves with the site prior to submitting their respective prices.

01 11 00 SUMMARY OF WORK

Part 1 General

1.1 PRECEDENCE

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

1.2 DEFINITIONS

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

1.3 PROJECT LOCATION

- .1 The project is located in Yoho National Park, British Columbia. Construction work is on Mt Stephen, adjacent to the Trans Canada at ~Km 94. The following are key locations relative to the project:
 - .1 TCH km 0 – BNP East Gate
 - .2 TCH km 46 – Castle Mountain Interchange
 - .3 TCH Km 66.9 – Lake Louise Overflow Campground
 - .4 TCH km 75 – Icefield Parkway Interchange (Km 0 of Icefield Parkway)
 - .5 TCH km 82 – Alberta/British Columbia and Banff/Yoho National Park borders
 - .6 TCH km 86.7 – Great Divide Lodge Access
 - .7 TCH km 93.7 – Mt. Stephen Staging Access

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The project work consists of the design, supply and install of three (3) Remote Avalanche Control Systems on Mt Stephen, including consumables for the first two years of operation, and maintenance, transportation and storage following the first year of operation.
- .2 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following, as directed by the Departmental Representative:
 - .1 Design, manufacture, supply and installation of three (3) Remote Avalanche Control Systems on Mt Stephen in accordance with Section 33 42 36.
 - .2 Site preparation for RACS in accordance with Section 31 23 20, including rock scaling and blasting as required, and site access.
 - .3 Drilling for RACS anchors in accordance with Section 31 72 13.
 - .4 Grouting RACS anchors in accordance with Section 31 72 13.
 - .5 Prepare reinforced concrete foundations for RACS in accordance with Section 03 20 00.
 - .6 Supply of software and hardware for communicating with RACS in accordance with the Contract Documents.
 - .7 Training of Parks Canada staff to operate, load and maintain the RACS.
 - .8 Supply and loading of all consumables required for commissioning/testing and for the first winter's operation.
 - .9 Transportation of removable components of RACS from Mt Stephen to location outside the Park in Spring 2020, storage during the off-season, first year inspection and maintenance.
 - .10 Transportation of removable components of RACS from storage location to Mt Stephen in Fall 2020.
 - .11 Supply and loading of consumables required for the second winter's operation.
 - .12 Miscellaneous Additional Work as directed by the Departmental Representative.
- .4 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 in nearby pits or from other Parks facilities can be coordinated through the Departmental

Representative and the ESO but will require the Contractor to obtain a Restricted Access Permit and to adhere to all conditions contained therein.

- .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 the desired minimal adverse effects are achieved. The Contractor’s EPP must be approved by Parks Canada Agency prior to the commencement of construction. The Departmental Representative and Parks Canada’s Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the Plan and Contract Documents. The EPP will form part of the Contract.
- .6 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, **BC MoTI –Standard Specifications for Highway Construction (latest edition)** shall apply unless directed otherwise by the Departmental Representative.

1.5 CONTRACT METHOD

- .1 Construct Work under combined price Contract.

1.6 WORK BY OTHERS

- .1 The Contractor is advised that the following Work and anticipated completion in the vicinity has been or will be contracted by Parks Canada:
 - .1 Rock Recapitalization / Slope Stabilization km 88 to km 91, Summer 2019
 - .2 Rock Recapitalization / Slope Stabilization: km 117 to km 118. Fall 2019
 - .3 Line painting at various locations. Spring 2019
 - .4 Bridge deck repairs on TCH at km 91.2, km 121.2.
 - .5 Other projects and maintenance work may occur along the TCH in 2019 and 2020.
- .2 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors and the PCA Departmental Representative in reviewing their construction schedules and sharing their work space, and shall coordinate their operations with the other Contractors, including traffic management and construction staging.
- .3 The Contractors shall coordinate all work on this project with other Contractors including Site Safety and Traffic Control.
- .4 The borrow, staging areas and pits mentioned in the Contract Documents are operational and are used by many contractors and Parks Canada. The Contractor shall coordinate and cooperate with the other users of the applicable areas.

1.7 WORK SEQUENCE

- .1 Schedule work progress to allow Owner / Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Maintain fire and emergency access on the roadways at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.

- .4 The Contractor shall prepare a meaningful bar chart or network diagram showing the proposed schedules of major work, which shall be submitted to the Departmental Representative in accordance with Section 01 32 16 - Construction Progress Schedules.
- .5 The Contractor shall:
 - .1 **Obtain the Interim Certificate (Substantial Performance) by September 15, 2019.**
 - .2 **Complete all of the Work by October 31, 2020 (Contract Completion Date).**
 - .3 Demobilize from site if at any time, the relevant area is declared to be at risk of being impacted by an avalanche.
 - .1 Although no guarantee is provided as to when this may occur, in the past it has been after mid-October.
 - .4 Remobilize to site only when the relevant area is declared to not be at risk of being impacted by an avalanche.
 - .1 Although no guarantee is provided as to when this may occur, in the past it has been after June 1.

1.8 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of site subject to Section 01 14 00 –Work Restrictions and Section 01 29 01 – Site Occupancy, until Contract Completion date. The Contractor's use of the site is not exclusive of other contractors or work zones within the limits of this Contract.
- .2 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other Contractors.
- .3 Coordinate use of premises under direction of the Departmental Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 The Contractor and any subcontractors shall obtain a business license and vehicle work passes in accordance with Section 01 35 43 - Environmental Procedures.

1.9 OWNER OCCUPANCY

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

1.10 OWNER FURNISHED ITEMS

- .1 None.

1.11 CONSTRUCTION SIGNAGE

- .1 To be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.
- .2 Signage shall be coordinated with other Contractors.

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

1.12 SETTING OUT OF WORK

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

Part 2 Products

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

Part 3 Execution

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

END OF SECTION

01 14 00 WORK RESTRICTIONS

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 ACCESS AND EGRESS

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

1.3 USE OF THE SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site (limits shown on the Drawings) will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .3 Contractor may establish a Construction Staging Area within the Mt. Stephen avalanche berm at TCH Km 93.7. An area approximately 40 m by 80 m will be available for staging and helicopter use. See Section 01 35 43 – Environmental Procedures for additional regulations.
- .4 Contractor may establish a construction camp in the west end of the Lake Louise Overflow Campground at TCH Km 66.9. This campground is used by the Public between the end of June to after the long weekend in September. Contractor's Camp shall be limited to accommodation of Contractor's personnel only. The Overflow Campground area will be shared with other Contractors. The area for a camp will be determined by the Departmental Representative. See Section 01 35 43 – Environmental Procedures. Parks Canada regulations prohibit anyone working within the Park from using public campground facilities.
- .5 Office-tool trailer may also be set up within the Mt. Stephen avalanche berm. See Section 01 35 43 – Environmental Procedures.
- .6 The Contractor shall not store material or park equipment along the Highway Right of Way within the clear zone.
- .7 Contractor shall maintain adequate drainage at the Work Site.

- .8 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at their cost for the performance and inspection of the Work.
- .9 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and Section 01 35 43 - Environmental Procedures. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .10 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .11 Pets shall not be brought to or maintained at the construction site or worker's camp.

1.4 WORKING TIMES

- .1 Work in YNP is permitted during daylight hours from 06:00 to 22:00, Monday to Sunday unless stipulated otherwise in the Contract Documents.
- .2 No work will be permitted on Sundays unless prior written approval is granted by the Departmental Representative
- .3 The Contractor will not be permitted to work during the period of any Alberta or British Columbia statutory holiday long weekend, including one day prior to and one day following. The Contractor will not be permitted to work during the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
 - .6 Statutory and Civic Holidays (2019)
 - .1 Good Friday weekend: From 19:00 Thursday, April 18, 2019 to 07:00 Tuesday, April 23, 2019.
 - .1 Victoria Day Weekend: From 19:00 Thursday May 16, 2019 to 07:00 Tuesday, May 21, 2019.
 - .2 Canada Day weekend: From 19:00 Thursday June 27, 2019 to 07:00 Tuesday, July 2, 2019.
 - .3 Heritage Day weekend: From 19:00 Thursday August 1, 2019 to 07:00 Tuesday August 6, 2019.
 - .4 Labour Day long weekend: From 19:00. Thursday, August 29, 2019 to 07:00 Tuesday, September 3, 2019.
 - .5 Thanksgiving Day weekend: From 19:00 Thursday, October 10, 2019 to 07:00 Tuesday, October 15, 2019.
 - .6 Remembrance Day Weekend: From 19:00 Thursday, November 7, 2019 to 07:00 Tuesday, November 12, 2019.
 - .7 Statutory and Civic Holidays (2020)
 - .1 Good Friday weekend: From 19:00 Thursday, April 9, 2020 to 07:00 Tuesday, April 14, 2020.
 - .2 Victoria Day Weekend: From 19:00 Thursday May 14, 2020 to 07:00 Tuesday, May 19, 2020.
 - .3 Canada Day: From 19:00 Monday June 29, 2020 to 07:00 Friday, July 3, 2020.
 - .4 Heritage Day weekend: From 19:00 July 30, 2020 to 07:00 Tuesday August 4, 2020.

- .5 Labour Day long weekend: From 19:00. Thursday, September 3, 2020 to 07:00 Tuesday, September 8, 2020.
- .6 Thanksgiving Day weekend: From 19:00 Thursday, October 8, 2020 to 07:00 Tuesday, October 13, 2020.
- .4 Variance of the Working Times and any others may be provided on the strict condition of satisfactory performance in all requirements as determined at the Departmental Representative's discretion and may be revoked at any time for any reason. It is provided on the presumption that no additional costs or any delay will be attributed to Parks Canada in relation to conducting Works in accordance with the Variance and if that is not the case, the Contractor shall not commence work under the Variance. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from a Variance will be entertained.

1.5 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .2 All components of the Work shall be conducted without equipment entering into wetlands, water bodies, or streams.
- .3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the Project.

1.6 UTILITIES

- .1 The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from their operations.
- .2 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall co-operate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .3 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.
- .4 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .5 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .6 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.7 SURVEY OF EXISTING CONDITIONS

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

1.8 INSTREAM WORK

- .1 Contractor shall adhere to recommendations for measures and standards to mitigate serious harm to fish as identified in Section 01 35 43 – Environmental Procedures and the Reference Documents.
- .2 The period of least risk for instream works is as listed in the Contract Documents.
- .3 No work identified in Section 01 35 43 – Environmental Procedures, or otherwise, as requiring DFO Request for Review is to occur until such a review has been completed by the Departmental Representative.

1.9 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafe BC and the Workers Compensation Act of British Columbia and Alberta including, but not limited to, Occupational Health and Safety Regulations and General Safety Regulations. Within the Site, the Contractor has all the responsibilities of an “employer” under the *Workers Compensation Act* and the *Occupational Health and Safety Regulation* and is designated as the “Prime Contractor”.
- .2 Prime Contractor must comply with Workers Compensation Act and Occupational Health and Safety Regulation Section 20.3 Coordination of multiple employer workplaces.
- .3 Comply with all applicable safety regulations of the Workers' Compensation Board of British Columbia and Alberta (WCB) including, but not limited to, WCB's Industrial

Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations, when working in that province.

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

1.10 USE OF PUBLIC AREAS

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

1.11 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 - Project Management and Coordination, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 At a minimum, the following personnel shall be included in the list:
 - .1 Contractor Manager
 - .2 Project Superintendent;

- .3 Safety Representative;
- .4 Quality Control Manager;
- .5 Environmental Representative;
- .6 Traffic Control Representative;
- .3 The above personnel shall perform the following duties:
 - .1 Contractor Manager with full authority, as agent of the Contractor, to act on behalf of and legally bind the Contractor in connection with the Work and the Contract. The Contractor may, at its discretion, appoint one person as both Contractor Manager and Project Superintendent.
 - .2 The Project Superintendent shall be employed full time with full authority to supervise the Work, who shall be directly available to the Department Representative during all active periods of Work. Either they or their designated deputy shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
 - .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
 - .4 The Safety Representative shall possess a minimum of 2 years' construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
 - .5 The Quality Control Representative shall be responsible for the development, implementation and execution of the Quality Management Plan and shall be the single point of contact for all quality related queries.
 - .6 The Traffic Control Representative shall be responsible for the development, implementation and execution of the Traffic Management Plan and shall be the single point of contact for all traffic control related queries.
 - .7 The Environmental Representative shall be responsible for the development, implementation and execution of the Environmental Protection Plan and shall be the single point of contact for all environmental related queries.

1.12 WASTE MANAGEMENT AND DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the Work Sites to approved sites outside the National Parks. Refer to Section 01 35 43 - Environmental Procedures.
- .2 Deposit of any construction debris into any waterway is strictly forbidden.
- .3 Cost for Waste management and disposal described above shall be considered incidental to the Unit Price items and no additional payment will be made.

1.13 WORK STOPPAGE

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

1.14 WINTER SHUTDOWN

- .1 No work should be scheduled over the winter months. In the case that it is required, the Contractor shall prepare the Site for safe, efficient winter operations. Winter shutdown requirements include, but are not limited to, Erosion and Sediment Controls

- .2 Although no guarantee is provided as to when winter shutdown will be required, in the past it has been mid-October to June 1.
- .3 The Contractor shall arrange a meeting with the Departmental Representative in mid-September, or as weather dictates, to review winter shutdown requirements.
- .4 All winter shutdown requirements shall be made to the satisfaction of the Departmental Representative, and no additional payment will be made.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 21 00 ALLOWANCES

Part 1 General

1.1 REFERENCES

- .1 General Conditions.

1.2 PRIME COST SUM

- .1 Included in Contract Price a total Prime Cost Sum of **\$150,000.00** for items as listed below.
- .2 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 Prime Cost Sum provided for in the Lump Sum Arrangement Table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .4 No interpretation of the items listed under Prime Cost Sum Allowances shall indicate that work will be included under the Prime Cost Sum. Items, tasks, and activities included in the Works elsewhere in the Contract, including Unit Price and Lump Sum Items, shall be paid as indicated in those sections and not under the Prime Cost Sum.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement and Payment Procedures below.
- .7 Such work may include, but not be limited to:
 - .1 Additional supply and install of RACS;
 - .2 Supply and install of Avalanche Detection Systems, Snowpack or Weather Sensors;
 - .3 Additional drilling as directed by the Departmental Representative;
 - .4 Additional rock scaling as directed by the Departmental Representative;
 - .5 Danger tree assessment and removal;
 - .6 Additional permanent fall protection as directed by the Departmental Representative;
 - .7 Supply and install of permanent helipads;
 - .8 Additional supply and loading of RACS consumables;
 - .9 Additional RACS maintenance, storage and/or transportation;
 - .10 Additional spare parts for RACS;
 - .11 Additional Mobile Control Units / Tablets for communicating with RACS;
 - .12 Additional rock bolting as directed by the Departmental Representative;
 - .13 Miscellaneous work as directed by the Departmental Representative.
- .8 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for Work under the **“Lump Sum Price Item 3 – Prime Cost Sum”** made using negotiated rates or by material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current British Columbia Roadbuilders and Heavy Construction Association’s 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 British Columbia Roadbuilders and Heavy Construction Association (most recent) or by mileage using National Joint Council (NJC) rates, whichever is lower. The Contractor will not be permitted to claim both daily rental and mileage rates.
 - .3 Fuel price adjustment to be determined from <https://www2.gov.bc.ca/gov/content/industry/construction-industry/transportation-infrastructure/hired-equipment-program/fuel-price-adjustment> for the applicable rate at the time the work is being performed.
 - .1 Pick-ups, light plants, service vehicles and similar equipment are excluded from the fuel price adjustments.
 - .4 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.
 - .5 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
 - .6 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
 - .7 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
 - .8 A claim for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
 - .9 The Departmental Representative’s, or their delegate’s, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
 - .10 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
 - .1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative’s sole discretion.
 - .11 The Departmental Representative’s, or their delegate’s, signature on any of the Contractor’s Daily Extra Work Reports shall not be an agreement to waive any portion of the Contract regardless of any wording to the contrary.

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

Part 2 Products

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

Part 3 Execution

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

END OF SECTION

01 25 20 MOBILIZATION AND DEMOBILIZATION

Part 1 General

1.1 DESCRIPTION

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under **“Lump Sum Price Item 1 – Mobilization / Demobilization”**.
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
 - .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
 - .4 Payment of only **5%** of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than **5%** of the total price tendered, payment of the remainder of the amount will be authorized when the Contract has been completed.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 29 01 SITE OCCUPANCY

Part 1 General

1.1 DEFINITION OF OCCUPANCY

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 CHANGES TO DESIGN

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

1.3 COORDINATION

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

1.4 PROJECT MEETINGS

- .1 During the course of the Work, the Contractor shall attend weekly construction meetings as scheduled, chaired, and documented by the Departmental Representative.
- .2 The agenda will include among other things, general construction, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .3 The Contractor shall provide physical space and make arrangements for meetings at or near the Work Sites for all meetings that take place in relation to the Contract from their mobilization until their demobilization.
- .4 Meetings held outside of the time noted above (before mobilization or after demobilization) will either be held in the local PCA Field Unit offices, or at the Owner's site office, as notified by the Departmental Representative.
- .5 The Contractor will attend or otherwise ensure the attendance of their staff, subcontractors, consultants, suppliers, or other key parties all other meetings identified in the Contract or reasonably requested by the Departmental Representative in an effort to resolve specific issues as they may arise.
- .6 Meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .7 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

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

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings if part of tender
 - .2 Specifications
 - .3 Addenda

- .4 Reviewed Shop Drawings and mix designs
- .5 Change Orders
- .6 Other modifications to Contract
- .7 Traffic Management Plan
- .8 Safety Plan
- .9 WHMIS
- .10 Environmental Protection Plan
- .11 Quality Control Plan and field test reports
- .12 Copy of accepted Work schedule and most recent updated schedule
- .13 Labour conditions and wage schedules
- .14 Equipment rate schedule and applicable versions of the relevant rate guides
- .15 Applicable current editions of municipal regulations and by-laws
- .16 WorkSafe BC Notice of Project

1.7 PROJECT SCHEDULES

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

1.8 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 Submit requests for interpretation of Contract Documents and obtain instructions through Departmental Representative.
- .4 Process substitutions through Departmental Representative.
- .5 Process change orders through Departmental Representative.
- .6 Submittal Schedule:
 - .1 Prepare a schedule of the required submissions and the date the submissions will be made. Include columns for Actual Date of Submission, Review Comments Received, Final Submission and Final Acceptance Received. Provide this schedule to the Departmental Representative in Excel format.
 - .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.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 32 16 CONSTRUCTION PROGRESS SCHEDULES

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 DEFINITIONS

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

1.3 REQUIREMENTS

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.
- .2 Ensure all the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Include an allowance in the schedule for Work performed and paid for as Prime Cost Sum. Refer to Section 01 21 00 – Allowances for a list of potential activities.
- .4 Include the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.
- .6 After review, revise and resubmit schedule to comply with revised project schedule.
- .7 During progress of Work revise and resubmit as directed by the Departmental Representative. If schedule is requested and not received, the Departmental Representative may hold back progress payment until an updated Project Schedule is received and accepted.

1.4 SUBMITTALS

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

1.5 PROJECT MILESTONES

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

1.6 MASTER PLAN

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

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule separately identifies the Work by area and station.
- .3 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Contract Award
 - .2 Obtaining Permits
 - .3 Pre-Mobilization Submittals (required prior to Preliminary Site Inspection)
 - .4 Preliminary Site Visit
 - .5 Remaining Pre-Mobilization Submittals (Detailed Design and Work Plan)
 - .6 Mobilization
 - .7 Site Preparation (Scaling, Blasting, Excavation)
 - .8 Drilling, Grouting and Pull Testing
 - .9 Foundation Preparation (Rebar and Formwork)
 - .10 Concrete Pouring
 - .11 RACS Install
 - .12 RACS Loading and Commissioning/Testing

- .13 Parks Staff Training
- .14 Flying down removable component of RACS and transportation to storage
- .15 First year maintenance of RACS
- .16 Inspection of permanent component of RACS
- .17 Remediation of any noted deficiencies
- .18 Site Clean-up / Demobilization
- .19 Final Completion

1.8 PROJECT SCHEDULE REPORTING

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

1.9 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 33 00 SUBMITTAL PROCEDURES

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete, and written acceptance of the submittal has been issued by the Departmental Representative.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Submittals must be accompanied by a completed Quality Control Checksheet in accordance with Section 01 45 00 – Quality Control prior to submission to Departmental Representative. This completed Quality Control Checksheet represents that all the necessary requirements have been met and that the submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Departmental Representative in writing at time of submission, identifying any deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work is consistent.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one accepted copy of each submission on site.

1.3 “DESIGN AND BUILD”, SHOP DRAWINGS, PRODUCT DATA, AND MIX DESIGNS

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

- .3 The term “Mix Design” means an engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials properties, that is acceptable to the Departmental Representative.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to Contract Documents.
- .5 Allow fourteen (14) calendar days for Departmental Representative’s review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with the Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .8 Submit letter(s) of certification with all mix designs.
- .9 Accompany submissions with a transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor’s name and address.
 - .4 Identification and quantity of each shop drawing, mix design, product and sample.
 - .5 Other pertinent data.
- .10 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor,
 - .2 Supplier,
 - .3 Manufacturer.
 - .4 Contractor’s stamp, signed by Contractor’s authorized representative certifying approval of submissions, verification of field measurements and compliance with the Contract Documents.
 - .5 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication,
 - .2 Performance characteristics,
 - .3 Standards.
- .11 After the Departmental Representative’s review, distribute copies.
- .12 Submit one (1) electronic copy of the shop drawings or mix design for each requirement requested in the Contract Documents and as requested by the Departmental Representative.

- .13 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Contract Documents and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .14 Delete information not applicable to project.
- .15 Supplement standard information to provide details applicable to project.
- .16 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .17 The review of shop drawings and mix designs by Departmental Representative is for the sole purpose of ascertaining conformance with the Contract requirements. This review shall not mean that Departmental Representative approves details of the design inherent in shop drawings, responsibility for that shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting the generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

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

1.5 MOCK-UPS

- .1 Not used.

1.6 CERTIFICATES AND TRANSCRIPTS

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

1.7 REQUIRED CONTRACTOR SUBMITTALS

.1 General

- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.

.2 Pre-Mobilization Submittals

The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of submittals in writing. Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) calendar days prior to mobilization to the project site:

- .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in

Section 01 32 16 – Construction Progress Schedules. In addition, for each activity critical elements that could impact on the schedule are to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format

- .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone and cellular telephone.
- .3 Plan describing methods the Contractor will have to meet their responsibilities as the Prime Contractor for Safety and Traffic Control within the Work limits and to co-ordinate Work, traffic control, site access, safety, with other Contractors working in or adjacent to the Contract Work zone.
- .4 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone and cellular telephone. The list shall include the names and telephone/cellular telephone for contact persons who are available on a 24-hour basis in the event of emergencies.
- .5 Work Plan, describing in detail for each activity by road segment and location, the Contractor's intended methods of construction, and materials, equipment and manpower that will be used to meet stages specified in Section 01 32 16 – Construction Progress Schedules. The Work Plan must be linked to the Project Schedule.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples for each item of Work.
- .7 Traffic Management Plan, in accordance with the requirements of Section 01 35 31 – Special Procedures for Traffic Control.
- .8 Environmental Protection Plan (EPP) that meets the requirements of Section 01 35 43 – Environmental Procedures. Submission of EPP must allow 2 weeks for review by the Parks ESO, in accordance with Section 01 35 43 – Environmental Procedures.
- .9 Site Access and Detour Plans shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
- .10 Survey Plan describing the Contractor's intended methods of surveying during this project.
- .11 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. On site Contingency and Emergency Response Plan to address standard operating procedures to be implemented during emergency situations.
- .12 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.
- .13 Asphalt Plant provincial registration and records showing compliance with provincial and federal regulations for emission testing and monitoring.
- .14 Health and Safety Plan - The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site-specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work. Health and Safety Plan must include in accordance with Section 01 35 29 – Health and Safety Requirements.

- .15 BC One Call and Utilities Coordination Plan, including notifications to Utility Owners.
- .16 Blasting Safety Plan, describing special procedures to be followed during rock blasting to ensure protection of the public and workers in accordance with Section 01 35 29 – Health and Safety Requirements.
 - .1 The Contractor shall provide and follow a blast design, approved and signed by the blasting consultant, not less than one week prior to commencing drilling and blasting operations and a minimum of one day before the Contractor proposes to implement any changes to the previously utilized drilling or blasting methods. The design may be prepared by the blaster, but shall be reviewed by the Contractor and forwarded to the blasting consultant for signing. The design shall contain full details of the drilling and blasting patterns and controls that the Contractor proposes to use for controlled blasting. The blast design shall contain the following minimum information:
 - .1 Date the design was prepared and proposed date of blast.
 - .2 Station limits of proposed blast.
 - .3 Plan and section views of proposed drill pattern including free face, burden, blasthole spacing, blasthole diameters, blasthole angles, lift height, hole depth, and subdrill depth.
 - .4 The location of production (including buffer) and backline holes.
 - .5 Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.
 - .6 Initiation sequence of blastholes including delay times and delay system.
 - .7 Manufacturer's data sheets for all explosives, primers, delays, and initiators to be used.
 - .8 Blasting consultant's signature, printed name, and company name.
 - .9 Blaster's signature, printed name, company name, and blaster's certificate number
- .17 The Contractor shall not begin any Work on the Site until the Departmental Representative has provided a Notice to Proceed.
- .18 Submit a copy of the filed Notice of Project with Provincial authorities.
- .3 **Construction Phase Submittals**
 - .1 Monthly Progress Reports in accordance with Section 01 32 16 – Construction Progress Schedules.
 - .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities by road segment or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc. Weekly Progress Reports shall be submitted at the end of each week.

- .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be submitted to the Departmental Representative with the Weekly Progress Report. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each Weekly Progress Report.
- .4 “Design and Build” documents, Shop Drawings and Mix Designs – The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum fourteen (14) calendar days prior to fabrication / production.
- .5 Progress Photographs Format:
 - .1 Electronic: .jpg files, minimum three (3) mega pixels.
 - .2 Submission requirements: one (1) set of electronic files.
 - .3 Identification: Name and number of project, description of photograph and date.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .6 Submit all electronic pictures as part of closeout package.
- .6 Submit an electronic copy of Contractor’s authorized representative’s work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors immediately.
- .8 Submit copies of incident and accident reports immediately.
- .9 Submit daily extra work reports in accordance with Section 01 21 00 – Allowances.
- .4 **Project Completion Submittals**
 - .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
 - .2 Quality Control Records – The Contractor shall submit a .pdf electronic file containing an itemized set of project quality control documentation.
 - .3 All other documents noted within the Contract Documents, and under Section 01 78 00 – Closeout Submittals.
- .5 The Contractor shall not construe the Departmental Representative’s authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The

Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

- .6 The Departmental Representative may, at their sole discretion, withhold payment from the Contractor for Work completed until acceptable submittal documents have been provided by the Contractor to the Departmental Representative.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 35 29 HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 REFERENCES

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

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

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 REGULATORY REQUIREMENTS

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

1.7 PROJECT / SITE CONDITIONS

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

1.8 GENERAL REQUIREMENTS

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

1.9 RESPONSIBILITY

- .1 The Contractor shall act as the Prime Contractor in all matters relating to Occupational Health and Safety. They shall conduct their work and make all such arrangements necessary to allow them to be accepted as such by the relevant Provincial Authorities.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

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

1.11 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.

1.12 HEALTH AND SAFETY REPRESENTATIVE

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

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

1.15 BLASTING

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

1.16 POWDER ACTUATED DEVICES

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

1.17 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 35 31 SPECIAL PROCEDURES FOR TRAFFIC CONTROL

Part 1 General

1.1 DESCRIPTION

- .1 Supply, installation, maintenance and removal of Traffic Accommodation for the duration of the Contract or as described in this Section.

1.2 REFERENCES

- .1 British Columbia - Traffic Control Manual for Work on Roadways (1999)
- .2 BC MoTI – Standard Specifications for Highway Construction – Traffic Management for Work Zones (latest edition)
- .3 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada. (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for Traffic Control as described in this Section, shall be made under **“Lump Sum Price Item 2 – Traffic Accommodation”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Payment for Traffic Accommodation will be on a monthly basis based on the percent of Contract Works completed, not to exceed the total lump sum bid price for Traffic Accommodation. Extra works are not to be included in determining the percent complete of the Contract.
- .3 Payment for Traffic Accommodation will commence once the Contractor has implemented their accepted Traffic Management Plan and setup is accepted by the Departmental Representative.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Installation and removal of temporary pavement markings as described in the Contract Documents.
 - .2 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .3 Keeping the existing roadway within the Work limits, clean, free of pot holes while Contractor is on site.
 - .4 Repairing pot holes in within the Work limits during Winter Shutdown.
 - .5 Cost of snow removal required by the Contractor to complete the work identified in the Contract.
- .5 The Contractor shall not be responsible for the snow removal required for general highway road maintenance operations within the limit of construction so long as the roadway has been left in a condition deemed suitable, by Departmental Representative, for maintenance crews to safely complete the work.

1.4 GENERAL

- .1 The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.
- .2 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with the Section 2.2.1 of the “**BC MoTI - Traffic Control Manual for Work on Roadways, 1999**”.
- .3 The Contractor shall develop and implement a Traffic Management Plan in accordance with BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise in the Contract Documents. The Traffic Management Plan will include plans specific to each roadway for this project.
- .4 The Traffic Management Plan must duly consider the traffic volumes associated with the direction volume increases typically experienced on the lead up to weekends and/or special events. Adjustments to the TMP may be required at the request of the Departmental Representative to mitigate delays in excess of the stipulated maximum 20 minutes.
- .5 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement marking, other safety measures and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.
- .6 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. All signs are to be selected from the Construction Signage Translation Database provided in the Contract Documents.
- .7 Temporary pavement marking used shall be acceptable to the Departmental Representative and in accordance with Section 2.2.1 of the BC MoTI Traffic Control Manual for Work on Roadways, 1999. Spacing between temporary line markings to not exceed 10m.
- .8 All temporary pavement markings will be removed at the Contractor’s expense prior to the completion of the Contract.
- .9 Temporary lane markings that are not consistent with the final geometric design layout shall be removed using eradication or water blasting to the satisfaction of the Departmental Representative. Blackout painting of existing lines will not be permitted. No additional payment will be made for removal of existing paint lines.
- .10 Contractor shall have appropriate traffic control measures in place so that all lanes of highway traffic is maintained in each direction through the work zone at all times throughout the construction.
- .11 The Contractor shall coordinate traffic management procedures with other Contractors working in the immediate vicinity as well as collaborate with the Departmental Representative in respect to Traffic Management restrictions on the Highway Network. In consideration of the number of grading, paving and bridge construction projects in the corridor the Contractor must make a concerted effort to coordinate their traffic management strategies with other stakeholders. The Contractor must also be prepared to

attend traffic management and construction staging coordination meetings as requested by the Departmental Representative.

- .12 The Contractor is responsible for keeping the roadway, within the Construction Limits, clean at all times. Sweeping, grading and/or dust control to the acceptance of the Departmental Representative is considered incidental to the Contract and no additional payment will be made.

1.5 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 Carry out traffic regulation in accordance with BC MoTI – Standard Specifications for Highway Construction – Traffic Management for Work Zones (latest edition), except where specified otherwise.
- .3 When working on existing travelled way:
 - .1 Place equipment in a position presenting a minimum of interference and hazard to traveling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .4 The Contractor shall develop and have in place a completed Traffic Management Plan taking into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .5 The Contractor shall submit a Traffic Management Plan prior to commencement of work. Short closures may be allowed by the Departmental Representative for some activities such as asphalt removal as long as the delay to motorists does not exceed **20 minutes**.
- .6 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with the requirements of the BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise.
- .7 Contractor to maintain all lanes of traffic, unless otherwise authorized by the Departmental Representative.
- .8 Regardless of type of traffic control being used, maximum period of delay to public traffic shall be 20 minutes. Emergency vehicles (i.e., ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic.
- .9 The Contractor shall provide competent supervision and/or contact personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc., are in proper working order.
- .10 Traffic control measures will be monitored by the Departmental Representative, who may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.

- .11 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.

1.6 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work that requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the Traffic Management Plan submitted by the Contractor and approved by the Departmental Representative. **All temporary signs that are used for longer than one day shall be mounted on wood or steel posts installed in the shoulder areas at locations accepted by the Departmental Representative.**
- .3 At each end of the Work site, supply, install and maintain CMS's with a minimum of three (3) lines with eight (8) characters for the duration of the project.
- .4 Place signs and other devices to standards and in locations recommended in BC MoTI - Traffic Control Manual for Work on Roadways (1999). Provide intermittent signage if work zones exceed 2.0 km in length.
- .5 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5m from ground to the bottom of the sign, or as per BC MoTI - Traffic Control Manual for Work on Roadways (1999), whichever is higher.
- .6 As situation on site changes, Contractor to update their Traffic Management Plan outlining signs and other devices required for the project and submit for the acceptance of the Departmental Representative.
- .7 Continually inspect and maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability, location and height.
 - .2 Cleaning, repairing or replacing signs as required ensuring clarity and reflectance.
 - .3 Removing or covering signs that do not apply to conditions existing from day to day or time to time.

1.7 CONTROL OF PUBLIC TRAFFIC

- .1 Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in BC MoTI - Traffic Control Manual for Work on Roadways (1999).
 - .1 When public traffic is required to pass working vehicles or equipment, that block all or part of travelled roadway.
 - .2 When vehicles are entering or exiting Work Site access points.
 - .3 When vehicles are entering or exiting gravel pits in the park.
 - .4 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .5 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

- .6 Where temporary protection is required while other traffic control devices are being erected or taken down.
- .7 For emergency protection when other traffic control devices are not readily available.
- .8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .9 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to Contractor's operations: **maximum 20 minutes.**
- .3 During hours of darkness, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
- .4 No stoppage of traffic will be allowed for the periods specified in Section 01 14 00 – Work Restrictions, pertaining to Statutory Holiday or long weekend.
- .5 If night shift operations are implemented on 2-lane undivided sections, the public traffic must be escorted through the work zone by pilot cars in both directions.

1.8 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of Contract except that, when required for construction under Contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
 - .1 Posted speed limit shall be maintained in work zones in non-work periods.
 - .2 Speed limit to be 90 km/h in work zones in work periods.
 - .3 Contractor to maintain all lanes, unless otherwise authorized by the Departmental Representative.
 - .4 A schedule for all full work zone closures required longer than 45 minutes must be provided to the Departmental Representative at least one (1) week in advance of the planned closure.
 - .5 There may be restrictions to accommodate special events within the National Parks. PCA will provide two (2) weeks' notice of any upcoming restrictions.
 - .6 The Departmental Representative reserves the right to stop work in the case of excessive traffic delays. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.
 - .7 Maintain existing conditions for traffic crossing right-of-way.
 - .8 Provide the Departmental Representative with construction advisories for posting to the DriveBC website (<http://www.drivebc.ca>) and update advisories regularly to reflect the current and planned construction activities and highway closures. A minimum of 4 days notice is required for changes to the accepted TMP.
 - .9 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (<http://511.alberta.ca/>) and update advisories regularly to reflect the current and planned construction activities and highway closures. A minimum of 4 days notice is required for changes to the accepted TMP.

- .10 Emergency vehicles are to be directed through the Work Site immediately once conditions are safe.
- .11 No stoppage of traffic shall be allowed during inclement weather conditions.

1.9 QUALITY CONTROL

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

1.10 SUBMITTALS

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 35 43 ENVIRONMENTAL PROCEDURES

Part 1 General

1.1 REFERENCES

1. Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure, May 2015
2. Pratiques exemplaires nationales de gestion de Parcs Canada - Routes, autoroutes, promenades et infrastructure connexe – Mai 2015
3. Whirling Disease in Yoho National Park (YNP), Alberta – Direction for Permitted Users conducting water-related activities in YNP – October 2016.
4. Tournis des truites – Unité de gestion du secteur de Lake Louise et des parcs nationaux Yoho et Kootenay – avril 2017

1.2 MEASUREMENT AND PAYMENT PROCEDURES

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

1.3 SUBMITTALS

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

1.4 NATIONAL PARK REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-contractors shall obtain a business license from a Parks Canada Administration Office, prior to commencement of the Contract. The business license must be valid for the Park in which the Work is occurring.
- .3 All Contractor's vehicles are required to display a vehicle work pass from PCA. These permits may be obtained free of charge from the PCA Administration Office once a business permit has been obtained.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and subsequent amendments.
- .2 The Contractor is required to implement all recommendations and mitigations and follow all procedures and processes whether supply, construction, administration or

otherwise as described in particular in this Section 01 35 42 – Environmental Procedures, BMPs, and all Contract Documents.

- .3 The Contractor shall prepare their Environmental Protection Plan (EPP) to implement the mitigations identified in this Section 01 35 42 – Environmental Procedures, BMPs, and all Contract Documents as a minimum but shall ensure that all environmental requirements under the Contract and associated with the Works are appropriately managed through their EPP processes.
- .4 Where there is a discrepancy or inconsistency between this Section 01 35 43 – Environmental Procedures and other documents, this Section takes precedence over other documents.
- .5 Failure to comply with or observe environmental protection measures as identified in the Contract Documents may result in the work being suspended pending rectification of the problems. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

1.6 ENVIRONMENTAL BRIEFING AND ESO

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

1.7 ENVIRONMENTAL PROTECTION PLAN

- .1 The EPP is to be 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 particular in this Section 01 35 42 – Environmental Procedures, BMPs, and all Contract Documents.
- .5 Spill Response and Erosion and Sedimentation Management Plans are to be included in the EPP, in accordance with this Section.
 - .1 The Spill Response Plan will detail the containment and storage, security, handling, use and disposal of empty containers, surplus fuels or other hydrocarbon products to the satisfaction of the Departmental Representative and LLYK Environmental Surveillance Officer (ESO) and in accordance with all applicable federal and provincial legislation.
 - .2 The Spill Response Plan will include a list of products and materials to be used or brought to the work site that are considered or defined as hazardous or toxic to the environment. Such products may include but are not limited to fuels and lubricants. The Safety Data Sheets for all chemicals used will be made available on-site. Appropriately sized and stocked spill kits will be on site capable of dealing with 110% of the largest potential spill. All Contractor staff must be aware of their location(s) on site and must be trained on spill response procedures. Pumps, tanks and generators must have secondary containment capable of holding 110% of the stored volume.
- .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.
- .8 A Vegetation Management Plan shall be included in the EPP which will be prepared and implemented to minimize the potential for WBP to be damaged or removed due to the Project. Pre-construction field surveys will identify and flag any Whitebark Pine (WBP) individuals in the work area for avoidance during construction. Removal or damage to WBP is prohibited at all sites.
- .9 An Emergency Response Plan shall be included in the EPP and will include any procedures to follow in case of an emergency. Emergencies include but are not limited to wildlife encounters, equipment malfunctions and failure, and fires.
- .10 A Fire Prevention Plan which describes the fire prevention equipment (e.g., fire extinguishers) and procedures on-site in the event of a fire. Should a fire occur, Banff Dispatch and the Fire Duty Officer must be notified immediately.

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 / on the RAP Application form which will be provided by the Departmental Representative.
- .4 The Contractor is required to submit an application form to the Departmental Representative for each required RAP.
- .5 RAP application details include, but are not limited to: Name of activity, start and end date of activity, location of Work, Contractor company name and address, Contractor contact name, phone number and email address and vehicle / equipment information.
- .6 Following the application submission, the Contractor may be required to provide further details regarding the Work to PCA.
- .7 Submission of a RAP application to the Departmental Representative does not permit the Contractor to commence the restricted activity.

1.9 CONSTRUCTION SITE ACCESS AND PARKING

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

1.10 ACCIDENTAL FINDS

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

- .4 Should any process or requirements regarding archeological matters listed in this Section contradict the BMPs and other Contract Documents, this Section shall take precedence.

1.11 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

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

1.12 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 The Contractor's QEP shall prepare an Erosion and Sedimentation Management Plan (ESMP) for the components of the Contract that are undertaken in proximity to watercourses, wetlands or riparian environments. The plan shall be included in the EPP and prepared to the satisfaction of the Departmental Representative and ESO.
- .2 An Erosion and Sediment Plan for construction activities at the Mt. Stephen Berm CSA site to prevent containment of sediment, runoff, or other contaminants from leaving the CSA and entering the Kicking Horse River.
- .3 The ESMP shall be prepared so as to ensure that there is no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are <250 mg/L, or a maximum instantaneous increase of 10% over background levels when background levels are >250 mg/L. This threshold shall not be exceeded.
- .4 If necessary, on-site sediment control measures shall be constructed and functional prior to initiating construction activities.
- .5 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control performance.
- .6 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 by the Contractor's QEP as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and PCA and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
- .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from watercourses.
- .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection / drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
- .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
- .6 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
- .7 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. Parks Canada Dispatch shall be notified immediately of any spill immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
- .8 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .9 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.14 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 National Parks before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres 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 immediate attention to the fuelling operation.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed above.
- .5 Equipment used on the project shall be fuelled with E10, and low sulfur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of vehicles is avoided.
- .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc., anywhere within the National Parks.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight the National Parks. Alternatively, the Contractor may hire a security person employed to prevent vandalism in accordance with Section 01 52 00 - Construction Facilities.

1.15 OPERATION OF EQUIPMENT

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

- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the right-of-way or into watercourses or water bodies.
- .3 When, in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc., to the satisfaction of the Departmental Representative and ESO.
- .4 Restrict vehicle movements to work limits.
- .5 Workers private vehicles are to remain within the construction footprint.

1.16 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. Fires or burning of waste materials is not permitted.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. Parks Canada Dispatch shall be notified immediately of any fire immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified.
- .6 Fires or burning of waste materials is not permitted.

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

1.18 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 National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.19 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 INSTREAM WORK

- .1 In accordance with this Section, Section 01 14 00 – Work Restrictions, the National BMPs and all Contract Documents.
- .2 A QEP hired by the Contractor will provide surveillance while working within 30 metres of a watercourse and during an instream works, in accordance with the Contract Documents. The QEP services are considered incidental to the Work and no additional payment will be made.
- .3 The period of least risk for instream works is as listed in the Contract Documents.

3.2 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*.
- .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 must be provided to the Departmental Representative and ESO for verification.
- .4 Extraction of water within any National Park requires a RAP.
- .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.

3.3 CLEARING AND GRUBBING

- .1 Clearing, grubbing and/or tree removal is only permitted during the migratory bird least risk window, which is August 31 – April 15 National Park. A RAP must be obtained prior to any vegetation removal. Clearing, grubbing and/or tree removal will only be permitted outside of the migratory bird least risk window upon written approval by the Departmental Representative.

3.4 SPECIFIC CONCERNS RELATIVE TO SENSITIVE SITES AND ACTIVITIES

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

3.5 ENVIRONMENTAL IMPACT ANALYSIS MITIGATION MEASURES

- .1 The Contractor will ensure that works are completely contained such that deleterious substances (e.g., sediment, spills or leaks) will not be released into the environment, through the following procedures.

- .1 To prevent spills, helicopter fueling will not occur at the Project Sites; instead it will take place either at the Mt. Stephen Berm on an impermeable surface (ie pavement) or at the helicopter base.
- .2 Prior to use on the Project sites and during daily use, equipment and fuel lines will be inspected for leaks and structural integrity, and inspections will be recorded. Any detected leaks will be addressed immediately, and spills over 5 L or any spill quantity in water are to be reported to Banff Dispatch and the LLYK ESO immediately.
- .3 Hazardous or toxic products (e.g., fuels, lubricants) will be stored no closer than 100 m from any watercourse.
- .4 Any absorbent materials used in spill clean-up or soils contaminated by a spill will be disposed of in the appropriate facilities and transported in accordance with the Transportation of Dangerous Goods Regulations..
- .2 All equipment will be stored either on the road or on previously hardened surfaces in order to avoid trampling roadside vegetation and compaction of soils.
- .3 The Contractor will minimize vegetation clearing at the Mt. Stephen Berm CSA site to reduce risk of impacts to the Kicking Horse River and surrounding areas.
- .4 The Contractor will control/restrict the spread of invasive plant species within the construction staging areas through the following procedures:
 - .1 cleaning station will be set at the Mt. Stephen Berm to remove soil and plant material from vehicles and equipment before being moved. The cleaning station will be inspected, photographed, documented, and approved by the Field Unit, where possible and appropriate, during setup and prior to entry/exit. Materials removed from the vehicles and equipment, and the water used for cleaning will be collected and disposed in a manner dictated by the LLYK field unit.
 - .2 Construction staff and others entering the Project site will be required to scrape mud off their boots and brush seeds and dirt from their clothing before entering the Project site.
 - .3 Discussion about areas of concern, if any, at the Mt. Stephen Berm where special attention must be paid to invasive species control will take place between the contractor and the Field Unit before work commences.
- .5 Once siting is finalized and prior to construction, Qualified Environmental Professionals will conduct a site survey to confirm WBP individuals will not be affected by proposed Project footprint. During this field survey WBP individuals in the work area will be identified and flagged for avoidance during construction. The proposed RACS have small footprints and there is flexibility for placement of these structures; therefore, it is expected that impacts to WBP can be avoided through adjusted placement of the structures. Removal or damage to WBP is prohibited at all sites. Any damage or mortality that occurs during operations/maintenance must be documented and reported to the LLYK Field Unit to develop a mitigation plan.
- .6 Workers will be educated on the importance of protecting WBP and associated mitigation measures.
- .7 Mitigations to avoid impact on goats will be limited to alteration or delay of flights, flight lines and landing sites if goats appear on site or are directly on flight lines used to access the site. Use of RACS will reduce the use of helicopters during avalanche control, which may provide a benefit to goats (PCA 2018).

- .8 Pre-construction nest surveys should be conducted by Qualified Environmental Professionals with an appropriate level of experience identifying migratory birds and migratory bird nesting behaviour. Should active nests be detected during surveys, consultation will occur with LLYK Field Unit staff to determine the appropriate course of action, which may include species-specific setback distances until nestlings have fledged. Most migratory birds, their nests and eggs are protected under the Migratory Birds Convention Act, 1994 (MBCA) (Government of Canada 1994). As any ground disturbance will occur above the treeline or in the already disturbed CSA, habitat is relatively simple and pre-construction nest surveys are expected to be highly effective at locating any nests that may be present.
- .9 Any active nests, roosts, or dens of species protected by the SARA or the MBCA and detected on the Project Sites will not be disturbed, and consultation with the LLYK Field Unit will occur to determine appropriate mitigation, if any are observed.
- .10 Crews will avoid the use of dynamite when possible and use pry bars, S-mite, or Bentonite as an alternative.
- .11 Prior to any blasting that cannot be avoided, the Contractor will "sweep" the work area and maintain a continuous watch for wildlife that might be present. If wildlife is observed, work will be stopped until the wildlife has passed through the area. If wildlife persist at the work area, a Human-Wildlife Conflict/Wildlife Specialist will develop a mitigation plan to move the wildlife.
- .12 If sensitive wildlife are observed during flights between the CSA and work sites, the pilot should immediately retreat to an altitude of 300 m overhead of the animal, divert to a lateral distance of 450 m or alter flight paths to the fullest extent possible to reduce stress on wildlife. Sensitive wildlife includes Grizzly Bear (*Ursus arctos*), Mountain Goat, Black Bear (*Ursus americanus*), Wolf (*Canis lupus*), and Cougar (*Puma concolor*).
- .13 Limit human presence to areas essential for construction to limit the potential for disturbance of and interactions with wolverine (*Gulo gulo*) and grizzly bears, which have an association to avalanche chutes for foraging.
- .14 In general, helicopters will stay 1.5 horizontal km or further from cliffs that are below 2700 m. Helicopters will follow approach routes that avoid goat cliffs to the extent possible.
- .15 Helicopters will be shut down when stopping at a site for a prolonged period of time (i.e., >10 minutes) to limit sensory disturbance.
- .16 Boxes for controls associated with RACS will be properly secured to prevent nesting of animals, and wires will be properly enclosed to prevent chewing by rodents.
- .17 Inspections of the RACS will be conducted during maintenance activities to ensure that wildlife are not using the equipment for nesting or shelter. If wildlife is found, they will not be disturbed. LLYK wildlife conflict specialists will be contacted in order to identify the appropriate course of action.
- .18 Overflight and ground surveillance using spotting scopes should be conducted within 1.5 km of the target area prior to the detonation of any unexploded ordinance as a part of summer and fall maintenance programs. If wildlife are present near the blasting area, potential adverse effects of unexploded ordinance detonation on mountain goats and other wildlife will be minimized through the following procedures:

- .1 Follow guidelines outlined in the BMP 04.00 for Ordinance Detonation (Parks Canada 2015c).
- .2 If mountain goats are observed within the surveillance area, crews will first allow animals to leave the area prior to conducting any hazing activity.
 - .1 If animals do not leave area when left undisturbed, a Human-Wildlife Conflict/Wildlife Specialist will develop mitigation plan to move the wildlife.
- .3 Once mountain goats have left the planned detonation site, the animals should be monitored to ensure that they do not re-enter the area.
- .19 Wildlife will be prevented from obtaining food, garbage or other domestic wastes by the Contractor and contract staff. Wildlife attractants will be stored away from animal access and will not be stored at the work site overnight. Existing Parks Canada waste receptacles will not be used for disposal of such wastes without prior arrangement with PCA. Incidents involving wildlife accessing garbage or attractants will be reported immediately to the ESO or Resource Conservation staff.
- .20 Wildlife encountered at or near Project locations will be allowed to passively disperse without undue harassment. If wildlife persist at the work area, a Human-Wildlife Conflict/Wildlife Specialist will develop mitigation plan to move the wildlife.
- .21 Wildlife observations, in particular observations of Mountain Goats, Black Bears, Grizzly Bears and Wolverine, will be reported to the ESO.
- .22 Parks Canada will be notified in the event of human-wildlife interactions, or activity or encounters with bears, Canada Lynx (*Lynx canadensis*), Wolves, Cougars, Wolverines, and any species at risk, dens and/or nests. Work will be stopped, and the following will be reported immediately to Banff dispatch and the ESO:
 - .1 aggressive encounters involving any species,
 - .2 sightings of large carnivores,
 - .3 toad migration,
 - .4 snake hibernaculum,
 - .5 bat roost,
 - .6 bird nest, or
 - .7 observations of carcasses.
- .23 Soil disturbance will be minimal. If present, soil will be retained to facilitate recovery.
- .24 The Contractor will keep the LLYK Field Unit updated on timelines, work periods and construction activities so that their staff (e.g., visitor center and media) can provide information to the public to prevent additional safety risks for recreational users in the vicinity of the Project Sites during construction.
- .25 Construction equipment will be turned off when not in use, equipment and vehicles will be operated at optimal efficiency and performance, and carpooling of personnel to CSAs and Project sites will be encouraged.

END OF SECTION

01 45 00 QUALITY CONTROL

Part 1 General

1.1 REFERENCES

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 All Quality Control is to be done by the Contractor.
- .2 This work shall be incidental to the Contract and will not be measured for payment.

1.3 QUALITY CONTROL PLAN

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

1.4 TESTING BY THE CONTRACTOR

- .1 Testing required to provide quality control to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, miscellaneous metals, concrete barriers, and all source acceptance testing; and
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 Testing proposed shall be based on testing requirements in the latest edition of the BC MoTI Standard Specifications for Highway Construction in collaboration with current ASTM and CSA Standards or as stated below.
- .3 All Quality Control technicians are to be certified by Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .4 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one Day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.

- .5 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .6 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work
- .7 The minimum frequency for Quality Control testing during embankment construction will be as follows:

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

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	ASTM C136 / C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates	- Split Stockpiles: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 tonnes.
	Or C 117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	- Blend Sand: 1 for every 100 tonnes during stockpiling. - Natural filler: 1 for every 50 tonnes during stockpiling.
Tests During Aggregate	ASTM D5821 – Standard Test Method for Determining	Every second coarse aggregate sieve test

Production (cont.)	the Percentage of Fractured Particles in Coarse Aggregate	
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.
Tests during Asphalt Plant Mixing	C 136 / C 136M – Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	D 2216 – Moisture Content	Aggregate: 2 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed.
	D 5581– Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 – Asphalt Extraction, Ignition Method	One/Sub-Lot.
	D 5 / D 5M – 13 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix production.
	D 2171 / D 2171M –Viscosity	Contractor's Option
	D 2041 / D 2041M – Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245- Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing.
	Core Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100 mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

**These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency, where aggregate source is not uniform or any other condition exists that may warrant it. QC frequencies may be reduced below this level, subject to the Departmental Representative's authorization, should the Contractor's QC plan be proven very effective.*

** Passing the minimum quantity of QC tests does not relieve the Contractor from the obligation of meeting the Contract requirements and any identified non-compliant works or products shall be rectified by the Contractor at their cost.*

1.5 CONTRACTOR'S QUALITY CONTROL PROGRAM

- .1 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.

- .2 The Quality Control Program shall be described in a Quality Control Plan. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Quality Control Plan shall include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and testing equipment including methods and frequency of calibration;
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Departmental Representative, if the Departmental Representative witnesses the tests; and
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Contract Document compliance.
- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of their time dedicated to quality matters and who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matter and shall be onsite for the duration of the Contract.

- .5 The Quality Control Plan shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.6 INSPECTION

- .1 Allow inspectors access to Work. The Contractor is responsible for transporting inspectors to site from the staging area as required. This may include but will not be limited to certain PCA staff and the Departmental Representative. This shall be considered incidental to the work and no additional payment shall be made. Inspectors shall adjust their schedules as much as possible to optimize flight times and capacities. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.
- .5 The Departmental Representative will provide the Contractor with an Approval to Proceed document, after performing an audit and confirming all requirements are met, as stated in Section 01 71 00 - Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.
 - .1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

1.7 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and

irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

1.8 ACCESS TO WORK

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

1.9 PROCEDURES

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

1.10 NON-CONFORMANCES

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

- .7 The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.
- .8 Appealing an NCR:
 - .1 If the Contractor disputes the validity of a finding in an NCR, the Contractor may file an appeal with the Departmental Representative. The Departmental Representative and the Contractor Representative will use all reasonable efforts to refine the area of dispute and to resolve the determination of conformance with the Contract.
 - .2 If the Departmental Representative and the Contractor Representative cannot come to a mutually agreeable resolution, the Work that is the subject of the Non-Conformance Report shall be re-evaluated by an independent third-party, selected by the Departmental Representative in consultation with the Contractor, at a test frequency equivalent to twice that specified in the Contract or to such other frequency as may be mutually agreed between the Departmental Representative and the Contractor.
 - .3 If the appeal testing confirms the non-conformance determination, all appeal testing costs will be borne by the Contractor. If the appeal testing shows that the Work did in fact meet the requirements of the Contract, all appeal testing costs will be borne by the Owner.

1.11 OPPORTUNITIES FOR IMPROVEMENT

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

1.12 REJECTED WORK

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

1.13 REPORTS

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

1.14 TESTS AND MIX DESIGNS

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

1.15 MILL TESTS

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 52 00 CONSTRUCTION FACILITIES

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 INSTALLATION AND REMOVAL

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

1.3 SITE STORAGE / LOADING

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

1.4 CONSTRUCTION PARKING

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

1.5 SECURITY

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

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.7 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations, ordinances and the EPP.

- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 CONSTRUCTION SIGNAGE

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 61 00 COMMON PRODUCT REQUIREMENTS

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 This work shall be incidental to 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 Conform to these reference standards, in whole or in part as specifically requested in the Contract Documents.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 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.
- .3 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.
- .4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in Contract Documents, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.
- .7 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .8 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.4 AVAILABILITY

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

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and miscellaneous metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the Contract Documents, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between Contract Documents and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 CO-ORDINATION

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

1.9 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.

1.10 REMEDIAL WORK

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

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings that cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 PROTECTION OF WORK IN PROGRESS

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

Part 2 Products

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

Part 3 Execution

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

END OF SECTION

01 74 11 CLEANING

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative and in accordance with Section 01 35 43 - Environmental Procedures. Do not burn waste materials on site.
- .3 Clear snow and ice in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .4 Keep roadway clean in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 One bear proof container will be provided by Parks Canada. Contractor to provide any additional on-site bear proof containers they require for collection of waste materials and debris.
- .7 Remove waste material and debris from site at end of each working day.
- .8 Dispose of waste materials and debris off site in accordance with Section 01 35 43 - Environmental Procedures.
- .9 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 The Departmental Representative and Environmental Surveillance Officer may, at their total discretion, require the Contractor to suspend work activities until such a time as the Work Site is cleaned and debris, waste, and animal attractants are satisfactorily managed. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

1.3 FINAL CLEANING

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

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 77 00 CLOSEOUT PROCEDURES

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 INSPECTION AND DECLARATION

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 78 00 CLOSEOUT SUBMITTALS

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

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

1.2 CLOSEOUT SUBMITTALS

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

1.3 AS-BUILTS AND SAMPLES

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

1.4 RECORDING ACTUAL SITE CONDITIONS

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

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

1.5 FINAL SURVEY

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

1.6 WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

02 81 01 HAZARDOUS MATERIAL

Part 1 General

1.1 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).

1.2 MEASUREMENT AND PAYMENT PROCEDURES

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

1.3 DEFINITIONS

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

1.4 SUBMITTALS

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

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 All explosives must be mixed outside of the Park and delivered to the site. No storage of explosives shall be allowed within the National Parks.

- .5 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .6 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .7 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .8 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 TRANSPORTATION

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

- .7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report any discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

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

Part 3 Execution

3.1 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .3 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .4 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .5 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .6 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

END OF SECTION

03 10 00 CONCRETE FORMING AND ACCESSORIES

Part 1 General

1.1 DESCRIPTION

- .1 Supply and installation of Concrete Formwork as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

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 Section 211 Portland Cement Concrete

1.3 MEASUREMENT AND PAYMENT PROCEDURES

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

1.4 QUALITY CONTROL

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

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.
- .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 or Alberta, wherever the Work is occurring.
- .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.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
- .5 Dispose concrete waste in accordance with Section 01 35 43 - Environmental Procedures 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 slabs, decks, barriers, and other structural members.
 - .2 Three (3) days for abutments and return walls.
- .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

03 20 00 CONCRETE REINFORCING

Part 1 General

1.1 DESCRIPTION

- .1 Supply and installation of Concrete Reinforcing as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

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 MEASUREMENT AND PAYMENT PROCEDURES

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

1.4 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.
- .5 Provide Departmental Representative with certified copy of mill test report of reinforcing steel.
- .6 Submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Provide the Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, prior to commencing reinforcing work.
- .3 Inform the Departmental Representative of proposed source of material to be supplied.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

1.7 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 To be in accordance with the RACS manufacturer.
- .2 Cold-drawn annealed steel wire ties: to ASTM A1064/1064M for black reinforcing.
- .3 Stainless steel wire ties to UNS standards identified above.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .5 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.

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 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 Protect coated portions of bars with covering during transportation and handling.
- .8 Repair of galvanizing shall only be done if bare areas are infrequent, small and suitable for repair as determined by the Departmental Representative.
- .9 Repair of galvanized surfaces shall be in accordance with ASTM A780 / A780M , Method A3 Metallizing. The thickness of the metallizing shall be a minimum of 180 µm, 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.

END OF SECTION

03 30 00 CAST-IN-PLACE CONCRETE

Part 1 General

1.1 DESCRIPTION

- .1 Supply and installation of Cast-in-Place Concrete as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 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.

1.3 REFERENCES

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

1.4 MEASUREMENT AND PAYMENT PROCEDURES

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

1.5 SUBMITTALS

- .1 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 Contract Documents.
- .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 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.
- .5 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.

- .6 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 WASTE MANAGEMENT AND DISPOSAL

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

1.7 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 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in this Section.

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 this Section.

2.3 MATERIALS

- .1 Portland Cement: to CAN/CSA-A3000, Type GU.
- .2 Blended hydraulic cement: Type GUb to CAN/CSA-A3000.
- .3 Supplementary cementing materials: with maximum 25% fly ash replacement, by mass of total cementitious materials to CAN/CSA-A3000.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260 / C260M.
 - .2 Chemical admixture: to ASTM C494 / C494M. 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 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
- .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
- .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-XL.
 - .2 Compressive strength at 28 days age: 45 MPa minimum.
 - .3 Intended application: Barriers.
 - .4 Aggregate size 20 mm maximum.
- .4 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 days age: 35 MPa minimum.
 - .3 Intended application: Substructure, Retaining Wall Panels and Coping.
 - .4 Aggregate size 20 mm maximum.
- .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .6 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.
 - .5 Finish concrete to CSA A23.1/A23.2 unless noted otherwise.
 - .6 Schedule:
 - .1 Deck and approach slab – Floated surface finish for exposed face
 - .2 Underside of deck – smooth form finish.
 - .3 Top and inner surface of barriers – sack rubbed finish.
 - .4 Abutments – smooth form finish.
 - .5 Bearing seats – broom finish.
 - .7 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 this Section.
 - .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:
- .7 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
- .8 For concrete abutments, and footings: cure at 10 degrees C for additional 4 days.
 - .1 Keep concrete surfaces continually moist while protected.
 - .2 Provide fogging equipment to allow for mist spray curing before start of deck pour.
- .9 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.
- .10 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.
- .11 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

END OF SECTION

31 23 20 ROCK SCALING

Part 1 GENERAL

1.1 DESCRIPTION

- .1 This section provides requirements for scaling of rock faces where requested by the Departmental Representative or where necessary for safety as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

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

1.3 DEFINITIONS

- .1 Scaling: Removing loose soil, rock, and overburden from up to 5 m behind the crest of any slopes, slope faces, and benches on the slopes. Scaling also includes felling and removing trees and brush and pulling down larger rocks with wire rope attached to equipment on the highway.
- .2 Safety Scaling: The removal of all loose material from the excavation face using scaling bars, portable hydraulic jacks, air bags, other hand tools, wire rope cables, compressed air / water blow pipes, blasting without the need for drilled holes and other methods authorized by the Departmental Representative; and the removal of loose soil, rock, and overburden from up to 5 m behind the crest of any slopes, slope faces, and benches on the slopes.
- .3 Hand Scaling: Scaling done by hand working from a fall restraint or work positioning system and using suitable hand tools and powered equipment.
- .4 Mechanical Scaling: Removing loose soil, rock, trees and bushes, on, above, or below the slope using mechanical means, typically an excavator with toothed bucket, ripping tooth, or hydraulic breaker.
- .5 Over-cutting: Additional excavation beyond the Limits of Excavation.
- .6 Cleaning: Removal of loose rock and debris on the excavated slopes following blasting and mucking out by handheld tools, or with handheld compressed air/water blow pipes or with machine held chains, rubber tires or brush attachments.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment for Scaling will be the hours spent by each individual scaler actively working on the slope, beginning at the top of rope decent to the scaling area, and ending at the time the scaler reaches the bottom of that particular rope decent, including standby for passing traffic.
 - .1 Payment for Scaling will be made under “**Unit Price Item 3 – Initial Safety Rock Scaling**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Scaling unnecessarily beyond design lines established by Departmental Representative, with exception of unavoidable slide material, shall not be measured for payment.

- .3 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

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

1.6 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures
- .2 Pre-Construction Condition Survey: The Contractor shall submit to the Departmental Representative a Pre-Construction Condition Survey of all infrastructure in the work area that may be subject to damage as a result of the Work. The format of the survey shall be acceptable to the Departmental Representative. If the survey has been completed for other Work Items, then this requirement shall be considered complete.
- .3 Contractor Experience and Qualifications: The scaling crew shall consist of a supervising scaling foreman with substantial experience in both scaling and working from ropes at heights. The scaling crew shall not have more than one (1) scaler with less than one (1) years' experience at any time. The Contractor shall provide a Statement of Qualifications to the Departmental Representative including:
 - .1 Experience and duties of all personnel assigned to Scaling activities.
 - .2 A summary of previous project experience including the project name, location, duration, and the owner/client name and contact information.
 - .3 Rock scaling procedure and methodology including proposed equipment.
- .4 The Contractor shall provide the Departmental Representative with a Work Plan/Procedure that details measures the Contractor shall implement to protect any existing utilities and infrastructure that may be impacted by Scaling or other construction activities.

3.2 REQUIREMENTS

- .1 Stage rock scaling Work accordingly to avoid damage to infrastructure. Repair damaged infrastructure at Contractor's expense. Repair to the satisfaction of the Departmental Representative.

- .2 Where Scaling activities may affect existing infrastructure, the Contractor shall provide protective measures as detailed in the Contractor's Work Plan/Procedure, prior to commencing Scaling. Protective measures shall include, but not be limited to, padding material placed on the roadway, blasting mats, temporary rock berms or barriers, and temporary removal of signs, guardrails, and similar infrastructure. The Contractor shall be fully and completely responsible for all damage resulting from its Scaling or other operations.
- .3 The Contractor shall have scaling bars, mattocks/pulaskis, shovels, hydraulic jacks or wedge jacks, compressed air "blow pipes", air bags, chainsaws, wire rope for pulling down large rock using a front end loader, and other hand tools and equipment available on site such that Scaling can be carried out using the most appropriate and effective tools and methods for any given situation.
- .4 The Scaling foreman and at least one other scaler on the slope shall have a two-way radio for communication with supervisory/traffic control personnel at the highway grade.

3.3 GENERAL EXECUTION

- .1 For each slope section or undesirable feature, scale areas as directed by the Departmental Representative.
- .2 Trees and brush shall only be removed as directed and approved by the Departmental Representative or Environmental Surveillance Officer.
- .3 Scaling shall be carried out using the most appropriate and effective tools and methods for any given situation as approved by the Departmental Representative.
- .4 Any construction access on the slope including but not limited to trail building, installing access ropes and ladders, and tree and brush removal to facilitate access to the designated scaling areas shall be considered incidental to the Work. Any temporary construction access shall be removed upon completion of the Work.
- .5 All rope work shall comply with best practices detailed in applicable WorkSafe BC regulations including Part 34 of the OHS Regulation / safety regulations.

END OF SECTION

31 72 13 ROCK ANCHORS

Part 1 General

1.1 DESCRIPTION

- .1 Rock anchors consist of the installation of deformed steel bars (tendons) in holes drilled into rock or soil. Rock anchors shall be fully grouted and either tensioned or un-tensioned (dowels) as directed by the Contractor's Geotechnical Engineer and confirmed by the Departmental Representative.
- .2 Unless otherwise specified, the Post Tensioning Institute (PTI) recommendations for prestressed rock anchors shall apply to rock anchors and other rock anchoring systems.
- .3 The required number, length, location, and orientation of rock anchors will be determined on site by the Contractor's Geotechnical Engineer and confirmed by the Departmental Representative. The Contractor shall be prepared to install any number of rock anchors at any or all of the work sites.

1.2 REFERENCES

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

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The supply and installation of rock anchors for the foundation system will be considered incidental to **"Unit Price Item 1 – Design and Supply RACS"** and **"Unit Price Item 2 – Install RACS"** and shall include the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Measurement for payment for supply and installation of rock bolts or anchors, with the exception of rock anchors required for the foundation system, will be the length in meters of rock anchors successfully installed and embedded into the ground in accordance with the Contract Documents and as accepted by the Departmental Representative.
 - .1 Payment for this item will be made under **"Lump Sum Price Item 3 – Prime Cost Sum"** and shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .2 The quantity of anchorages delivered to site shall not exceed the amount approved by the Departmental Representative under the Prime Cost Sum.
- .3 Excessive bar protruding from the rock face shall not be measured for payment.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures
 - .2 Selection of appropriate installation method.
 - .3 Drilling, sealing, bar insertion, grouting and testing of rock anchors.
 - .4 Sealing to facilitate access to the designated anchoring areas.
 - .5 Survey and layout.

- .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.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Materials to be as specified by the Contractor's Geotechnical Engineer and confirmed by the Departmental Representative unless otherwise specified in the Contract Documents.
- .2 Rock anchors and all associated hardware shall be hot-dip galvanized to CSA G164 & CSA G30.18M. Field cut anchor bar shall be touched up with “Galvanox” zinc-rich paint or equivalent as approved by the Departmental Representative.
- .3 Resin grout or cementitious grout may be used. Resin grout shall not be used where the rock is excessively fractured or wet, as determined by the Departmental Representative.
- .4 Resin Grout shall be the product of an established manufacturer who has been producing these products for at least five (5) years. Resin shall be supplied in cartridge form and have a shelf life of not less than six (6) months, as dated on the container, and be used within the first three (3) months of the shelf life. Cartridges shall be stored in accordance with the manufacturer's recommendations. Resin used for the anchorage length of the bolt shall have a gel set time of one (1) to two (2) minutes. Resin used to encapsulate the remainder of the bolt length shall have a gel time of fifteen (15) to thirty (30) minutes.
- .5 Cement grout shall be a pre-bagged, non-shrink cementitious product such as “Microsil® Anchor Grout” produced by Basalite Concrete Products, or equivalent as approved by the Departmental Representative. Cement grout shall have a minimum three (3) day and twenty-eight (28) day compressive strengths of 30 MPa and 50 MPa, respectively, when tested in accordance with CAN/CSA A23.2-1B. Equipment for mixing and pumping grout shall be capable of satisfactorily mixing and agitating the grout, and pumping it into the holes at the water/cement ratio recommended by the grout manufacturer. Grouting shall be tremied from the base of the hole to rock face. Cementitious grouts and mortar shall not be warmer than 30°C or colder than 5°C during mixing or pumping.
- .6 Cement mortar levelling pads shall be SIKA 212, or equivalent as approved by the Departmental Representative, and shall be mixed, placed, and cured in accordance with the manufacturer's recommendations.
- .7 The Contractor shall maintain on site a Reserve Supply of anchor accessories and grout such that there are no delays for procurement of materials.

Part 3 Execution

3.1 SUBMITTALS

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

- .2 Anchor Installation Procedure: Prior to ordering anchor materials, the Contractor shall submit an Anchor Installation Procedure for review by the Departmental Representative. The Installation Procedure shall include product information from the anchor hardware and grout manufacturers including their recommended installation procedures, drilling equipment and hole diameter, grouting and tensioning procedures, calibration certificate(s) for anchor testing equipment, and similar information.
- .3 Anchor Installation Records: The Contractor shall submit anchor installation records to the Departmental Representative daily in a format approved by the Departmental Representative. The records shall include, but shall not be limited to, individual anchor reference number, bar length, bar grade/diameter, depth of anchor distal end, proximal extension from face, proximal bar extension behind nut, over-drill depth, grout type, grout temperature, grout volume used, number of spacers used, grout samples taken, lock off load/tension, date/time tested, as-constructed anchor azimuth, dates/time of staged grouting, and date/time completed.
- .4 Driller's Logs: The Contractor shall submit the Driller's Logs to the Departmental Representative within one (1) day after drilling or upon request. The records shall include, but shall not be limited to, details of flush losses/reductions, inferred faults, depth of overburden, hole diameter, rig type, type of flush, water ingress, jamming during drilling, changes in rock type, and other relevant information that may affect the quality of the anchor installation.
- .5 Grout Testing Results: The Contractor shall submit to the Departmental Representative grout testing results, including but not limited to, Compressive Strength Testing within seven (7) days following completion of testing.
- .6 Mill and Galvanizing Certificates: The Contractor shall submit to the Departmental Representative mill and galvanizing certificates in accordance with Section 01 33 00 – Submittal Procedures.
- .7 Calibration Certificates: The Contractor shall submit calibration certificates for testing and tensioning equipment within one (1) day of commencing work on site, including but not limited to, hydraulic jacks, gauges, and torque wrenches.

3.2 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Drill and install rock anchors under the direct supervision of an individual having substantial experience in the installation of resin and cement grouted rock anchors.
- .3 All the rock anchors shall be installed in the presence of the Departmental Representative.
- .4 Hydraulic jacks, gauges, and torque wrenches used for testing and tensioning of rock anchors shall be calibrated by an independent, certified testing laboratory within one (1) year of use.
- .5 Provide the Departmental Representative with any samples of grouting materials that may be requested for quality assurance testing.
- .6 Grout quality control measures shall comprise:
 - .1 Specific Gravity compliance.
 - .1 Apparent viscosity with an ASTM Flow Cone or Marsh Cone.
 - .2 Bleed tests as per CSA A23.2-1B Clause 6.

3.3 PROCEDURES

- .1 Drill holes for each anchor to a uniform diameter recommended by the tendon manufacturers. Completely clean holes of all drill cuttings, sludge, debris, and water using clean water and air. In the case of resin grout the borehole diameter shall be compatible with the bar and the resin capsules used.
- .2 If required, Rock anchors shall be installed with sufficient thread exposed to accept a plate and nut and to facilitate tensioning and testing. Where a plate and nut is not required, rock anchors shall be cut off flush with the rock surface after tensioning and testing, and be covered with mortar coated with drill cuttings. Wet burlap shall be placed over all mortar to aid curing.
- .3 Use commercially manufactured centralizers at intervals not greater than 2 m to keep the bar centred in the hole. Fill the holes with grout by pumping the grout through a delivery line that extends to the lowest end of the hole, while providing a means of venting at the highest end of the hole. Prior to the grout setting, perform testing and tensioning, and attach the bearing plate and nut (if required).
- .4 Installation – Resin Grouted Anchorages. Insert resin cartridges in the hole. The number of cartridges per hole shall be not less than recommended by the manufacturer for the hole length, diameter, and bar size combination. Add additional cartridges as necessary to ensure holes are completely filled with resin. Use at least three (3) fast setting cartridges at the bottom of the hole for anchorage and slow setting cartridges for the remainder of the hole. Mix the resin by inserting the bolt in the hole and rotating it at a uniform penetration rate, rotation rate and duration as recommended by the resin manufacturer. After allowing the fast setting cartridges to set, but at least 10 minutes prior to the gel time of the slower cartridges, perform testing and tensioning, and attach the bearing plate and nut (if required).
- .5 Remove all excess cement grout from rock surfaces.
- .6 Testing: Testing equipment shall consist of a suitably sized hollow core jack, an adjustable bearing truss for aligning the direction of pull with the centreline of the anchor, an extension bar for attaching the jack to the anchor, a hydraulic pump with a gauge, a calibration chart for the ram/gauge combination that provides the applied load directly in kN, and an independently mounted dial gauge for measuring the strain of the anchor under load. Rock anchors for testing will be selected by the Contractor's Geotechnical Engineer and observed by the Departmental Representative. All testing will be undertaken by the Contractor as directed by the Departmental Representative. The Contractor shall supply all necessary equipment and be capable of performing adequate testing as required by the Contractor's Geotechnical Engineer and approved by the Departmental Representative.
- .7 Additional tests shall be performed as directed by the Contractor's Geotechnical Engineer and approved by the Departmental Representative where different rock types or anchor installation conditions are encountered as construction progresses.
- .8 Tensioning of the rock anchors to be in accordance with the Contractor's Geotechnical Engineer with the approval of the Departmental Representative.

END OF SECTION

33 42 36 SPECIAL PROCEDURES REMOTE AVALANCHE CONTROL SYSTEMS

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 The quantity of RACS units that are delivered and stored in accordance with the specifications of this Contract, to a location in Western Canada subject to approval by the Departmental Representative, shall be measured per RACS unit supplied, and shall include all equipment and infrastructure required for avalanche control at each RACS location. Payment will be made under **“Unit Price Item 1 – Design and Supply RACS”**.
- .2 Survey, layout, and transportation of RACS from storage area to the site, construction and assembly of the RACS units and operating system, including supply and install of operating system hardware and software, and linking of the RACS to the Lake Louise and Banff Parks Offices, shall be paid under **“Unit Price Item 2 – Install RACS”**, and shall be inclusive of all costs of labour, materials, permits, licenses, manuals, documentation and equipment to satisfactorily complete this item as specified and in accordance with Section 33 42 36 – Special Procedures RACS.
- .3 Detailed design and submittal of shop drawings in accordance with the plans and specifications shall be considered incidental to **“Unit Price Item 1 – Design and Supply RACS”**.
- .4 Testing and commissioning of the RACS once installed, including the supply and loading of consumables necessary for testing, commissioning and the first year of avalanche control, and helicopter access, shall be paid under **“Lump Sum Price Item 5 – Test and Commission and Provide Staff Training RACS”**.
- .5 Training of Parks Canada staff to operate, resupply, maintain and service the RACS, including the supply of consumables and documentation, and helicopter access, if required, shall be paid under **“Lump Sum Price Item 5 – Test and Commission and Provide Staff Training RACS”**.
- .6 Flying down of the removable component of the RACS and transportation to a location outside the Park, inspection and maintenance after the first winter of operation, storage during the off-season, loading of consumables and transportation from the storage facility to Mt Stephen in Fall 2020, including helicopter use, shall be paid under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.
- .7 Other Work required shall be paid under the following items:
 - .1 Mobilization and demobilization required for the installation of RACS and Storage Facility shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made. No payment for Mobilization or Demobilization shall be made for the design, supply and storage of RACS in accordance with Section 01 25 20.
 - .2 Traffic Control during the survey, layout and construction shall be paid under **“Lump Sum Price Item 2 – Traffic Accommodation”** and shall include all traffic control necessary to safely perform the work.

- .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 LOCATION

- .1 RACS locations are indicated on Figures 1 & 2, the Photo Atlas, and in the KMZ file.
 - .1 The Contractor is responsible for verifying the accuracy of any imagery available from online sources (e.g. Google Earth).

1.3 SCHEDULE

- .1 Work shall be in accordance with Section 01 14 00 – Work Restrictions unless otherwise approved by the Departmental Representative.

1.4 TRAFFIC CONTROL REQUIREMENTS

- .1 The Contractor shall provide traffic control in accordance with Section 01 35 00.06 - Special Procedures for Traffic Control.

1.5 STAGED CONSTRUCTION

- .1 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required, until RACS are complete.

1.6 DESIGN CRITERIA

- .1 The Contractor shall design to ensure minimum effective service life of 25 years.
- .2 The Contractor shall design to ensure all components operate at the environmental range experienced at Mount Stephen, specifically for a location that receives equivalent weather conditions to the proposed sites, as observed in the weather data included in the Contract Documents.
- .3 All materials and components must be designed, constructed and installed in accordance with the following current codes and regulations:
 - .1 National Building Code (Canadian), where applicable
 - .2 Workers Compensation Board regulation (Province of BC), where applicable
 - .3 British Columbia Electrical Code (wiring)
 - .4 WHMIS, where applicable
 - .5 Canadian Radio-television and Telecommunications Commission regulations, where applicable
 - .6 Natural Resources Canada Explosives Regulatory Division regulations, where applicable
 - .7 Transportation of Dangerous Goods regulations, where applicable
 - .8 BC Safety Authority
- .4 All designs and implementations must conform to the requirements of any licenses, permits, registrations or guidelines issued by any Canadian authority having jurisdiction. For details on licensing and permitting requirements, it is the Contractor's responsibility to

contact any authorities directly and to act as agent, once approved to do so, on behalf of Parks in obtaining the necessary permits

- .5 The Contractor shall obtain all relevant permits and licenses, and comply with the Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34), the Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286), the Explosives Act (R.S.C., 1985, c. E-17), any Natural Resources Canada Explosives Regulatory Division regulations and any Worksafe BC requirements at all times. Staging and arming locations and flight paths must be approved by the Departmental Representative prior to flying any consumables.

1.7 PERFORMANCE REQUIREMENTS

.1 General

- .1 Tolerances in fabrication and installation as per Manufacturer's recommendations.
- .2 All RACS supplied and installed under this Contract shall be manufactured by the same supplier. Supplier, make and model of RACS to be submitted at time of bidding.

.2 Detonation

- .1 RACS units must be capable of initiating avalanches in the locations specified in Figures 1 & 2.
- .2 Each RACS unit must installed in such a way as to focus the center of the explosive force on the points indicated in Figures 1 & 2. Payment will be made per RACS unit supplied and installed.
- .3 Individual detonations from the RACS units must produce an explosive force equal to or greater than the explosive force that is characteristic of the detonation of 4 kilograms Net Explosive Quantity above the snowpack or 3.0 cubic meters of gas above the snowpack.
- .4 Explosive charges must be completely biodegradable.
- .5 The Contractor shall include a geophone with each RACS unit to confirm each detonation. Each detonation shall be individually recorded by a detection system and reported to the operator via the installed telemetry system. The Contractor shall ensure the system is capable of reliably detecting exploded and non-exploded charges.
- .6 Non-exploded charges must contain a Recco reflector (or approved equivalent) for tracking.
- .7 The system shall not use military artillery ammunition or bomb tramway methods.
- .8 All explosives shall be tethered to the RACS in such a way as to prevent them from sliding beyond the target area.

.3 Security and Communications

- .1 The entire system, including, but not limited to, all electronic and electrical components, must be operable and remain able to conduct avalanche control during all winter conditions. See Appendix B and Clause 1.8.2, this section.

.2 The system shall allow the operator to establish contact with all RACS units from:

- .1 a single location, safe from snow avalanches, on the existing highway;
- .2 the Lake Louise Warden Office; and
- .3 the Banff Parks Office;

at any time for the purpose of examining the status of the equipment and magazine, determining the state of operational readiness and to initiate detonations. The Contractor will coordinate with PCA to establish their connection.

.3 The system shall include security features in the communications to avoid tampering or unauthorized detonations.

.4 The system shall include alarms and redundancies in case of communications equipment or detonation confirmation failures.

.5 A backup communication system independent of the primary communication system must be installed that provides redundant communications in the event of failure of the primary communication system.

.6 The RACS communications systems must be configured such that they are not susceptible to cyber-attacks (e.g. spam).

.7 The Contractor must provide a secure, password protected, web-based interface, allowing simultaneous, multi-user access (applications such as TeamViewer are not permitted), which unifies data presentation from RACS units. The RACS interface must be a web-based application accessible via the internet on both desktop and mobile devices, scaled appropriately for both and be functional on any operating system (e.g. Windows, Android, iOS, Blackberry).

.8 The Contractor must have technicians available continuously (24/7) during the winter season (November 1 – May 31) for the Contract duration to provide troubleshooting and technical support. If the Contractor cannot resolve the issue remotely, the Contractor must have technical support onsite within 72h.

.9 All data must be hosted and processed by the Contractor, according to PCA requirements. All data is the property of PCA and must be available to PCA at any time upon request. Permission to use PCA's data for any purpose, research or otherwise, or to share PCA's data with any other party, is subject to the approval of PCA.

.10 The Contractor shall supply two tablet devices (diagonal screen measurement must be 8 – 10 inches) for monitoring the data, full versions of all necessary software and hardware licenses and any necessary sim cards and subscriptions (e.g. mobile plan) required for data transfer or communication for the Contract duration.

.4 Installation

.1 The system must be structurally designed for installation in the geological conditions found at the sites as described in the attached BGC Geotechnical Report, and according to any requirements specified by further geotechnical analysis performed at the request of the Departmental Representative or as required by the Contractor's qualified Professional Engineer. The Contractor is

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SPECIAL PROCEDURES

REMOTE AVALANCHE CONTROL SYSTEMS

- responsible for a detailed geotechnical investigation and/or geotechnical testing if required to perform the Work.
- .2 All parts of the system must be treated to inhibit or prevent corrosion or made of material that prevents corrosion.
 - .3 Each device and component must be protected from the effects of lightning.
 - .4 The system components shall be installed on structurally engineered foundations that will provide adequate height to components and structures that are designed to be accessed or to operate above the snow surface.
 - .5 The design and construction of the system must ensure that all installed components are able to withstand and remain fully operational under the effects of natural forces that will be encountered at each location where the components are installed. These forces include, but are not limited to, the effects of avalanche, cornice fall, rock fall, seasonal snow cover, severe riming, frost jacking, snow glide, snow creep and wind loads.
 - .6 The Contractor shall ensure that safety measures are in place for worker access during construction. This includes fall protection and rock fall protection of workers. This is considered incidental to the work and no additional payment will be made.
 - .7 The Contractor shall ensure that safety measures are in place for worker access to all RACS components when snow is not present at the location, and that these comply with industry best practices and BC MoTI – 2012 Standard Specifications for Highway Construction. This includes but is not limited to Fall Protection systems for maintenance access. This is considered incidental to the work and no additional payment will be made.
 - .8 The Contractor shall ensure that all components of the system are protected from rockfall. The design, supply and installation of permanent rock fall protection is considered incidental to the work and no separate payment shall be made.
 - .9 The Contractor shall be familiar with the forces that are to be encountered at all sites where components of the system will be located and shall select locations that will minimize the exposure of workers and equipment to these forces.
- .5 Loading, Operation and Maintenance
- .1 The system shall be designed such that no maintenance or loading of the component which houses consumables and delivers the detonation (hereafter referred to as the removable component) takes place on the mountain. In this context, the removable component does not include the foundation system which is permanently fixed to the mountain.
 - .2 The removable component of the system shall be removable at any time when flying conditions allow without requiring any worker presence on the mountain (ie on the ground, on the RACS units, or suspended from a helicopter or the RACS units).
 - .3 The system shall be designed to prevent snow buildup or riming which may prohibit the removal of the RACS unit during the winter months.
 - .4 An AS350 B2 or Bell 407 (or equivalent) helicopter must be able to transport the removable component of each unit between the staging area and each location indicated in Figures 1 & 2 when flying conditions allow.

- .5 RACS must be able to deliver, as a minimum, 12 detonations at each location indicated in Figures 1 & 2 prior to requiring replenishment of consumables. One successful test detonation must be conducted at each RACS location during commissioning. Up to two test detonations per location will be allowed during commissioning without requiring replenishment. Any additional consumables required to complete a successful test detonation at each location will be replenished at the cost of the Contractor. Any deviation from these numbers shall be subject to approval by the Departmental Representative.
- .6 The Contractor shall supply all consumables required for testing, commissioning and training, as well as all consumables required for the first year of avalanche control, including supply, transportation and loading. Payment shall be made under **“Lump Sum Price Item 5 – Test and Commission and Provide Staff Training RACS”**.
- .7 The Contractor is responsible for removing the removable components of the RACS from the mountain after the first winter and transporting them to a secure storage location outside of the Park. The Contractor is responsible for secure storage of the removable component of the RACS until they are returned to the locations indicated on Figures 1 & 2 in the Fall of 2020. Payment shall be made under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.
- .8 The Contractor is responsible for maintenance of the RACS after the first year of use, including inspection and servicing of the removeable components and inspection of the foundations. Any deficiencies identified by the Departmental Representative within the warranty period will be covered by the warranty and no additional payment will be made. Payment shall be made under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.
- .9 The Contractor is responsible for the supply, transportation, preparation and loading of consumables for the second year of operation (Winter 2020 – 2021). The Contractor will assume 12 detonations will be required for the second year of operation. Any deviation will be subject to the approval of the Departmental Representative. Payment shall be made under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.
- .10 The Contractor is responsible for transportation of the removable component of the RACS from the secure storage location to the staging area, loading of consumables and transportation of the loaded units to their locations on the mountain prior to October 31, 2020. Payment shall be made under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.
- .11 The purchase of any consumables additional to the aforementioned shall be negotiated by Parks and shall be separate to this contract. The Contractor shall be able to supply all consumables required by the system to PCA should Parks request this service.

1.8 DESIGN REVIEW

- .1 Within two weeks of Contract Award, the Contractor shall provide the Departmental Representative with one (1) electronic copy of complete working Drawings, and one (1)

- electronic copy of detailed design calculations. RACS drawings to bear signature and stamp of qualified Professional Engineer registered in Province of British Columbia.
- .2 The Contractor shall verify existing site conditions and ground elevations before preparing foundation Drawings. The Contractor shall submit foundation drawings within two weeks of the first site visit. Foundation drawings and design calculations to bear signature and stamp of qualified Professional Engineer registered in Province of British Columbia, Canada. Contractor to include in this submittal plans for any anticipated rock bolting, scaling and/or blasting.
 - .3 Shop Drawings, the Contractor shall:
 - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit shop drawings of all required consumables (including explosive charges).
 - .3 Ensure each drawing submitted bears stamp and signature of qualified Professional Engineer registered in the Province of British Columbia.
 - .4 Within two weeks of Contract Award, the Contractor shall submit documentation verifying that each of the Design Criteria and the Performance Requirements are satisfied by the proposed system. The Contractor should address each Criteria individually and include drawings or details to verify that the criteria is satisfied. Submittal shall include, but not be limited to, the following information:
 - .1 The maximum number of explosions that can be delivered by the RACS at each location without requiring replenishment of consumables.
 - .2 The equivalent explosive force of each detonation and the type of consumable to be used.
 - .3 The proven environmental operating range of all components.
 - .4 Type of communications systems to be used (primary and back-up).
 - .5 Detailed description of any inspection and maintenance requirements during the system's service life, including estimated costs of this service after the construction Contract ends.
 - .6 Outline of the procurement process for consumables, including a list of suppliers, transportation requirements, permits and licensing, and cost estimates for supply of consumables, including transportation to the staging area from the point of purchase of the consumables
 - .5 The Departmental Representative retains right of final approval for equivalent products and locations.

1.9 STORAGE AND HANDLING OF EQUIPMENT

- .1 The Contractor shall follow storage and handling instructions of RACS supplier.
- .2 The Contractor shall be responsible for any damage that occurs to the systems during storage and no additional payment for repairs shall be made.
- .3 The Contractor shall be responsible for all costs associated with the storage and security of the systems until installation is complete, and no additional payment shall be made. Payment for storage and security of the removable components during the off-season following the first year of operation shall be paid under **“Lump Sum Price Item 4 – Transport, Maintain, Store and Load RACS”**.

1.10 QUALITY CONTROL – TESTING

- .1 All Quality Control testing shall be performed by the Contractor.
- .2 Testing shall be as per approved Manufacturer's and Contractor's Quality Control Plan.
- .3 The Contractor is required to complete all inspections as required by the RACS manufacturer, as recommended by any of the additional system Design Engineers, or as a result of studies carried out as part of the installation of the RACS.

1.11 WARRANTY

- .1 In addition to any other requirement of the Contract, all material and workmanship shall be under warranty for one year after the date of Final Certificate of Completion. All parts, hardware, software, and any other materials supplied and/or installed by the Contractor for a period of 24 months from the date of final acceptance that fail to operate, break, are defective or show unusual wear will be replaced or repaired by the Contractor without charge for material or costs associated with reinstallation. The period of time for initiating rectification of any defects or other condition within the warranty period shall not exceed 96 hours.
- .2 Deficiencies identified under the warranty will be considered rectified after one full winter of successful performance. Any costs associated with warranty repairs are the Contractor's responsibility and will not be paid for under the first year Maintenance Payment Item.
- .3 All workmanship shall be under warranty for two (2) years after the date of the Final Certificate of Completion.

Part 2 Execution

2.1 STAGING

- .1 The Staging Area for this work is within the Mt. Stephen avalanche berm, located at TCH km 93.7, as shown in the Contract Documents. The Contractor will be provided an area approximately 40m by 80m. The Staging Area will be closed for public use, suitable for helicopter operations, and suitable for storage of fuel and support equipment/supplies according to Section 01 35 43. The Contractor is responsible for preparing the Staging Area to the specifications of Clause 2.2 Work Site Preparation, this Section. The designated area will be the laydown for materials receiving and storage during Construction.
- .2 The Contractor shall ensure, through treatment if required, that the staging site does not include any invasive species with the potential of being transported to within the National Parks.

2.2 WORK SITE PREPARATION

- .1 The Contractor shall prepare safe landing areas for the helicopter on the mountain. Installation of any heli pads will be incidental to the work and no additional payment shall be made.
- .2 The Contractor shall assess the work site and staging location for potential hazards including, but not limited to, unexploded charges (ANFO bags and cast primer), loose rock and dangerous trees. Only areas where work is undertaken need be surveyed.

- .3 The Contractor shall scale loose rock from the work site and surrounding as required to protect workers and equipment from rockfall hazard, and provide an adequate rock for rock anchors and foundations (as determined by the Contractor's geotechnical engineer).
- .4 The Contractor shall carry out any necessary access construction, including but not limited to, trail building, access ropes, staging or platforms for workers, and supply of equipment and materials to facilitate RACS construction operations.
- .5 Disturbance to surrounding area shall be kept to a minimum; the Contractor shall remove only trees, vegetation and overburden where RACS are to be installed and at anchor locations in accordance with Section 01 35 43 - Environmental Procedures.

2.3 SUPPLY AND INSTALL ROCK ANCHORS

- .1 If rock joints indicate that stabilization is required to stabilize areas of rock mass prior to RACS installation, the Contractor shall install rock bolts as per Section 31 72 13 and as directed by the Departmental Representative.

2.4 REINFORCED CONCRETE FOUNDATION INSTALLATION

- .1 In accordance with Section 03 20 00.

2.5 RACS ASSEMBLY

- .1 The Contractor shall assemble RACS in accordance with Contractor's Drawings and in accordance with instructions of RACS supplier.

2.6 TECHNICAL ASSISTANCE

- .1 The Contractor shall arrange for qualified and experienced technical representative of RACS supplier to be onsite for initial stage of installation to ensure correct installation procedures. Arrange for a minimum of 2 additional visits during installation or as directed by Departmental Representative. Field report for each visit to be submitted to Departmental Representative.

2.7 TESTING AND COMMISSIONING

- .1 The Contractor shall arrange for qualified and experienced representative of RACS supplier to be on site for testing and commissioning of RACS once installation is complete.
- .2 The Contractor shall submit an outline of the testing and commissioning procedure to the Departmental Representative.
- .3 The Contractor shall arrange a flight for the Departmental Representative and two PCA staff members during testing to confirm successful detonation of all systems.

2.8 TRAINING

- .1 The Contractor shall arrange for qualified and experienced representative of RACS supplier to be onsite for PCA staff training once testing and commissioning is complete.
- .2 The following minimum training is required by the Contractor:
 - .1 Training of up to 8 operational staff members and any other staff required to maintain the systems as designated by PCA, including electronics technicians, radio technicians, and information technologists, resulting in the trainees being

capable of loading, operating and maintaining the RACS correctly, safely and efficiently.

- .2 The Contractor shall include one site visit to at least one RACS location and will provide transportation for trainers and trainees to the site from the staging area.
- .3 The Contractor shall submit a detailed program of the training to be provided that includes but is not limited to:
 - .1 a schedule of training, hours of training that will be delivered
 - .2 topics that training will cover
 - .3 description of training materials/manuals
 - .4 any certifications that are required to operate the equipment

2.9 SUPPORT

- .1 The Contractor shall provide a list of support and service centers for the RACS in Canada, including which centers provide parts, consumables and repairs.

2.10 DOCUMENTATION

- .1 The Contractor shall supply all necessary documentation for the RACS and their supporting software and infrastructure, including but not limited to permits, licenses, maintenance and operation manuals, and shop drawings for all design components, including but not limited to specifications and design drawings for consumables
- .2 Maintenance and Operation Manual
 - .1 The Contractor shall prepare and submit a Maintenance and Operations Manual which will be used during the training of the PCA staff. This manual shall include but is not limited to the following:
 - .1 Equipment models and serial numbers;
 - .2 Procedures for inspections and maintenance;
 - .3 Procedures for operations;
 - .4 Safety requirements;
 - .5 Contact information for replacement parts and consumables;
 - .6 Shop drawings for all consumables;
 - .7 Contact information for service locations;
 - .8 Site access methods and plans;
 - .9 Troubleshooting;
 - .10 Schedules for inspections and maintenance.

END OF SECTION