

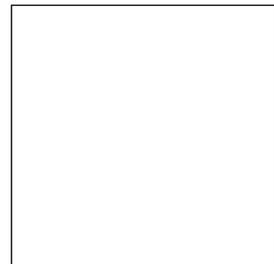


# Glacier National Park, Trans-Canada Highway Slope Remediation Program 2019

Project No. 566-09 – Specifications

## Document Status – **ISSUED FOR TENDER**

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## **SECTION 01 11 00 SUMMARY OF WORK**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Title and description of Work.
- .2 Contract Method.
- .3 Work sequence.
- .4 Contractor use of premises.
- .5 Owner occupancy.

#### **1.2 PRECEDENCE**

- .1 For Federal Government projects, General Conditions take precedence over technical specification sections.

#### **1.3 RELATED SECTIONS**

- .1 All.

#### **1.4 PROJECT LOCATION**

- .1 The project is located in Glacier National Park, British Columbia at various locations along on the Trans-Canada Highway (TCH).
- .2 The following are key locations relative to the project:
  - a. The eastern boundary of Glacier National Park on the TCH is designated as km 0+000, and distances are measured to the west from this point. The following slope sections are on the left or right of the highway relative to the direction of increasing distance.
  - b. Beaver Hill – km 12+097 to 12+992  
Illecillewaet Curve – km 25+952 to 26+279
- .3 Disposal Site Location
  - a. Dispose all Common Excavation materials from this Rock Slope Remediation at km 3.5 (opposite the Eastgate Landslide). The location of this disposal site is shown on the enclosed location figure.

#### **1.5 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 In preparation for and during the Work in Glacier National Park, an “Environmental Protection Plan” (EPP) is to be prepared by the successful Contractor to meet the requirements of Section 01 57 19 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Departmental Representative and Parks Canada’s Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the plan and contract specifications. The EPP will form part of the contract.
- .2 Without limiting the scope of work, the work under this Contract generally comprises the following:
  - a. Rock Scaling, Trimming, Rock Bolting, Common Excavation, hauling debris and excavated materials to disposal site, temporary removal and replacement or relocation of concrete guardrail, and other related works.
  - b. Mobilization and Demobilization of all manpower, equipment, materials, and other resources necessary to execute the Work.

- .c Assess with the Departmental Representative the work to be undertaken at each location.
- .d Manage the project in accordance with Section 01 31 00 – Project Management and Coordination.
- .e Carry out the Work in the order of priority specified, or as determined by the Departmental Representative.
- .f Prepare and submit all required submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .g Responsibility for all aspects of site safety in accordance with Section 01 35 30 – Health and Safety Requirements.
- .h Provide traffic signage and traffic control in accordance with Section 01 55 26 – Traffic Management.
- .i Coordinate work with Parks Canada and other contractors who may be working in the project area. The following work items are known at the time of tender;
  - i. Mounds and Beaver Valley Pond Phase 2, km 0 and 19
  - ii. Culvert works, km 5.5 and 8.1
  - iii. Beaver Valley Access Road Amphibian Crossing, km 11.8
  - iv. Avalanche Detection Network (AND), km 14 – 44
  - v. Snowshed Drainage, km 16 – 20
  - vi. Snowshed Bypass Geotechnical Investigation, km 16 – 20
  - vii. Snowshed Lighting, km 17 – 19
  - viii. Illecillewaet Phase 1A Paving, km 26 and km 18 – 28
  - ix. Cougar Corner Avalanche Mitigation km 31.6 – 32
  - x. Snow Net Repair, km 32
  - xi. Line painting, various locations
  - xii. Other projects and maintenance work may occur along the TCH in 2019

#### CONTRACT METHOD

- .1 Construct Work under the Contract in a Unit Rate Contract.
- .2 Rates for provision of equipment and operators to carry out any additional works or works not explicitly specified herein shall be in accordance with the most recent edition of the BC Roadbuilders and Heavy Construction Association Equipment Rental Rate Guide and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site is to be reimbursed only if equipment is used exclusively for additional work.
- .3 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .4 The Prime Contractor may apply up to 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.

#### 1.6 ACTION REQUIRED BY CONTRACTOR

- .1 The Contractor shall take whatever measures are necessary to protect all existing infrastructure including the surface of the TCH at the worksites.

- .2 The Contractor has checked or is familiar with the Site and understands the extent and details of the work.
- .3 The Contractor has checked or is familiar with the Disposal Site and understands the access conditions and the extent of any work that may be required to facilitate access for disposal of Common Excavation material.

#### **1.7 WORK SEQUENCE**

- .1 Coordinate Progress Schedule to allow Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Conduct the work in the priority order determined by the Departmental Representative.
- .3 Maintain fire and emergency access at all times.
- .4 Work may be started on **September 4, 2019**, weather permitting, and if the pre-submittals as per Section 01 33 00 Clause 1.10.2 are approved by the Departmental Representative.
- .5 Complete all work by **October 18, 2019** (Contract End Date).
- .6 At each work site where there is a requirement for Trimming, priority shall be given to work directly associated with completing Trimming prior to rock bolting, general scaling and other work activities.

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

- .1 The Contractor has unrestricted use of Site, subject to Section 01 14 00 – Work Restrictions, from award of contract and approval of submissions, until the Contract is completed.
- .2 The Department Representative reserves the right to stop work in the event of excessive traffic delays or if excessive dust is impacting driver safety when traffic is flowing. No payment will be due to the Contractor for these stoppages.
- .3 The Contractor shall coordinate use of premises with others under direction of the Departmental Representative.
- .4 The Contractor is responsible for obtaining and paying for use of additional storage or work areas needed for operations under this Contract.
- .5 The Contractor and all Sub-Contractors shall obtain a business license from the Glacier National Park Administration Office prior to commencement of Work on site. Details will be provided at start-up meeting.
- .6 All Contractor's business and private vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from Parks Canada.

#### **1.9 OWNER OCCUPANCY**

- .1 Owner will occupy premises during construction period to execute normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

#### **1.10 OWNER FURNISHED ITEMS**

- .1 Owner will not supply any labour, equipment, or material resources for this project.

#### **1.11 CONSTRUCTION SIGNAGE**

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

- .2 Signs and notices for safety and instruction shall be in both official languages, or utilize graphic symbols. All signs shall be diamond grade and shall conform to the BC Traffic Control Manual for Work on Roadways.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.
- .4 Signage shall be coordinated with other Contractors where necessary.

#### **1.12 SETTING OUT OF WORK**

- .1 Departmental Representative will provide:
  - .a Complete set of Photographs as part of this document.
  - .b Measurements for Payment.
- .2 Contractor shall:
  - .a Allow sufficient time and facilitate site access for Departmental Representative to inspect the work and take measurements for payment. Such inspection may include the use of the Contractors rope access equipment to facilitate locating the work and measurement for payment.
  - .b Discuss and come to an agreement (sign off sheet required) with the Departmental Representative on measurement for payment at the end of each day or completion of work in an area, whichever is more frequent.

#### **1.13 EXECUTION**

- .1 Disposal of Materials from Rock Slope Remediation:
  - .a All materials from rock scaling, trimming and excavation of existing fallen material in ditches in work areas shall be hauled to the Disposal Site as identified by the Departmental Representative, and noted within these specifications (Section 31 23 22 Common Excavation).
  - .b All ditches in work sites where stabilization work is carried out, shall be cleaned and restored to a visually pleasing quality, which includes having side slopes and bottom slopes, as well as preventing the ponding of water, or as directed by Departmental Representative.
  - .c Roadways and sidewalks in work sites shall be cleaned of blasted and scaled rock before motorists and pedestrians are permitted to pass through the work site.
  - .d No extra payment will be made for clean-up of roadway and work site following rock scaling, trimming, and all other project work as it will be considered incidental to project. Ditch clean up and disposal of rock materials are paid under the Common Excavation bid item.
  - .e No extra payment will be made for any Work required to facilitate access to the disposal site. Such work may include but is not limited to clearing an access path, leveling the site, or moving barriers which may be present.
  - .f Dust control at the Disposal Site is required and the Departmental Representative may request the use of a water truck. This is considered incidental to the Common Excavation Unit Price and shall not be measured separately for payment.
- .2 Blasting:
  - .a The Departmental Representative must be provided with proposed blasting plans for review at least 24 hours prior to drilling commencing and must be notified as to where blasts are proposed and how long traffic is proposed to be delayed at

least 48 hours prior to blasting. The Contractor shall be completely responsible for all liaison and coordination with respect to blasting.

- .b Notwithstanding Departmental Representative's approval of blasting methods, the Contractor shall be completely responsible for any damage, which is a direct result of its blasting or other operations.
- .c Prior to blasting the Contractor and the Departmental representative will jointly inspect the road, other infrastructure and other tangible assets (including but not limited to trees, ditches, culverts, pipelines, and railways). This record will be used as the basis to establish if damage has occurred as a result of blasting.
- .d In the event that blasting could or is likely to halt traffic longer than one (1) hour, extended notice will be given of two (2) weeks prior to blasting. Electronic (matrix) signage at the park gates, or other strategic location advising of each blast for a minimum of 1 week prior to blasting may be instructed and is considered to be incidental to the cost of traffic management.

.3 Execution of Work:

- .a Departmental Representative reserves right to order removal from work site, any piece of equipment that is not in good operating condition and the Contractor shall immediately rectify problem or replace faulty equipment with an equivalent unit within 48 hours.

.4 Crew Qualifications:

- .a The Contractor must have a crew and supervisors experienced and qualified in rock scaling as specified, drilling and blasting, rock bolt installation, excavation and disposal of excavated material, and all other work identified herein.
- .b The Project Superintendent shall have at least ten (10) years' experience with rock slope remediation projects involving scaling, bolting and trim blasting. The Project Superintendentshall be dedicated to this project.
- .c The Deputy Project Superintendent shall have at least five (5) years' experience with rock stabilization projects involving scaling, bolting and trim blasting. One (1) of these projectsshall have been in a supervisory role.
- .d The Blast Consultant shall have at least ten (10) years' experience in the design of blasts for rock excavation and trim blasts on slopes for rock stabilization purposes. The BlastConsultant shall have performed blast consultant duties on at least three (3) projects over the last five (5) years. At least one project shall have a trim blast greater than 1,000 m<sup>3</sup>. The blasting consultant shall not be a direct employee or affiliated with the Contractor and shall be registered with a professional body inBritish Columbia.
- .e The Blaster shall be licensed with WorkSafeBC and shall have designed and carried out trim blasts for at least four (4) similar projects in the last five (5) years. At least one of the trim blasts shall have been greater than 1,000 m<sup>3</sup> bank volume.
- .f The Scaling Foreman shall have at least eight (8) years' experience in roped access rock scaling, with foreman duties on at least one (1) rock slope remediation project including supervision of at least six (6) Scalers.
- .g The Scaling Crew shall consist of at least six (6) Scalers with an average (median) of at least **three (3)** years' experience each scaling and working from ropes at heights. The Scaling Crew shall have no more than one (1) Scaler with less than one (1) years' experience.
- .h The Supervisor for Drilling Holes and Installation of Rock Bolts must have at least eight (8) years' experience in the installation of cement grouted bolts.

- .i The Traffic Control Manager must have at least 5 years' experience.
  - .j The Health and Safety Representative must have at least 5 years' site-related working experience specific to activities associated with roadway construction and rope access operations
- .5 Scope and Description of Specific Work Sites:
- .a Work sites are illustrated and described in Appendix A included in contract documents.
  - .b The CP Rail MacDonald Tunnel runs parallel to the Beaver Hill rock face about 100 m into the hillside.
  - .c The quantities of work at different work sites indicated in Appendix A, and summarized in the Unit Price Table, are for estimating purposes only.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

## SECTION 01 14 00 WORK RESTRICTIONS

### PART 1 GENERAL

#### 1.1 PRECEDENCE

- .1 For Federal Government projects, General Conditions take precedence over technical specification.

#### 1.2 RELATED SECTIONS

- .1 Section 01 35 30 – Health and Safety Requirements.
- .2 Section 01 55 26 – Traffic Management.
- .3 Section 01 57 19 – Environmental Procedures.

#### 1.3 EXISTING SERVICES

- .1 Provide for pedestrian, bicycle, vehicular, and wildlife traffic through the work areas for the duration of the construction.

#### 1.4 USE OF THE WORKSITE/LAYDOWN AREA

- .1 Laydown area(s) will be allocated by Parks Canada and shall only be used for purposes of the Work. Laydown area(s) will be made available for the Contractors non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
  - .1 The project laydown area is half of the pull out at approximately km 12+900.
- .2 Parks Canada Agency regulations prohibit anyone working within the Park from using public campground facilities.
- .3 While the Work Site and laydown area are under the Contractor's control, the Contractor shall be entirely responsible for their security. The definition of the Work Site will be taken to mean any place or location the Contractor is working, has personnel (either working or on standby), or has equipment (being used or stored), or any location noted in the annotated photographs.
- .4 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish / trash regardless of source. Snow shall be removed by the Contractor as necessary for the performance and inspection of the Work.
- .5 The Contractor shall provide and maintain at least two (2) portable sanitary facilities (toilets), one at either end of each traffic control area for use by both the Contractor and the Public, in accordance with governing regulations and Environmental Procedures for this project.
- .6 Any damage to the Work Site or adjacent roadways or other existing facilities caused by the Contractor shall be repaired by the Contractor at its own expense.
- .7 The Contractor may work during daylight hours, seven (7) days per week from 06:00 hrs to 22:00 hrs with the following restrictions:
  - .a No work during the period including one day prior to and one day following an Alberta or British Columbia statutory holiday long weekend (e.g. no work on Friday through Tuesday if the holiday falls on Monday).
  - .b No hauling of material during inclement weather.
  - .c Restricted hours for blasting – 07:00 hrs to 15:00 hrs seven (7) days per week.

- .d Traffic closures to facilitate the work shall be limited to 20 minutes and/or traffic lineups of no more than 1 km.
- .e One (1) 60 minute closure is permitted per week between 09:00 hrs and 13:00 hrs Monday through Thursday with seven (7) days' notice.
- .8 The Work may be restricted to accommodate special events within the Park. Parks Canada will provide two weeks' notice of any upcoming restrictions.
- .9 The Departmental Representative reserves the right to stop work in the case of excessive traffic delays during peak travel times.
- .10 Blast induced vibrations shall be lower than those in Specification 31 23 21 Clause 3.5.f

#### **1.5 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS**

- .1 All components of the Work shall be conducted in accordance with Section 01 57 19 - Environmental Procedures, and the Environmental Protection Plan for the project.
- .2 All components of the Work shall be conducted without equipment entering into wetlands or waterbodies.
- .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. Waste materials shall be disposed of in accordance with Section 01 57 19 - Environmental Procedures, and the Environmental Protection Plan for the project.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

#### **1.6 ACCESS TO ADJACENT PROPERTIES**

- .1 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.

#### **1.7 UTILITIES & EXISTING INFRASTRUCTURE**

- .1 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period and shall immediately notify the Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts, and landscaped areas.
- .2 The Contractor shall be responsible for locating and protecting all utilities in the Work Area and for any damage incurred to utilities in the Work Area while occupying site.
- .3 The Contractor shall be responsible for moving (and replacing) signs, concrete barriers, and other infrastructure where feasible to do so, and otherwise protecting all existing infrastructure such as pavement surface, curb, sidewalks and culverts, in the work sites. Contractor shall be responsible for repairing all damage which can reasonably be prevented. Costs of this is considered incidental to the Contract.

## **1.8 PROTECTION OF PERSONS AND PROPERTY**

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafeBC including, but not limited to, the Worker's Compensation Act and the Occupational Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site in accordance with Section 01 35 30 – Health and Safety Requirements.
- .3 The Contractor shall promptly 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.
- .4 'Blast Guards' and overnight security personnel shall not have worked for at least eight (8) hours prior to the start of their shift and shall not work for at least twelve (12) hours after their shift is complete.

## **1.9 USE OF PUBLIC AREAS**

- .1 The Contractor shall ensure its vehicles and equipment do not cause nuisance in public areas. Vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of soil, seeds, and other detritus clinging to the vehicle body and wheels. All vehicles transporting materials to or from the Work Site shall be loaded in a manner that prevents dropping of materials or debris on the roadways. Where contents may 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. The Contractor is required to submit photographs of cleaned equipment prior to the equipment entering the Park. All activities shall be in accordance with Section 01 57 19 - Environmental Procedures, and the Environmental Protection Plan for the project.
- .2 Hauling units running on the TCH are not to exceed legal highway load limits. If the Contractor fails to follow these provisions the Contractor shall pay the cost of any repairs required to the roadway.
- .3 All tracked equipment operating on paved roadways shall be equipped with "Street Pads" to prevent damage to the road surface.

## **1.10 SUPERVISORY PERSONNEL**

- .1 Any changes to the Contractor's Supervisory Personnel must be approved in writing by the Departmental Representative before they begin Work at the Site.
- .2 Crew Qualifications and Experience must remain consistent for the duration of the Work.

## **1.11 MEETINGS**

- .1 The Work includes attending weekly meetings between the Contractor and the Departmental Representative. The weekly meeting may be held at PCA offices at the discretion of the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .2 The Departmental Representative will schedule an initial meeting to be held on site after award notification as per Specification 01 31 00 Part 1.5 and other applicable clauses.

- .3 The Contractor shall assemble its entire site staff for an initial environmental briefing to be conducted by Parks Canada Environmental Safety Officer at initial project start-up. The briefing shall be approximately two (2) hours in duration and held at a time and place agreeable to the Departmental Representative and Contractor. Subsequent environmental briefings will be arranged for new staff arriving on the project.
- .4 Cost of attending the above meetings and briefings shall be considered incidental to the Unit Price items and no additional payment will be made.
- .5 The blast consultant is required to attend the kick off meeting at the start of the project.

#### **1.12 MIXING AND STORAGE OF EXPLOSIVES**

- .1 No site for storage of explosives products will be provided to the Contractor. It is the responsibility of the Contractor to store all explosives products **outside of the Park** in accordance with all federal and provincial regulations. Improper storage of explosives will result in immediate reporting to law enforcement.

#### **PART 2 PRODUCTS**

##### **2.1 NOT USED**

- .1 Not Used.

#### **PART 3 EXECUTION**

##### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## SECTION 01 21 00 ALLOWANCES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

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

#### 1.2 REFERENCES

- .1 General Conditions.

#### 1.3 PRIME COST SUM

- .1 Include in Contract Price a total Prime Cost Sum of \$80,000.
- .2 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with such Prime Cost Sum.
- .3 Prime Cost Sum provided for in the unit price 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 ordered under GC 6.1 of the General Conditions.
- .4 Any additional work must be approved by the Departmental Representative prior to commencement.
- .5 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement for Payment Procedures below.
- .6 Such work may include, but not be limited to: rock scaling, common excavation, rock bolting, trim blasting, supply, removal, and replacement of road barriers, rock mesh and fencing, within Glacier National Park.
- .7 Once a Prime Cost Sum has been agreed upon with Parks Canada Agency, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

#### 1.4 MEASUREMENT FOR PAYMENT

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour and equipment rates as per the following:
  - a. Rental rates will be in accordance with the current British Columbia Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated.
  - b. Vehicles (i.e. Pickup trucks) will be paid either at daily rates as per the British Columbia Roadbuilders & Heavy Construction Association's Guidebook (most recent edition) 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.
  - c. 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.
  - d. Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
  - e. When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.

- f. The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- g. A request for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
- h. 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 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.
- i. The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
- j. 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 working to the contrary
- k. Unless otherwise provided for in the Contract, payment on a Force Account basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.

**PART 2 PRODUCTS**

**2.1 NOT USED**

.1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

## **SECTION 01 25 20 MOBILIZATION AND DEMOBILIZATION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Mobilization and Demobilization.

#### **1.2 RELATED SECTIONS**

- .1 All.

#### **1.3 DESCRIPTION**

- .1 Consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, supplies, shops, offices and incidentals to and from the project sites.

#### **1.4 MEASUREMENT PROCEDURES**

- .1 Payment shall be made under "Lump Sum Price Item 1 – Mobilization/Demobilization".
- .2 60% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
- .3 The Remainder of 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 a condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .4 Mobilization shall include temporary demobilization and remobilization (if required) for the project hiatus and will not be measured for additional payment.
- .5 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 contract has been completed.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 This section includes the requirements for Project Management and Coordination during the Work, including organization and start-up, on-site documents, scheduling, meetings, and submittals.

#### **1.2 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 57 19 – Environmental Procedures.
- .4 Section 01 52 00 – Construction Facilities.
- .5 Section 01 77 00 – Closeout Procedures.

#### **1.3 MEASUREMENT**

- .1 Project Management is considered incidental to the Contract and shall not be measured for payment.

#### **1.4 COORDINATION**

- .1 Co-ordinate progress schedules, submittals, use of site, temporary utilities, construction facilities, construction Work, and Work by others, under instructions of the Departmental Representative.
- .2 The Contractor shall co-ordinate with other contractors and stakeholders working on the site to develop a work schedule agreeable to all parties to carry out the work without interruption.

#### **1.5 CONSTRUCTION ORGANIZATION AND START-UP**

- .1 Within seven (7) days after award of Contract, a start-up meeting is required to discuss administrative procedures, responsibilities, and specific requirements. The 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 attend the start-up meeting. Meeting is to be at a PCA office (time and location to be determined).
- .3 The Contractor's Blast Consultant shall attend the start-up meeting. At this meeting, the location of trim blasts shall be reviewed.
- .4 Start-up meeting agenda will include:
  - .a Appointment of official representatives of participants in Work.
  - .b Schedule of Work and progress scheduling in accordance with Section 01 33 00 – Submittal Procedures.
  - .c Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
  - .d Site safety and security in accordance with Section 01 52 00 – Construction Facilities and Section 01 35 30 – Health and Safety Requirements.

- .e Proposed changes (Contemplated Change Notice - CCN), change orders (CO), approvals required, Confirmation of Verbal Instructions (CVI), Request for Information (RFI), Non-Conformance Reports (NCR), mark-up percentages, time extensions, and other administrative requirements and procedures.
- .f Owner furnished materials.
- .g Monthly progress claims, photographs, and holdbacks.
- .h Closeout procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
- .i Insurances, blasting licenses, and transcript of policies.
- .j Other business.
- .5 All Work shall comply with Departmental Representative's allocation of laydown areas on site for field offices and sheds, for access, traffic, parking, sanitary facilities, and use of temporary utilities and construction facilities.
- .6 The Contractor shall coordinate intra-project communications including submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts through Departmental Representative.
- .7 Coordinate with Departmental Representative to review and layout the proposed work at each site prior to the start of work at that site.

#### **1.6 ON-SITE DOCUMENTS**

- .1 Maintain at job site, one copy each of the following:
  - .a Contract Drawings, Specifications, and Addenda.
  - .b CCN, CO, CVI, RFI, NCR, and other modifications to the Contract.
  - .c Other modifications to Contract.
  - .d Traffic Management Plan.
  - .e Safety Plan.
  - .f WHMIS documentation and all Health and Safety records.
  - .g Environmental Protection Plan (EPP).
  - .h Field test reports.
  - .i Proposed blasting plans and As-built Blasting Records for each blast.
  - .j Copy of accepted Work Schedule and most recent updated schedule in GANTT chart format.
  - .k Labour conditions and wage schedules.
  - .l Applicable current editions of municipal regulations and by-laws.
  - .m Letters and permits for use of dump site(s) as per Section 31 23 22 Clause 3.2.1 (if required).

#### **1.7 SCHEDULES**

- .1 Submit preliminary construction progress schedule in accordance with Section 01 33 00 – Submittals to Departmental Representative coordinated with Owner's project schedule.
- .2 After review, revise and resubmit schedule to comply with revised project schedule.

- .3 Periodically revise and resubmit schedule as directed by Departmental Representative.

#### **1.8 CONSTRUCTION PROGRESS MEETINGS**

- .1 The Work includes attending weekly progress meetings between the Contractor and the Departmental Representative. The weekly meeting may be held at a PCA at the discretion of the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. Senior team members or off-site personnel shall be given the opportunity to attend via phone, satellite phone, internet, or in person as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.

#### **1.9 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit requests for payment for review and transmittal to Departmental Representative.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 Process Change Orders through Departmental Representative.
- .5 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

#### **1.10 CLOSEOUT PROCEDURES**

- .1 The Contractor shall undertake project closeout in accordance with Section 01 77 00 – Closeout Procedures.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## SECTION 01 33 00 SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- .1 Shop Drawings and product data.
- .2 Certificates and transcripts.
- .3 Required Contractor Submittals:
  - .a Pre-mobilization Submittals:
    - i. Schedule.
    - ii. Contractor Chain of Command.
    - iii. Work Plan.
    - iv. Traffic Management Plan.
    - v. Construction Access Plan.
    - vi. Environmental Protection Plan (EPP).
    - vii. Blasting Safety Plan.
    - viii. Emergency Response Protocol.
    - ix. Blasting Plans.
    - x. Health and Safety Plan.
    - xi. Common Excavation Disposal Plan.
    - xii. Rock Bolt Installation Procedure.
    - xiii. Photographs of clean powered equipment.
  - .b Construction Phase Submittals:
    - i. Proposed Blast Designs.
    - ii. Rock Bolt Installation Records.
    - iii. Dump Site permits as per Section 31 23 22 Clause 3.1.2 (when required).
    - iv. Monthly Progress Reports including revised Project Schedule.
    - v. Daily Quantity Sheets.
    - vi. Pre-Construction Condition Surveys.
    - vii. Blasting Consultant Field Report(s).
  - .c Project Completion Submittals:
    - i. Record digital Photographs (CD not prints).
    - ii. As-Built Blasting Records.

#### 1.2 PRECEDENCE

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

### **1.3 RELATED SECTIONS**

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 35 30 – Health and Safety Requirements.
- .3 Section 01 55 26 – Traffic Management.
- .4 Section 01 57 19 – Environmental Procedures.
- .5 Section 01 78 00 – Closeout Submittals.

### **1.4 REFERENCES**

- .1 Not used.

### **1.5 ADMINISTRATIVE**

- .1 Provide submittals to Departmental Representative for review a minimum of twenty (20) days prior to the start of the Work. Failure to provide submittals in ample time is not considered sufficient reason for an extension of Contract Time.
- .2 The Contractual language shall be English. All submittals shall be in English. Documents translated from French or another language shall be acceptable.
- .3 Work affected by a submittal shall not proceed until review is complete.
- .4 Where information is not produced in SI Metric units, converted values by the Contractor are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying any deviations from requirements of the Contract Documents stating reasons for deviations.
- .7 Verify that field measurements and affected adjacent Work are coordinated.
- .8 The Contractor's responsibility for errors and omissions in submissions is not relieved by Departmental Representative's review of submittals.
- .9 The Contractor's responsibility for deviations in submissions from requirements of the Contract Documents is not relieved by Departmental Representative's review.
- .10 Keep one reviewed copy of each submission on site.

### **1.6 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit manufacturers' data sheets for all explosive, rock bolt, concrete guardrail, fencing, and all other products to be incorporated into the Work prior to their use in the Work.

### **1.7 SAMPLES**

- .1 Not used.

## **1.8 MOCK-UPS**

- .1 Not used.

## **1.9 CERTIFICATES AND TRANSCRIPTS**

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

## **1.10 REQUIRED CONTRACTOR SUBMITTALS**

- .1 General:
  - .a This Clause identifies the plans, programs, and documentation required prior to mobilization to site, during the construction phase, and upon project completion.
  - .b The Contractor shall not construe the Departmental Representative's review and authorization of the submittals to imply approval of any particular method or sequence for conducting the Work. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .2 Pre-Mobilization Submittals:
  - .a Submit the following plans and programs to the Departmental Representative for review a minimum of twenty (20) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
    - i. Project Schedule in Gantt chart format detailing milestone dates, schedule of workdays, and manpower required to complete each project activity.
    - ii. List of contact persons on the Contractor's Crew who are available on a 24-hour basis in the event of emergencies.
    - iii. Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.
    - iv. Site Specific Traffic Management Plan, in accordance with the requirements of Section 01 14 00 - Work Restrictions and Section 01 55 26 – Traffic Management.
    - v. Construction Access Plan, which shall include, but not be limited to, procedures for accessing all areas of the Work.
    - vi. Environmental Protection Plan (EPP), which shall meet the requirements of Section 01 57 19 - Environmental Procedures.
    - vii. 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 30 – Health and Safety Requirements.
    - viii. Emergency Response Protocol detailing the Contractor's procedures for management of emergency situations and providing a response plan, protocols, and contact information.

- ix. General Blasting Plan for the work which outlines the proposed types of explosives, delays, detonators, and provide details for drilling, loading, and blasting. Handling and storage practices for explosives products shall be described in detail.
- x. Occupational Health And Safety Program - 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.
- xi. Common Excavation Disposal Plan detailing disposal site location and Ownership in accordance with Section 31 23 22 – Common Excavation.
- xii. Rock Bolt Installation Procedure in accordance with Section 31 23 23 – Rock Bolts.
- xiii. Rock Scaling Procedure and methodology in accordance with Section 31 23 20 – Rock Scaling.
- xiv. Spill Response Plan as outlined in the Environmental Protection Plan.
- xv. Copy of Business Licence for applicable Park(s).
- xvi. Restricted Activity Permit application forms (scaling, blasting, haulage and disposal, and tree felling).
- xvii. Traffic Control Personnel qualifications.
- xviii. Photographs of cleaned powered equipment.

.3 Construction Phase Submittals:

.a Proposed Blast Designs:

- i. Not less than two (2) days prior to commencing work at each trimming location, submit a Proposed Blast Design for that trim location to the Departmental Representative for review in accordance with Section 31 23 21 – Trimming.
  - ii. Typical blast designs for Trimming shall be prepared by or certified by an independent Blasting Consultant retained at the Contractor's expense where directed by the departmental representative, or as detailed within these specifications. For specific blasts where a vibration limit has been imposed on a receptor, the blast designs will be prepared by the blasting consultant. Qualifications of the Consultant are to be reviewed and approved by the Departmental Representative.
- .b Rock Bolt Installation Record in accordance with Section 31 23 23 – Rock Bolts.
- .c Monthly Progress Report updates will be submitted, including an updated schedule.
- .d Daily Quantity Sheet. The Contractor is required to submit a daily quantity sheet for the work.
- .e Traffic log sheets on a daily basis. Each Traffic Control Person shall submit a log as detailed in Section 01 55 26 – Traffic Management.
- .f Pre-Construction Condition Survey. The Contractor shall submit a survey of the pre-existing conditions at each work site prior to undertaking scaling, trimming, or other work that could damage existing infrastructure. The Pre-Construction

Condition Survey shall be in a format acceptable to the Departmental Representative and include digital photos, measurements, and written descriptions as appropriate to document the existing conditions.

- .g Blasting Reports as per Specification 31 23 21 – Trimming (Rock Excavation).
  - .h Work Site Health and Safety Inspection Report (weekly) – Submit weekly in accordance with Section 01 35 30 – Health and Safety Requirements.
- 4 Project Completion Submittals:
- a As-Built Blasting Record - The Contractor shall submit an As-Built Blasting Record for each blast.
  - b Closeout submittals in accordance with Section 01 78 00 – Closeout Submittals.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 01 35 30 HEALTH AND SAFETY REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Health and safety considerations required to ensure that PCA shows due diligence towards health and safety on construction sites, and meets the requirements laid out in PCA/RPB Departmental Policy DP 073 - Occupational Health and Safety - Construction.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 All Sections.

#### **1.4 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .3 Province of British Columbia
  - a Workers Compensation Act.
  - b Occupational Health and Safety Regulations.
  - c Occupational Health and Safety Code, Part 34 –Rope Access

#### **1.5 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan at least twenty (20) days prior to mobilization to site. Health and Safety Plan must include:
  - a Contractor's health and safety policy.
  - b Identification of applicable compliance obligations.
  - c Definition of responsibilities for project safety/organization chart for project.
  - d General safety rules for project.
  - e Job specific safe work procedures and communications plan.
  - f Inspection policy and procedures.
  - g Incident reporting and investigation policy and procedures.
  - h On-Site Contingency and Emergency Response Plans to address standard operating procedures to be implemented during emergency situations.
  - i Occupational Health and Safety meetings.
  - j Occupational Health and Safety communications and record keeping procedures.
  - k Results of site specific safety hazard assessment.

- .l Results of safety and health risk or hazard analysis for site tasks and operation.
- .m Schedule of regular on-site health and safety meetings.
- .n Schedule of regular on-site tool-box meetings.
- .3 The Departmental Representative will review the Contractor's site-specific Health and Safety Plan and provide comments to the Contractor within seven (7) days after receipt of plan. The Contractor shall revise the plan as appropriate and resubmit it to the Departmental Representative within five (5) days after receipt of comments.
- .4 The Departmental Representative's review of the Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 The Contractor shall submit an electronic version or two (2) paper copies of a weekly Work Site Health and Safety Inspection Report prepared by the Contractor's authorized Safety Representative to the Departmental Representative on a weekly basis.
- .6 The Contractor shall submit copies of reports or directions issued by Federal and Provincial health and safety inspectors to the Departmental Representative.
- .7 The Contractor shall submit copies of incident and accident reports to the Departmental Representative within 48 hours of the incident / accident.
- .8 The Contractor shall submit copies of Safety Data Sheets (SDS) to the Departmental Representative.

#### **1.6 FILING OF NOTICE**

- .1 The Contractor shall file Notice of Project with Provincial authorities prior to beginning of Work.

#### **1.7 SAFETY ASSESSMENT**

- .1 The Contractor shall perform site specific safety hazard assessment related to project.

#### **1.8 MEETINGS**

- .1 The Contractor shall schedule and oversee a Health and Safety meeting with the Departmental Representative prior to commencement of Work.
- .2 The Contractor shall hold daily toolbox meetings and biweekly Health and Safety meetings.

#### **1.9 REGULATORY REQUIREMENTS**

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

#### **1.10 PROJECT/SITE CONDITIONS**

- .1 Work at site will involve contact with WCB British Columbia.

#### **1.11 GENERAL REQUIREMENTS**

- .1 Where deficiencies or concerns are noted, The Departmental Representative may alert the Contractor in writing, and may request correction of deficiencies or concerns in a timely manner.

#### **1.12 RESPONSIBILITY**

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

#### **1.13 COMPLIANCE REQUIREMENTS**

- .1 Comply with the Workers Compensation Act and Occupational Health and Safety Regulations of British Columbia.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .3 All rope work shall comply with best practices detailed in the British Columbia Occupational Health and Safety Code, Section 34 –Rope Access.

#### **1.14 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.

#### **1.15 HEALTH AND SAFETY REPRESENTATIVE**

- .1 Employ and assign to the Work, a competent and authorized Health and Safety Representative. The Health and Safety Representative must:
  - .a Have site-related working experience specific to activities associated with roadway construction and rope access operations.
  - .b Have working knowledge of occupational safety and health regulations.
  - .c 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.
  - .d Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .e Be on site during execution of Work and report directly to and be under direction of Site Supervisor.

#### **1.16 POSTING OF DOCUMENTS**

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

#### **1.17 CORRECTION OF NON-COMPLIANCE**

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

- .4 In the event that work is temporarily stopped either by the Departmental Representative, or by a body having jurisdiction, it will not relieve the Contractor of his responsibilities under this Contract. Standby time and all costs associated with a stop work order due to safety considerations, is considered incidental to the contract.

#### **1.18 BLASTING**

- .1 Blasting or other use of explosives is not permitted until approval has been provided by the Departmental Representative.
- .2 Blasting is to be in accordance with Section 01 57 19 - Environmental Procedures, and Section 31 23 21 – Trimming (Rock Excavation).

#### **1.19 POWDER ACTUATED DEVICES**

- .1 The use of powder actuated devices is only permitted after receipt of written permission from the Departmental Representative.

#### **1.20 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.

#### **1.21 SCALING AND ANCHORING**

- .1 Work shall not commence until written authorization has been received confirming that the relevant supervisor's and scaling crew's experience and credentials have been met in the submittals in Sections 31 23 20 - Rock Scaling, and 31 23 23 - Rock Bolts.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

- .1 Not used.

### **PART 4 MEASUREMENT**

- .1 All health and safety requirements are considered incidental to the Contract and shall not be measured for payment.

**END OF SECTION**

## **SECTION 01 52 00 CONSTRUCTION FACILITIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification.
- .5 Resident Departmental Representative facilities requirements.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 Section 01 25 20 – Mobilization and Demobilization.

#### **1.4 INSTALLATION AND REMOVAL**

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

#### **1.5 SITE STORAGE/LOADING**

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

#### **1.6 CONSTRUCTION PARKING**

- .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .3 No camping is permitted on Work Site.

#### **1.7 SECURITY**

- .1 If required by the Contractor, the Contractor shall provide and pay for security personnel to guard the Work, Work Site, and contents of Site after working hours, during holidays, and during extended shutdowns. The Contractor is advised that thefts and some random acts of vandalism to equipment have occurred within the National Park.
- .2 Personnel used for security work shall not work for at least eight (8) hours prior to the start of their shift and not work again on this project twelve (12) hours after their shift ends. Camping trailers are not allowed for security purposes.
- .3 Security personnel shall be dedicated to this task and shall not be undertaking separate or alternative duties other than a Blast Guard.

### **1.8 OFFICES**

- .1 No site office is required to be provided.
- .2 Provide a clearly marked and fully stocked first aid case in a readily available location.

### **1.9 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 Store materials not in use on Site in weatherproof sheds and minimize aesthetic impacts.
- .3 Materials, equipment or other Construction equipment shall not be stored on soft shoulders without the written consent of the Departmental Representative.

### **1.10 SANITARY FACILITIES**

- .1 The Contractor shall provide and maintain a minimum of two (2) portable sanitary facilities (toilets), one at either end of each traffic control area, for use by both the Contractor and the Public, in accordance with governing regulations and Environmental Procedures for this project. These facilities shall be moved as the work progresses from rock face to rock face.
- .2 The facilities noted in Clause 1.10.1 above shall be maintained at least once a week. Consumables replenished as required by the Contractor with no additional cost to the Project.
- .3 Post notices and comply with requirements of the local health authorities. Keep area and premises in sanitary condition.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 01 55 26 TRAFFIC MANAGEMENT**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Informational and Warning Devices.
- .2 Protection and Control of Public Traffic.
- .3 Operational Requirements.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 35 30 – Health and Safety Requirements.

#### **1.4 MEASUREMENT PROCEDURES**

- .1 Measurement will comprise a lump sum payment which will be considered full and complete payment for the preparation and implementation of Traffic Management Plans, for the Contractor to meet the requirements of this section. The Departmental Representative will review that the measures detailed within the Traffic Management Plans are being implemented.

#### **1.5 REFERENCES**

- .1 Uniform Traffic Control Devices for Canada, (UTCD) September 1998 (distributed by Transportation Association of Canada), and subsequent amendments. Manual of Uniform Traffic Control Devices for Streets and Highways, US FHWA, Part IV, 2001.
- .2 Manual of Uniform Traffic Control Devices for Streets and Highways, US FHWA, Part IV, 2009, and subsequent amendments.
- .3 BC Traffic Control Manual for Work on Roadways (1999) and subsequent amendments.

#### **1.6 QUALITY CONTROL**

- .1 All quality control for Traffic Management will be the responsibility of the Contractor.

#### **1.7 GENERAL**

- .1 The Contractor shall develop and implement a Traffic Management Plan in accordance with the requirements of the latest edition of the British Columbia Transportation Standard, except where specified otherwise. The Traffic Management Plan shall be submitted to the Departmental Representative a minimum of twenty (20) days prior to commencement of site work and be accepted by the Departmental Representative prior to commencement of the site work.
- .2 Traffic closures to facilitate the Work shall be limited to 20 minutes and/or traffic lineups of no more than 1 km.
- .3 One (1), sixty (60) minute closure is permitted per week between 12:00 hrs and 14:30 hrs Monday through Friday with seven (7) days' notice.
- .4 Traffic Management Plan shall include special requirements for traffic control during blasting.

- .5 The Traffic Management Plan shall include plans specific to each traffic control location which needs to be established during construction.
- .6 The Traffic Management Plan must specifically address and identify measures to deal with site specific hazards along the TCH including, but not limited to, a sharp corner from km 26+279 to km 27+421, and rock fall hazards at some locations.
- .7 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs and 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.
- .8 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada. All signs shall be "Diamond Grade" reflectivity.
- .9 All speed limits, traffic control and warning signs shall have an 'NPC' adhesive sticker added to bottom right-hand corner. These stickers will be supplied by Parks Canada following the acceptance by the Departmental Representative of the Contractor's Traffic Management Plan.
- .10 The Work shall be staged and/or detour roads provided, with the appropriate controls in place, so that two lanes of highway traffic are maintained through the work zone at all times throughout the construction, except where allowed for under Part 1.11 – Operational Requirements.
- .11 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.
- .12 The Contractor shall keep a written log of all traffic holds during the course of each day on site that shall include time at start of traffic hold, time at end of traffic hold, and explanation of exceedances of time hold limits, if any.
- .13 The Contractor shall supply a Traffic Control Manager with at least five (5) years' experience. Their role will be to confirm traffic line ups comply with other Specification requirements and to relieve the active TCP's if they are required to leave their position.

#### **1.8 PROTECTION OF PUBLIC TRAFFIC**

- .1 Comply with requirements of Acts, Regulations, and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
  - .a Place equipment in position to present minimum of interference and hazard to traveling public.
  - .b Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .c Do not leave equipment on travelled way overnight.
- .3 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of Uniform Traffic Control Device for Canada (UTCD).
- .4 Keep travelled way graded, free of potholes and debris, and of sufficient width to accommodate two 3.7 m wide lanes for traffic, one in each direction.

- .5 As directed by the Departmental Representative, provide paved detours to facilitate passage of traffic around restricted construction area, within the existing paved width of the Highway. In active work zones where the shoulder width has been reduced:
  - .a Traffic barriers shall be provided on both sides of the roadway.
  - .b The reduced speed limit shall be 50 km/hr or less if conditions require a reduced speed limit.
  - .c The Contractor shall provide temporary lighting of the roadway from dusk until dawn throughout the periods where detours are constructed and in use. These lights shall be capable of providing adequate illumination of the work site and detour without blinding drivers of approaching vehicles on the highway. The Contractor shall provide power supply for temporary lighting throughout the construction period.
  - .d The Contractor shall provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc. are in proper working order.
  - .e The Departmental Representative will monitor traffic control measures and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.
- .6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Departmental Representative.
- .7 The Contractor shall maintain a dust free construction zone by means of sweeping and watering when required.

#### **1.9 INFORMATIONAL AND WARNING DEVICES**

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the Traffic Management Plan.
- .3 Place signs and other devices to standards and in locations recommended in BC Traffic Control Manual for Work on Roadways (1999) and subsequent amendments. Provide intermediate signage if work zones exceed 1.0 km in length.
- .4 Signs shall be wind resistant.
- .5 Prior to the commencement of Work, the Contractor is to provide for the Departmental Representative's review, a Detour/Traffic Management Plan outlining signs and other devices required for the project. If the situation on site changes, revise the Plan and resubmit for the approval of the Departmental Representative.
- .6 No Stopping pictorial signs shall be installed at either end of the immediate work zone with end of no stopping zones at the opposite end of the work zone.
- .7 Continually maintain traffic control devices in use by:
  - .a Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .b Removing or covering signs which do not apply to conditions existing from day to day or time to time.

#### **1.10 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent Traffic Control Persons (TCPs), trained in accordance with, and properly equipped as specified in the BC Traffic Control Manual for Work on Roadways (1999) and subsequent amendments:
  - .a When public traffic is required to pass working vehicles or equipment which block all or part of travelled roadway.
  - .b When stoppage of public traffic is required due to rock scaling, blasting, rock bolting, excavation, and other work.
  - .c When it is necessary to institute a 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.
  - .d When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .e Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .f For emergency protection when other traffic control devices are not readily available.
  - .g In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .h At each end of restricted sections where pilot cars are required.
- .2 The Contractor shall provide and equip responsible TCPs for the direction and control of traffic. The Contractor shall ensure that TCPs are instructed in and use proper traffic control procedures appropriate for the prevailing conditions.
- .3 TCPs shall have proof of certification from a recognized training program on traffic control procedures through construction zones. The Departmental Representative will recognize traffic control programs administered by the Alberta Construction Safety Association or BC Road Construction and Maintenance Safety Network, however the Departmental Representative reserves the right to accept or reject certification from any other institute.
- .4 TCPs shall be dressed in safety apparel (coveralls), which meets the Class 3 Level 2 requirements of the BC Traffic Control Manual for Work on Roadways, High Visibility Safety Apparel. Each pair of coveralls shall have a permanent label affixed certifying compliance with Class 3 Level 2 of CSA Z96-02 or equivalent within the BC Traffic Control Manual for Work on Roadways. The colour of the coveralls shall be fluorescent yellow-green with silver retro-reflective striping. The retro-reflective striping shall be a minimum of 50mm wide and shall be sewn onto a 100mm wide fluorescent red-orange background material. TCPs safety apparel must be kept clean and in good condition. Faded, torn and/or dirty coveralls, or coveralls without a CSA certification label, will not be acceptable and shall be replaced by the Contractor at the Departmental Representative's discretion.
- .5 TCPs shall also wear fluorescent orange or fluorescent green hardhats, and shall be equipped with the traffic control paddles.
- .6 TCPs shall be equipped with two-way radios and back up batteries.
- .7 During hours of darkness, TCPs shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with

flashers.

#### **1.11 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:
  - .a Speed limit reduced to 50 km/h in work zones in work periods or slower if site conditions dictate.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 Post construction advisories on the DriveBC website (<http://www.drivebc.ca>) and 511 Alberta (<http://511.alberta.ca>), and update regularly. Updates shall be passed through the Departmental Representative
- .4 Standard traffic hold times shall be as per Specification 01 14 00 Clauses 1.4.7.e and f.
- .5 Emergency vehicles are to be directed through the work site immediately once conditions are safe.

#### **1.12 PAYMENT**

- .1 Payment will be as per the lump sum price in the lump sum price breakdown, prorated over the duration of the Contractor's work schedule.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .2 Not Used.

### **PART 3 EXECUTION**

- .1 Traffic management for the purposes of all aspects of the work including, but not limited to, bulk rock excavation, rock scaling, trim blasting, common excavation, removal and replacement of road barriers, installation of new road barriers, and anchoring shall be undertaken as per this specification.
- .2 If applicable, the Contractor shall work with paving contractors working in the area so that trucks used in hot asphalt operations may, if safe to do so, bypass the line ups to the front of the queue. This shall be coordinated with the paving contractor.

**END OF SECTION**

## **SECTION 01 56 00 TEMPORARY BARRIERS AND ENCLOSURES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 Section 01 55 26 – Traffic Management.
- .2 Section 01 52 00 – Construction Facilities.

#### **1.4 INSTALLATION AND REMOVAL**

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

#### **1.5 HOARDING**

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

#### **1.6 GUARD RAILS AND BARRICADES**

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

#### **1.7 WEATHER ENCLOSURES**

- .1 Not used.

#### **1.8 DUST TIGHT SCREENS**

- .1 Not used.

#### **1.9 ACCESS TO SITE**

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

#### **1.10 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent Traffic Control Personnel, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

#### **1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

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

### **1.12 PROTECTION OF BUILDING FINISHES**

- .1 The Contractor is advised that concrete curbs and sidewalks, light fixtures, architectural stone faced walls, and other infrastructure are present in some of the work areas and shall be protected against damage due to the Work.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 01 57 19 ENVIRONMENTAL PROCEDURES**

### **PART 1 GENERAL**

#### **1.1 PRECEDENCE**

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

#### **1.2 MEASUREMENT PROCEDURES**

- .1 Preparation and implementation of an Environmental Protection Plan in accordance with this Section 01 57 19 – Environmental Procedures will not be measured separately for payment and will be considered incidental to the work.

#### **1.3 SUBMITTALS**

- .1 The Contractor is required to prepare an Environmental Protection Plan (EPP) in accordance with this Section 01 57 19 – Environmental Procedures will not be measured separately for payment and will be considered incidental to the work.

#### **1.4 NATIONAL PARK REGULATIONS**

- .2 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.
- .3 The following permits are required prior to commencement of Work:
  - .1 Business License for Contractor and Sub-contractors.
  - .2 Disturbance of natural objects.
  - .3 Travel in restricted areas (disposal sites).
- .4 All Contractors' vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from Parks Canada.

#### **1.5 ENVIRONMENTAL SURVEILLANCE OFFICER (ESO)**

- .1 PCA will assign an ESO to the project to ensure compliance with the identified environmental protection measures. In addition to the measures identified in these Specifications, the ESO may require other mitigation in response to any unforeseen environmental impacts. The ESO or Departmental Representative may suspend Work that is in non-compliance of these Specifications or additional mitigation measures required by the ESO.

#### **1.6 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)**

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .2 Failure to comply with or observe environmental protection measures identified in these specifications may result suspension of the work pending rectification of the problems.

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

- .1 All staff employed at the construction site will be subject to a briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing, lasting approximately 2 hours, before beginning their work at the

site. Each employee, having received the briefing, will be issued a certification sticker to be displayed on their helmet.

- .2 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 Environmental Surveillance Officer (ESO) through the Departmental Representative.
- .3 The ESO or alternate designated PCA staff member will present the Environmental Briefing.
- .4 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

#### **1.8 CONSTRUCTION SITE ACCESS AND PARKING**

- .1 The Contractor shall review both short and long-term construction access requirements with the Departmental Representative, both at start-up and on an ongoing basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.
- .2 Workers' private vehicles are to remain within the construction footprint.

#### **1.9 PROTECTION OF WORK LIMITS**

- .1 The EPP shall include details of how the Contractor shall mark work limits and procedures that shall be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO. The Contractor shall ensure that the environment beyond the work limits is not negatively affected or damaged by workers' vehicles or construction machinery and shall instruct workers on the defined boundaries.

#### **1.10 EROSION CONTROL**

- .1 Sediment and erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor.
- .2 On-site sediment control measures shall be constructed and functional prior to initiating activities that may generate sediment or deleterious runoff. The EPP shall include an Erosion Control Plan to the satisfaction of the Departmental Representative and ESO.
- .3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control performance.
- .4 The site shall be secured against erosion during periods of construction inactivity.

#### **1.11 HAZARDOUS PRODUCTS AND SPILL MANAGEMENT**

- .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.
- .2 The EPP shall include a list of products and materials to be used or brought to the construction site that are 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, sand blasting agents, and petroleum based products. Hazardous products shall be stored no closer than 100 m from any rivers and their tributaries.
- .3 A Spill Response Plan shall be prepared as part of the EPP and shall detail containment and storage, security, handling, use, and disposal of empty containers, surplus product, or waste generated through use of products outlined in Clause 1.10.2, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable Federal and Provincial legislation.
- .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berm shall be capable of holding 110% of the tank storage volume 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 by methods 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 at all times. 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 their use.
- .7 Timely and effective action shall be taken to stop, contain, and clean up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. If not available, Parks Canada Dispatch shall be immediately contacted at 1-877-852-3100 (emergencies).
- .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.

#### **1.12 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 of the National Park before delivery to the work site. Photographic proof of cleaning is required prior to construction equipment being mobilized to site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres to any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative. Equipment shall be fuelled on hardened surfaces.

- .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. Fueling personnel shall maintain presence at and immediate attention to fueling operations.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times while not used for fueling equipment.
- .5 Equipment used on the project shall be fueled with E10, and low sulphur 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 a National Park.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers, lubricant products, or other potentially deleterious substances shall be stored only in secure locations specified by the Departmental Representative and be secured to ensure they are tamperproof and cannot be drained by vandals. Alternatively, the Contractor may hire security personnel to prevent unauthorized access or damage.
- .9 Overnight equipment shall be parked on spill containment trays, as per Clause 1.13.4
- .10 Noise and air pollution on site from equipment and trucks shall be kept to a minimum by shutting off all motors while not in use.
- .11 Pre and post construction inspections will be conducted of the laydown areas. The Contractor will be responsible for cleaning of all hard surfaces to remove oil/fuel stains.

### **1.13 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 shall enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities.
- .2 When, in the opinion of PCA, 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.
- .3 Vehicle movements shall be restricted to work limits.
- .4 Spill containment trays shall be placed under all equipment when parked, including compressors when in operation. The spill containment trays shall have a minimum

side wall height of 100 mm and be constructed of hydrocarbon resistant material. Tarpaulins and cardboard shall not be used as containment under vehicles or equipment.

#### **1.14 FIRE PREVENTION AND CONTROL**

- .1 A fire extinguisher shall be carried and available for use on each machine and equipment.
- .2 Construction equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented. Smoking or other activities with the potential to cause a fire may be restricted and/or prohibited in some of the work areas at the discretion of the ESO and the Departmental Representative depending on the current fire hazard rating.
- .4 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately. If not available, Parks Canada Dispatch shall be immediately contacted at 1-877-852-3100 and 911 in case of emergencies.
- .5 Fires or burning of waste materials is not permitted.

#### **1.15 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 If necessary, schedule construction activities around important wildlife windows.
- .3 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 behavior or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) shall be exercised at all times.
- .4 Notify the ESO and Departmental Representative immediately about dens, litters, nests, wildlife-vehicle collisions, 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 shall be immediately contacted at 1-877-852-3100.
- .5 Feeding or harassment of wildlife is strictly prohibited.

#### **1.16 RELICS, FOSSILS AND ANTIQUITIES**

- .1 Artifacts, relics, fossils, 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 Glacier National Park 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.

### **1.17 WASTE MATERIALS STORAGE AND REMOVAL**

- .1 The Contractor shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act, applicable provincial regulations, and 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 be kept separate for disposal in separate waste streams where available or required.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere within 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 and recycling site(s) located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers shall have lids, and waste loads shall be covered while being transported.
- .4 The Contractor and workers shall make efforts 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 work in 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 from the National Park and off-site disposal of food scraps, food wrappers, pop cans, domestic waste, and other potential wildlife attractants is mandatory. Existing Parks Canada waste receptacles shall not be used for disposal of such wastes without prior arrangement with PCA.
- .6 The Contractor and workers shall immediately report any circumstances related to food/garbage and wildlife to the ESO or the Departmental Representative. If neither can be reached, the Contractor/worker shall immediately contact Parks Canada Dispatch 1-877-852-3100.
- .7 Sanitary facilities shall be provided and maintained in accordance with Section 01 52 00 – Construction Facilities.

### **1.18 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES**

- .1 The National Park Act regulations prohibit anyone working within National Parks from using public campground facilities.
- .2 Removal and storage of snow shall be the Contractors responsibility and arranged with the ESO and the Departmental Representative.
- .3 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down dry materials and rubbish. Dust control measures for temporary access roads may also have to be initiated.
- .4 Security services at the work site may be desirable or necessary during the contract, especially during quiet times. Fuel tanks or other potentially deleterious substances shall be secured to ensure they are tamperproof and cannot be drained by vandals.
- .5 Pets shall not be brought to or maintained at the construction site.
- .6 Construction access within 30 m of a stream will not be permitted.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 SPECIFIC CONCERNS RELATIVE TO BLASTING AND SCALING**

- .1 Prior to blasting and periodically during scaling, the Contractor shall sweep the work area and maintain a continuous watch for wildlife that may be present. If wildlife are present, work shall be halted until the wildlife have passed through the area or have been hazed out of the area by the ESO or a Park Warden.
- .2 Steps shall be taken to minimize fly-rock and dust.
  - .1 During blasting, trees and other vegetation shall be protected as much as possible by containing fly rock with blasting mats and/or laying charges to direct explosives away from trees.
  - .2 Slopes with particularly dry site conditions shall be sprayed with water to reduce dust.
- .3 Ditches shall be formed and cleaned upon the completion of the work and the natural drainage shall be restored as specified or as directed by the Departmental Representative.
- .4 The Contractor shall describe the proposed type and quantities of explosives to be used to the satisfaction of the Departmental Representative and ESO. Blasting products that may produce high residual nitrogen concentrations (such as ANFO) will not be permitted.
- .5 Blasting shall comply with the standards outlined in DFO's "Guidelines for the use of explosives in or near Canadian fisheries waters" (1998).

### **3.2 SPECIFIC CONCERNS RELATIVE TO EXCAVATING AND PLACEMENT**

- .1 Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location. 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.
- .2 All sediment control measures shall be implemented by the Contractor prior to the commencement of the work in the vicinity of water bodies, watercourses, and wetlands.
- .3 Special precautions must be taken during excavation near intermittent or active drainage channels.
- .4 Fisheries protection windows shall be observed for any watercourse in this contract and will guide the timing of the work so that stream disturbance is prevented.
- .5 If a pump-out sump to dewater excavation sites will be required, the Contractor is to prepare an EPP which details how the dewatering shall be undertaken, to the satisfaction of the Departmental Representative and the ESO. Special attention is to be given to the environmental sensitivity of the discharge area, freezing conditions operation, and overflow avoidance, decanting and settlement pond reclamation.

Water containing suspended materials shall not be pumped into watercourses, drainage systems or on to land, except with the permission of the Departmental Representative and the ESO.

### **3.3 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION**

- .1 The EPP shall include an Erosion and Sedimentation Management Plan for the components of this contract that are undertaken in proximity to watercourses, wetlands or riparian environments. This plan shall be to the satisfaction of the Departmental Representative and ESO. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger. The ponds shall also be designed to handle 1:5 year storm events, with overflow spill capacity for 1:10 year storm events and emergency spillway capacity for 1:100 year storm events. If the ditches are filled with runoff in the spring, such work shall be considered in the fall.
- .2 An important desired end result is to allow no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are <250 mg/L, or a maximum instantaneous increase of 10% over background levels when background levels are >250 mg/L. This threshold shall not be exceeded.

### **3.4 SPECIFIC CONCERNS RELATIVE TO PROJECT WORK SITE(S)**

- .1 For the work in Glacier National Park, the Contractor is advised that the Illecillewaet River is situated adjacent to the TCH throughout the work area and that manholes and storm water catch basins may drain directly to the creek in some areas. The Environmental Protection Plan for this project shall provide details of the methods the Contractor shall employ to prevent sediment from entering Illecillewaet River.

**END OF SECTION**

## **SECTION 01 74 23 CLEANING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Progressive cleaning.
- .2 Final cleaning.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTION**

- .1 Section 01 57 19 - Environmental Procedures.
- .2 Section 01 77 00 - Closeout Procedures.

#### **1.4 MEASUREMENT**

- .1 Cleaning is considered incidental to the Contract and will not be measured for payment

#### **1.5 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by the Owner, the Public, or other Contractors.
- .2 Roadways and sidewalks in work areas shall be thoroughly cleaned with a power broom to remove all loose soil and rock material at the end of each work day.
- .3 Remove all padding and blast material after a blast so that excessive dust, as determined by the Departmental Representative, is not released by traffic.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials in the Park.
- .5 Clear snow and ice from access to work areas during active construction periods and to maintain access to environmental protection facilities outside active construction times.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Provide on-site bear proof containers for collection of waste materials and debris.
- .8 Remove waste material and debris from site at end of each working day.
- .9 Dispose of waste materials and debris off site in approved facilities.
- .10 Store volatile waste in covered metal containers, and remove from premises at end of each work day.
- .11 Do not burn waste materials in any of the Parks.
- .12 Provide adequate ventilation during use of volatile or noxious substances.
- .13 Pre- and post-construction surveys will be conducted of the laydown areas. The Contractor shall be responsible for cleaning of all hard surfaces to remove oil/fuel stains.
- .14 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

- .15 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.

**1.6 FINAL CLEANING**

- .1 When Work is Substantially Complete, 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 PCA or other Contractors.
- .4 Inspect finishes, and ensure specified workmanship and operation.
- .5 Remove dirt and other disfiguration from exterior surfaces.
- .6 Sweep and wash clean paved areas.
- .7 Clean drainage systems.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 01 77 00 CLOSEOUT PROCEDURES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Administrative procedures preceding preliminary and final inspections of Work.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 Section 01 74 23 – Cleaning.
- .2 Section 01 31 00 – Project Management and Coordination.
- .3 Section 01 78 00 – Closeout Submittals.

#### **1.4 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. Once the Contractor's Inspection is complete:
  - .a Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .b 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: The Contractor shall submit a written certificate that the following have been performed:
  - .a Work has been completed and inspected for compliance with Contract Documents.
  - .b Defects have been corrected and deficiencies have been completed.
  - .c 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**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

## **SECTION 01 78 00 CLOSEOUT SUBMITTALS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

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

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

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

#### **1.4 AS-BUILTS AND SAMPLES**

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
  - .a Contract.
  - .b Specifications.
  - .c Addenda.
  - .d Change Orders and other modifications to the Contract.
  - .e Field Test Records.
  - .f Inspection certificates.
  - .g Manufacturer's Certificates.
- .2 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.
- .3 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .4 Keep record documents and samples available for inspection by Departmental Representative.
- .5 All Documents included in this Specification shall be submitted to the Departmental Representative prior to Demobilization.

#### **1.5 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of Drawings and site photos are required.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Specifications: legibly mark each item to record actual construction, including:
  - .1 Changes made by Addenda and change orders.

**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**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SECTION 31 23 20 ROCK SCALING**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Scaling requirements.
- .2 Submittals.
- .3 Execution.

#### **1.2 PRECEDENCE**

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

#### **1.3 RELATED SECTIONS**

- .1 Section 01 55 26 – Traffic Management.
- .2 Section 01 35 30 – Health and Safety Requirements.
- .3 Section 31 23 21 – Trimming (Rock Excavation).
- .4 Section 31 23 22 – Common Excavation.
- .5 Section 31 23 23 – Rock Bolts.

#### **1.4 DEFINITIONS**

- .1 Scaling: Removing loose soil, rock, and overburden from up to 5 m behind the crest of the slope, the slope face, and benches on the slope. Scaling also includes felling and removing trees and brush, use of hydraulic jacks and compressed air bags, and pulling down larger rocks with wire rope attached to equipment on the highway.
- .2 Hand Scaling: Scaling done by hand working from a fall restraint or work positioning system and using suitable hand tools and powered equipment.
- .3 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, hydraulic breaker, or rack system.

#### **1.5 MEASUREMENT PROCEDURES**

- .1 Scaling will be measured as 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 work area, including standby for passing traffic. Time spent accessing scaling areas, maintaining equipment, or carrying out work using tools or methods that are not best suited to a particular situation will not be measured for payment.
- .2 Payment for Scaling will be made at the Contract Unit Price per hour for Scaling, which shall be full compensation for supplying all material, labour, and equipment to execute the Work as specified, including timber and brush disposal, and other overhead costs.
- .3 Cleanup, disposal and / or storage of materials from rock scaling, trimming, and excavation of existing fallen materials in ditches in the work areas will be paid separately under the Common Excavation bid item.

- .4 Protection of infrastructure shall be considered incidental to scaling and all other unit price work items. Cleanup and removal of scaled material from the roadway and adjacent areas is incidental to Scaling.
- .5 Repair or replacement of all infrastructure damaged by scaling operations, to the satisfaction of the Departmental Representative, shall be at the Contractor's expense.
- .6 Removal and replacement of concrete barrier sections will be measured under Section 34 71 43 – Concrete Barrier Clause 1.4.1.
- .7 Set up time for all activities working with airbags and running of compressors shall be considered incidental to the work.
- .8 Use of the two way radio is considered incidental to Scaling and shall not be measured for payment.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used

## **PART 3 EXECUTION**

### **3.1 SUBMITTALS**

- .1 Pre-Construction Condition Survey: The Contractor shall submit to the Departmental Representative, not less than one day before the commencement of Work at each work area, 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.
- .2 Prior to the commencement of Scaling, the Contractor shall provide the Departmental Representative with a Work Plan/Procedure which details measures the Contractor shall implement to protect any existing utilities and infrastructure which may be impacted by scaling or other construction activities.

### **3.2 REQUIREMENTS**

- .1 The Contractor shall provide an experienced scaling crew that consists of a supervising scaling foreman with experience. The scaling crew shall not have more than one (1) scaler with less than one (1) years' experience at any time. The scaling crew size and experience shall be maintained at all times until the completion of all work above the highway grade.
- .2 Where scaling activities may impact upon any 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, guardrail and similar infrastructure. The Contractor shall be completely responsible for all damage that is a result of 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 rocks 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 Contractor shall supply a front end wheel loader (CAT 966 or equivalent) equipped with a flat blade for removal of rock and debris from the pavement surface. This loader shall not utilize fluid filled tires as counterweights.
- .5 The scaling foreman and at least one other scaler on the slope shall have a 2-way radio for communication with supervisory/traffic control personnel at the highway grade.
- .6 The Departmental Representative shall be given a two way radio on the same channel as the Traffic Control Personnel, Scaling Foremen, and the Project Superintendent.

### **3.3 EXECUTION**

- .1 For each slope section, scale areas shown on the photographs and as directed by the Departmental Representative.
- .2 Trees and brush shall only be removed as directed and approved by the Departmental Representative or ESO.
- .3 Scaling shall be carried out using the most appropriate and effective tools and methods for any given situation as directed by the Departmental Representative.
- .4 Any construction access on the slope including but not limited to trail building, installing access ropes, mid height anchors for belaying, ladders, and tree and brush removal to facilitate access to the designated scaling areas shall be considered incidental to work and all shall be removed upon completion of the work.
- .5 All rope work shall comply with best practices detailed in the BC Construction Safety Network scaling operations guidelines and applicable WorkSafe BC regulations.

**END OF SECTION**

## SECTION 31 23 21 TRIMMING (ROCK EXCAVATION)

### PART 1 GENERAL

#### 1.1 PRECEDENCE

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

#### 1.2 RELATED SECTIONS

- .a Section 01 57 19 - Environmental Procedures.
- .b Section 31 23 20 – Rock Scaling.
- .c Section 31 23 22 - Common Excavation.
- .d Section 34 71 43 - Concrete Barrier.

#### 1.3 DEFINITIONS

- .a Blasting Consultant: A consultant with expertise in blasting and non-explosive rock excavation who is independent of the Contractor and retained by the Contractor to provide blasting design and quality control functions as specified herein. The Blast Consultant must be registered with an applicable professional organization in British Columbia such as EGBC or approved alternate.
- .b Blaster: A licensed blaster with WorkSafe BC who holds a current Surface Blaster, First Class endorsement (formerly identified as Urban Blasting).
- .c Controlled Blasting: The use of blasting methods designed to prevent rock damage or overbreak beyond the Limits of Excavation, provide adequate fragmentation, and prevent damage to infrastructure from vibrations, fly rock, or falling rock. Unless otherwise authorized by the Departmental Representative, Controlled Blasting requires that:
  - a. Blast holes shall not exceed 8 m depth.
  - b. “Buffer Blasting” shall be used with appropriate delays between successive rows of blast holes where there are more than two rows of holes.
  - c. Pre-shear blasting should be anticipated.
- .d Bulk Blasting: The removal of large volumes of rock from a cut slope. Drilling is typically undertaken using a track-mounted drill rig.
- .e Trim Blasting (Trimming): Usually instructed on a case by case basis and comprises the removal of potentially unstable rock material from the face of a rock slope that is too large to be removed by scaling using controlled blasting techniques. Drilling is often completed using plugger drills with operators suspended on ropes.
- .f Backline Holes: The line of holes drilled along the backslope of the limit of excavation.
- .g Production Holes: Holes within the limit of excavation that are not backline holes.
- .h Cushion Blasting: A blasting method where holes drilled along the final excavation backslope (i.e., backline holes) are detonated after production holes have been detonated.

- .i Pre-Shear Blasting (or Presplitting): A blasting method where holes drilled along the final excavation backslope are detonated in advance of the production holes to create a fracture line along the limits of excavation.
- .j Buffer Blasting: A line of holes located nearby and parallel to the backline holes to prevent damage beyond the limits of excavation.
- .k Fly Rock: Fragmented material (typically fragments of rock) that is thrown during blasting.
- .l Vibration Monitoring: The use of a seismograph to record blast induced ground movements.
- .m Stemming: Inert material placed in a drill hole on top of the explosives to contain the explosive gases.
- .n Limits of Excavation: Surfaces forming the required extent of excavation (i.e., the extents within which rock will be removed) shown on photographs/drawings or as directed by the Departmental Representative.
- .o “Half-Barrels”: Remnants of a borehole left on the final face.
- .p Half Barrel Area: Area on the final face where one or more half barrels exceed 4 m<sup>2</sup> as measured from the outside limits of each borehole to adjacent boreholes. Half barrels within 5 m of another half barrel area shall be not considered part of the same Half Barrel Area.
- .q Design Line: The final surface of the rock face as shown on the Design Drawings.
- .r Underbreak: Material remaining on the final face that causes the excavation not to reach the Limits of Excavation.
- .s Overbreak: Additional excavation beyond the Limits of Excavation.

#### 1.4 MEASUREMENT PROCEDURES

- .a Trimming will be measured as the in-situ “bank” volume of rock excavated, based on measurements agreed upon by the Departmental Representative and the Contractor before drilling commences on each trim. Over excavation and overbreak beyond the Limits of Excavation, and secondary breaking of oversize material resulting from Trimming will not be measured for payment.
- .b If the trim is expected to be smaller than or equal to 499 m<sup>3</sup>:
  - a. The trim shall be measured on site by the Departmental Representative and be agreed upon with the Contractor prior to the trim being undertaken.
- .c If the trim is expected to be larger than or equal to 500 m<sup>3</sup>:
  - a. The trim shall be measured through survey. The Departmental Representative will organize a third party to survey the blast prior to any work being undertaken by the Contractor. This survey will act as a guide to determine final face and volumes of rock excavated. The Departmental Representative reserves the right to resurvey the face once the blast debris has been removed to confirm the required volume of rock has been removed.
  - b. The blast consultant shall be present.
- .d Payment for Trimming will be made at the Contract Unit Price per cubic metre (m<sup>3</sup>) of rock trimmed. The tendered unit price shall be full compensation for supplying all material, labour and equipment to execute the work as specified.

- .e Payment for Trimming will not be made until all related submittals have been received and approved by the Departmental Representative.
- .f Each Blasting Consultant Site Visit of a minimum of eight (8) hours and maximum of two (2) days on site will be measured as one (1) Site Visit. Payment for each Site Visit will be made at the Contract Unit Price which shall include all hourly and disbursement costs associated with travel, accommodation, costs incurred on site, reporting and administration.
- .g The Blast Consultant is required on site at the discretion of the Departmental Representative for the initiation of sensitive trim blasts. Only Site Visits requested by and approved in advance in writing by the Departmental Representative will be measured for payment.
- .h If the Contractor requires the Blast Consultant to remain on site for additional time all disbursements and hourly charges shall be included in the lump sum rate and additional charges will not be measured for payment.
- .i The Blast Consultant shall remain on site until all the material in the trim has been removed from the slope unless released by the Departmental Representative in writing.
- .j Clean up and disposal of materials produced by rock scaling and trimming will be paid separately in accordance with Section 31 23 22 - Common Excavation.
- .k Rock Scaling or temporary support to facilitate access to trim locations and performance of Trimming, and Scaling of the trim area and the slope below the trim area to remove all loose rock produced by Trimming shall be incidental to Trimming.
- .l Preparation of submittals and engaging a Blast Consultant to prepare and/or certify Proposed Blasting Plans is considered incidental to Trimming.
- .m Protection of infrastructure and removal of trimmed material from the roadway and adjacent areas is considered incidental to Trimming.
- .n If the Contractor fails to follow their Blast Design and the slope remains in an undesirable condition following Trimming, all remedial measures necessitated by improper blasting as determined by the Departmental Representative shall be at the Contractor's expense.
- .o The as-built blast report comprises 5% of the total value of the trim.

## **PART 2 PRODUCTS**

### **2.1 TYPES OF EXPLOSIVES AND ACCESSORIES**

- .a Bulk ammonium nitrate and fuel oil (ANFO) type explosives shall not be used.
- .b Where there is a danger of initiation system cut-offs, detonators and delay elements must be of a type that includes down-hole delays (e.g. Handidet) to prevent cut-offs.
- .c Non-explosive rock excavation products shall be produced by a recognized manufacturer.

## **PART 3 EXECUTION**

### **3.1 SUBMITTALS**

- .a Pre-Construction Condition Survey: The Contractor shall submit to the Departmental Representative, not less than two (2) days before Trimming, a Pre-Construction Condition Survey of all infrastructure in the area that might be subject to damage. The format of the survey shall be acceptable to the Departmental Representative.
- .b Proposed Blast Design: Not less than two (2) days prior to commencing work for each trim location, submit a Proposed Blast Design for that trim location to the Departmental Representative for review. The Proposed Blast Design shall be in a format acceptable to the Departmental Representative and include as a minimum the following information:
  - .a Site kilometre location and Station limits of proposed Trimming.
  - .b Plan and cross section sketch drawings of proposed trim showing the free face, drill pattern (burden and spacing), dimensions, estimated volume, and calculations for maximum charge weight per delay.
  - .c Diameter, inclination, orientation, depth, and number of drilled holes.
  - .d Loading diagram showing type and amount of high explosive or non-explosive products, powder factor, initiators, and depth of stemming for each type of blast hole.
  - .e Initiation sequence for blast holes including delay pattern and delay times.
  - .f Manufacturer's data sheets for all explosive and non-explosive products, delays and initiation systems to be used.
  - .g Methods of protecting existing infrastructure that shall be employed.
  - .h Proposed time and date of blast.
- .c As-Built Blasting Record: Not more than one (1) working day after completing work at each trim location, submit an As-built Blasting Record to the Departmental Representative. The As-built Blasting Record shall indicate all deviations from the Proposed Blast Design, the actual date, time, and duration of Trimming, and identify any known or suspected damage, traffic delays, or other problems which may have resulted from Trimming.
- .d Blasting Consultant Field Report: Within three (3) days following each Site Visit, the Contractor shall submit a Field Report prepared by the Blasting Consultant. The Field Report shall document observations and recommendations made by the Blasting Consultant and consist of 2 to 4 typed pages plus relevant photographs, SDS, technical data sheets, and drawings.
- .e Blasting plan submittals are for quality assurance and record keeping purposes. Review of the Proposed Blast Designs by Departmental Representative shall not relieve Contractor from responsibility for accuracy and adequacy of the designs when implemented.

### **3.2 QUALITY CONTROL**

- .a Proposed Blast Designs for Trimming shall be prepared by the licensed Blaster who will directly oversee the Trimming, or by the Blasting Consultant.

- .b The Blasting Consultant shall have substantial experience, including experience with non-explosive rock excavation methods. Qualifications of the Blasting Consultant shall be subject to approval by the Departmental Representative.
- .c The Blasting Consultant shall make an initial Site Visit prior to any Trimming to inspect the Trimming areas and advise on Trimming methods and measures necessary to protect infrastructure and the environment. The Departmental Representative may require the Blasting Consultant to make subsequent Site Visits during the course of the work.
- .d The Blaster shall be licensed with WorkSafeBC, and shall have designed and carried out trim blasts for at least four (4) similar projects in the last five (5) years. At least one of the trim blasts shall have been greater than 1,000 m<sup>3</sup> bank volume.
- .e The Blaster shall directly oversee the drilling, loading, and detonation of all blasts.
- .f The Contractor shall not commence drilling or other work on a trim blast until the Blast Design has been submitted to and reviewed by the Departmental Representative.
- .g The Contractor shall provide at least four (4) hours between the completion of drilling and start of loading to permit the Departmental Representative to measure the length of holes, dimensions of the blast, and perform other quality assurance tasks.

### **3.3 GENERAL REQUIREMENTS**

- .a The Contractor shall provide a front end wheeled loader (CAT 966 or equivalent) equipped with a flat blade for removal of rock and debris from the pavement surface. This loader and other Construction Equipment shall be capable of placing all required infrastructure protection and clearing the pavement of blast debris within the allotted time window.
- .b The Contractor shall provide blasting mats and all other supplies, labour, and equipment necessary to control flyrock and protect existing infrastructure during the work.
- .c The contractor shall obtain all necessary permits from, and shall comply fully with the laws, rules and regulations of Municipal, Provincial and Federal agencies in connection with the use, transport, storage and safe handling of all explosives. The contractor shall be familiar with the Industrial Health and Safety regulations published by the Worker's Compensation Board of the Province in which the site is located.
- .d Explosives and all detonating apparatus shall be stored in a magazine in accordance with the requirements of all Federal or Provincial inspectors having jurisdiction, and the requirements of the Explosives Act (Canada), R.S.C. 1985, as amended, and any applicable Municipal By-laws.
- .e Blasting shall only be conducted after the Departmental Representative has received the Certificates of Insurance required by the Contract Documents. The Certificates shall verify that the Blaster's General Liability and Property Damage Coverage contain no specific exclusions for Work related to Blasting.
- .f The Blaster shall bear full responsibility for ensuring that all Blasting Operations are conducted in a satisfactory manner and in accordance with these specifications. The Departmental Representative's review of the Blasting Plan shall in no way relieve the Blaster from this obligation, nor shall the Engineer assume any responsibility for the adequacy of the Blasting to achieve adequate breakage or acceptable results.

- .g The Blast Consultant is required to attend the kick off meeting as per Specification 01 31 00 Part 1.5.

### **3.4 ENVIRONMENTAL REQUIREMENTS**

- .a Due to the sensitive nature of the infrastructure and environment in Glacier National Park, trimming in some areas may not be allowed and may be deleted from the project scope, and/or the scope and type of Trimming may be amended to satisfy environmental protection requirements.
- .b Use pneumatic chippers and/or an excavator mounted hydraulic rock breaker to remove all drill hole traces in the final excavation surfaces produced by trimming to the satisfaction of the Departmental representative and ESO (Environmental Surveillance Officer). Removal of drill hole traces shall be incidental to Trimming.
- .c Dispose of waste materials as specified in Section 01 57 19 - Environmental Procedures.

### **3.5 EXECUTION**

- .a Trimming shall be performed prior to other specified work such as scaling or rock bolting where this work may be adversely impacted by Trimming.
- .b Supply, place and remove protective measures for roadways and all other infrastructure that might be damaged by Trimming. Protective measures shall include but not be limited to; granular padding material to protect roadways, timbers or blasting mats to prevent flyrock or protect structures, and temporary removal of infrastructure at risk. The Contractor shall repair or replace any and all damage caused by Trimming at its own cost.
- .c Trimming shall be scheduled and coordinated with all stakeholders including but not limited to Parks Canada, the Departmental Representative, other Contractors in the area, utilities, and local businesses in compliance with traffic control and blasting related provisions of the specifications.
- .d Following Trimming, the slope shall be scaled to provide a sound rock surface in the trim area and to remove all loose rock and debris caused by Trimming.
- .e Where possible contamination of excavated rock with organic material shall be minimized.
- .f The blasts shall be designed to limit blast induced vibrations to be less than 50 mm/s at any CP Rail infrastructure.

**END OF SECTION**

## SECTION 31 23 22 COMMON EXCAVATION

### PART 1 GENERAL

#### 1.1 RELATED SECTIONS

- .1 Section 01 55 26 –Traffic Management.
- .2 Section 31 23 20 – Rock Scaling.
- .3 Section 31 23 21 – Trimming (Rock Excavation).
- .4 Section 01 35 30 – Health and Safety Requirements.

#### 1.2 DEFINITIONS

- .1 Common Excavation consists of excavation, hauling, and disposal of scaled and trimmed materials, and pre-existing loose rock and soil material from highway ditches and adjacent slope areas as shown on the photographs and as directed by the Departmental Representative. Common Excavation may include rock fragments up to 1.5 m<sup>3</sup> in volume as well as weak or fractured rock that can be removed with moderate effort with a 15 tonne excavator equipped with a rock bucket.
- .2 Common Excavation materials also includes timber, brush, and organic materials, but shall be separated from inorganic material where practical. Snow and ice are not considered to be common fill.

#### 1.3 MEASUREMENT PROCEDURES

- .1 Common Excavation will be measured to the nearest cubic metre as the volume of material excavated, loaded, and hauled to the disposal site(s) as measured in one stockpile. The tendered Unit Price shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.
  - .a Interim measurements and payment will be made at the Contract Unit Price per cubic metre of material hauled to the Disposal Site, measured as per Clause 1.3.3 below.
  - .b The stockpile does not require compaction. However, during the process of the work any compaction caused shall be incidental to the unit rate and no bulking or swell factor shall be applied.
  - .c Final payment will be based on final survey of the Dump Site and interim quantities will be adjusted accordingly.
- .2 Where practical, at the discretion of the Departmental Representative, large/bulk organic material should be segregated from inorganic materials at source. Or segregated at the Disposal Site as directed by the Departmental Representative.
- .3 The Departmental Representative will measure the volume of each haul truck for interim payment based on:
  - .a Physical dimensions of the truck box measured up to the base of batter boards, or if there are no batter boards, the physical dimensions that would provide a freeboard of at least 300 mm with a level load.
  - .b An adjustment factor (percentage of the physical dimensions) to account for partial or non-level loading based on random measurement of five percent (5%) of loaded trucks.

- .c The Departmental Representative reserves the right to alter the agreed volumes of the trucks if the trucks haul less than full loads.
- .4 At the start of the work the Contractor and Departmental Representative will inspect the disposal site. At the end of the work, final payment, and an adjustment to the interim payments for common excavation, will be made based on a survey or measured volume of the spoil piles dumped from trucks at the designated disposal site(s).
- .5 Haul truck Operators shall submit a haul ticket for each load to the Departmental Representative or an individual designated by the Departmental Representative prior to taking each load off site. Each ticket shall contain the load time, haul time, dump time and any waiting times. Failure to do so will result in the load not being measured for payment.
- .6 Over excavation beyond the limits shown on the photographs or as directed by the Departmental Representative will not be measured for payment.
- .7 The grading of stockpiles, clean up, and stockpile maintenance, the grading of excavation areas, and all costs related to use of the Disposal Site are considered incidental to Common Excavation.
- .8 Excavation, removal, stockpiling, clearance of snow or other frozen materials are not considered to be measurable items.
- .9 Any costs relating to Restricted Activity Permits is considered incidental to the Contract and shall not be measured for payment.

#### **1.4 WASTE MANAGEMENT**

- .1 Separate and recycle waste materials in accordance with Section 01 57 19 - Environmental Procedures.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 DISPOSAL SITES**

- .1 The designated disposal site is shown in Figure 1.
  - .a East Gate Landslide – TCH km 3.5 (right hand side of Trans-Canada Highway).
- .2 If the Owner specifies a different disposal site (other than the disposal site in Clause 3.1.1.a), the differential cost shall be applied to the Contract using the appropriate rate under the latest addition of the BC Roadbuilders and Heavy Construction Association Equipment Rental Rate Guide for vehicles travelling at 60 km/h and drawn against the Prime Cost Sum as per Section 01 21 00 - Allowances.

#### **3.2 SUBMITTALS**

- .1 Should the Contractor wish to use an alternative disposal site then they will provide the Departmental Representative with a Common Excavation Disposal Plan: At least two (2) weeks prior to the start of Common Excavation, the Contractor shall submit

details of its proposed disposal site to the Departmental Representative for review. The minimum information required in the Common Excavation Disposal Plan includes:

- .a Legal description and address of the disposal site.
- .b Name, address, and phone number of the registered Owner of the disposal site.
- .c Letter signed by the registered Owner of the disposal site authorizing the Contractor to use the site for disposal of Common Excavation materials, and granting the Departmental Representative access to the site for inspection and measurement purposes.
- .d This will require additional information and a unique Restricted Activity Permit.

### **3.3 REQUIREMENTS**

- .1 Excavation shall be carried out with a wheeled excavator of minimum 15 tonne weight class such as Caterpillar Model 214 or equivalent, or an equivalent tracked excavator equipped with Street Pads (Contrax Roadliner or approved equal). Tracked equipment that might damage the asphalt surface are not permitted. Use of a front-end loader for excavation will only be permitted where, in the opinion of the Departmental Representative, a loader can adequately complete the required excavation and properly clean and shape the ditches.
- .2 The Disposal Site must be accessible to the Departmental Representative during working hours to facilitate random measurement of hauled loads.
- .3 The haul trucks used must be road legal.
- .4 All vehicles using the TCH greater than 4,550 kg shall require a Restricted Activity Permit which can be obtained from Banff Dispatch 403-762-1470.

### **3.4 EXCAVATION**

- .1 Common Excavation shall be carried out within two (2) weeks of completing stabilization work at each work site unless otherwise authorized by the Departmental Representative.
- .2 Common Excavation areas shall be cleaned and restored to a visually pleasing quality, which includes having final slopes and grades as directed by the Departmental Representative.
- .3 Catch basins and culvert inlets shall be cleaned out and restored.
- .4 Excavated materials hauled to the Contractors disposal site shall be leveled and graded for survey requirements. This is incidental to the Common Excavation bid item and will not be measured for payment.

**END OF SECTION**

## SECTION 31 23 23 ROCK BOLTS

### PART 1 GENERAL

#### 1.1 PRECEDENCE

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

#### 1.2 RELATED SECTIONS

- .1 Section 01 55 26 – Traffic Management.
- .2 Section 31 23 20 – Rock Scaling.
- .3 Section 31 23 21 – Trimming.

#### 1.3 GENERAL

- .1 Rock Bolts consist of the supply and installation of deformed steel bars in holes drilled into rock. Rock Bolts shall be fully grouted and either tensioned or untensioned as directed by the Departmental Representative.
- .2 Numerous existing rock bolts have been installed at most of the work sites. Most of these bolts are camouflaged and not visible without close on-slope inspection. Therefore, the requirements for rock bolting cannot be determined in advance of construction and the photographs indicate estimated rock bolting allowances only.
- .3 The required number, length, location, and orientation of Rock Bolts will be determined on site by the Departmental Representative. The Contractor shall be prepared to install any number of rock bolts ranging up to 6 m in length at any or all of the work sites.
- .4 Reserve Supply: The Contractor shall maintain on site a Reserve Supply of 50 m of rock bolts, accessories and grout such that there are no delays for procurement of materials.
- .5 Rock bolts shall be cement grouted unless resin grout is approved in writing by the Departmental Representative. Boreholes shall be at least 26 mm larger than the tendon diameter unless approved in writing by the Departmental Representative.

#### 1.4 MEASUREMENT PROCEDURES

- .1 Supply of Rock Bolt Bars will be measured for payment as the length in metres of Rock Bolt Bar supplied to site and installed. The quantity of Rock Bolts delivered to site shall not exceed the tender amount. If required, additional Rock Bolts will be authorized by the Departmental representative. Rock Bolt Bar which is supplied but not used in the work will become the property of the Contractor and an assessment equal to eighty percent (80%) of the tendered unit price per metre for supply, multiplied by the length of unused Rock Bolt Bar will be charged to the Contractor. This assessment will be deducted from any monies due the Contractor.

- .2 Installation of Rock Bolts shall include the supply of bearing plates, nuts, hardened flat washers, beveled washers, centralizers, couplers, grout, resin, recessing of plates, mortar and the drilling, installation and testing of the rock bolts. Installation of Rock Bolts will be measured as the length in metres of Rock Bolt successfully installed and embedded into rock. Excessive bar protruding from the rock face shall not be measured.
- .3 Payment for Rock Bolts will be at the Contract Unit Prices for Supply and Installation. Payment will not be authorized until all related submittals have been received and approved by the Departmental Representative.
- .4 The Contract Unit Prices for rock bolts shall be considered full compensation for all rock bolt requirements in the specification. Scaling to facilitate access to the designated rock bolt areas is considered incidental to the work.
- .5 Supply of the galvanizing and mill certificates shall not be measured for payment and shall be considered incidental to Rock Bolt installation.
- .6 Grout sock (if required) shall be paid at cost plus 10% and drawn against the Prime Cost Sum.
- .7 Rock bolt testing is considered incidental to the work and shall not be measured for payment.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 Rock Bolts shall be 25 mm diameter, Grade 517/690 MPa deformed steel bars conforming to CAN/CSA G30.18, such as "Dywidag Threadbar" manufactured by Dywidag Canada Limited, Williams Bar, or approved equal. The first 20% of Rock Bolt Bar shall be supplied to a designated laydown area to be directed by the Departmental Representative. The first 20% of bolt steel shall be delivered in pieces of 9 m length and shall be field cut to the required length(s) as needed. Thereafter, additional Rock Bolt Bar shall be supplied in cut lengths of 4 m to 6 m as directed by the Departmental Representative.
- .2 Steel bearing plates shall conform to CAN/CSA-G40.21, Grade 300 W and have minimum dimensions of 10 mm by 150 mm by 150 mm. Plates shall be of "calotte" or similar style to accommodate non-perpendicular alignment of the bolt with the plate.
- .3 Nuts shall be hexagonal head, heavy duty type, with hemispherical end matching the bearing plate and shall conform to ASTM A325. Threads and nuts shall be capable of developing the full strength of the bolt.
- .4 Rock Bolts and all associated hardware shall be hot-dip galvanized to CSA G164 & CSA G30.18M. Field cut rock bolt bar shall be cold galvanized with "Galvanox" zinc-rich paint or approved alternate by the Departmental Representative.

- .5 Resin grout or cementitious grout may be used as directed by the Departmental Representative on an individual rock bolt basis. Resin grout shall not be used where the rock is excessively fractured or wet, as determined by the Departmental Representative.
- .6 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.
- .7 Cement grout shall be a pre-bagged, non-shrink cementitious product such as "Microsil® Anchor Grout" produced by Basalite Concrete Products or approved equal. 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. Cementaceous grouts and mortar shall not be warmer than 30°C or colder than 5°C during mixing or pumping.
- .8 Cement mortar shall be SIKA 212 or similar product mixed, placed and cured in accordance with the manufactures recommendations.
- .9 SIKA Arctic Grout may be used if the temperatures are suitable.

### **PART 3 EXECUTION**

#### **3.1 SUBMITTALS**

- .1 Rock Bolt Installation Procedure: Prior to ordering Rock Bolt materials, the Contractor shall submit a Rock Bolt Installation Procedure for review by the Departmental Representative. The Installation Procedure shall include product information from the bolt hardware and grout manufacturers including their recommended installation procedures, drilling equipment and hole diameter, grouting and tensioning procedures, calibration certificate(s) for rock bolt testing equipment, and similar information.
- .2 Rock Bolt Installation Records: The Contractor shall submit to the Departmental Representative on a daily basis in a format approved by the Departmental Representative.
  - .a Drillers Logs, including but not 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 rock bolt installation. Logs shall be

submitted to Departmental Representative within one (1) day after drilling or on request.

- .b Grout testing results, including but not limited to Compressive Strength testing, temperature, Flow, expansion, and bleed tests.
- .c Rock bolt Installation records, these shall include but shall not be limited to, Individual bolt 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/resin type, grout/resin temperature, grout volume used, resin capsules used, number of spacers used, grout samples taken, spin time in resin, lock off load/tension, date/time tested, as constructed bolt azimuth, dates/time of staged grouting, date/time completed,
- .d Mill and galvanizing certificates for the Rock Bolt tendon.

### **3.2 QUALITY CONTROL**

- .1 Holes shall be drilled and Rock Bolt tendons installed under the direct supervision of a rock bolt installation supervisor who has substantial experience in the installation of cement grouted bolts.
- .2 The first ten (10) rock bolts shall be installed in the presence of the Departmental Representative.
- .3 Hydraulic jacks, gauges and torque wrenches used for testing and tensioning of rock bolts shall be calibrated by an independent, certified testing laboratory within the previous 12 months.
- .4 Provide the Departmental Representative with any samples of grouting materials that may be requested for quality assurance testing.

### **3.3 PROCEDURES**

- .1 For resin grouted bolts drill holes for each bolt to a uniform diameter recommended by the resin and bolt manufacturers to ensure bolt holes are completely filled with resin. For cement grouted bolts, drill holes to a minimum diameter as per the design in Clause 1.3.5, or smaller at the distal end if required to accommodate an expansion shell anchor. Completely clean holes of all drill cuttings, sludge, debris and water using clean water and air.
- .2 Rock Bolts shall either be installed with an exposed plate and nut, or with the bolt cut off flush to the rock surface without plate and nut, or plate may be counter sunk into a recess in the rock face as directed by the Departmental Representative.
- .3 Rock Bolts shall be installed with sufficient thread exposed to accept a plate and nut (if required) and to facilitate tensioning and testing. Where a plate and nut is not required, bolts 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.
- .4 Installation – Resin Grouted Rock Bolts

- .a 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 ten (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 Installation – Cement Grouted Rock Bolts

- .a Cement grouted bolts that are to be tensioned shall use either resin cartridges or an expansion shell for the bond length anchorage. Use commercially manufactured centralizers at intervals not greater than 2 m to keep the bar centered in the hole. Fill the holes with grout by pumping the grout through a delivery line that extends to the distal end of the hole, while providing a means of venting at the proximal end of the hole. Prior to the grout setting, perform testing and tensioning, and attach the bearing plate and nut (if required). Remove all excess or spill resin and cement grout from rock surfaces.
- .b Primary and Secondary grouting may be required to permit rock bolt tensioning if a nut and plate are not being used.

#### .6 Testing

- .a 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 tendon, an extension bar for attaching the jack to the bolt, a hydraulic pump with a gauge, calibration chart for the ram/gauge combination that provides the applied load directly in kilonewtons, and an independently mounted dial gauge for measuring the strain of the bolt under load. Rock bolts will be selected at random by the Departmental Representative for testing by the Contractor. The first eight (8) of each type installed shall be tested; thereafter, 20% of the rock bolts shall be tested. Bolts shall be either Proof Tested or Pull Tested as directed by the Departmental Representative. Additional tests shall be performed where different rock types or bolt installation conditions are encountered as construction progresses.
  - i. Pull Tests: Prior to grouting the free stressing length of the anchor curing, the bond length of the anchor shall be proof tested by loading the anchor in tension to 184 kN and maintaining the load for five (5) minutes. Anchors will be considered to have failed, and shall be replaced, if load at the end of the test falls beneath 175 kN or if movement continues to occur at or below the test load.
  - ii. Proof Tests: After grout within the free stressing length of the anchor has cured, the anchor shall be pull tested by loading the anchor in tension to 184 kN and maintaining the load for ten (10) minutes. Anchors will be considered to have failed using the following criteria; if the creep is greater than 1 mm the test shall be extended to sixty (60) minutes and the total creep movement shall be less than 2 mm measured between six (6) minutes and sixty (60) minutes or if movement continues to occur at or below the test

load. Cement grouted anchors shall not be pull tested until at least seven (7) days after grouting.

- .b Up to five (5) additional bolts in the vicinity of a failed bolt shall be tested as required by the Departmental Representative.

.7 Tensioning

- .a The Departmental Representative will determine the tension load for each rock bolt. Tensioning equipment shall consist of the hollow core jack. A calibrated impact or torque wrench may be used for light tension loads, subject to approval by the Departmental Representative. Tensioned Rock Bolts shall be tensioned before the grout within the free stressing length of the rock bolt cures. Bolts shall be tensioned and locked-off at tensions ranging from 50 kN to 158 kN as directed by the Departmental Representative.
- .b Untensioned bolts with a bond length anchorage shall be nominally tensioned to 25 kN using an approved impact or torque wrench. Where a bearing plate and nut is not required, these shall be removed and the protruding length of bolt cut off after the grout in the free stressing length has cured. In the case of untensioned, cement grouted bolts with a plate and nut, they shall be nominally tensioned to 25 kN after the grout in the free stressing length has cured.

**END OF SECTION**

## **SECTION 34 71 43 CONCRETE BARRIER**

### **PART 1 GENERAL**

#### **1.1 PRECEDENCE**

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

#### **1.2 RELATED SECTIONS**

- .1 Section 01 57 19 - Environmental Procedures.

#### **1.3 SCOPE OF WORK**

- .1 Temporarily remove and then reinstall or relocate existing concrete guard rail to protect guardrail from damage and facilitate the Work.
  - .a Guard rail shall only be removed to facilitate Common Excavation where in the opinion of the Departmental Representative, this is necessary to allow adequate cleaning of the ditch.
- .2 Supply and install new concrete guard rail at the lines and grades as set out by the Departmental Representative.

#### **1.4 MEASUREMENT AND PAYMENT**

- .1 Removal and Reinstallation, or Removal and Relocation of existing concrete guardrail will be measured for payment as the length in number of guardrail segments that is either temporarily removed and then reinstalled, or removed and permanently relocated including removal of chain-link fence and posts, if present. Only that portion of the guardrail which is directly below Scaling or Trimming work areas as measured perpendicular to the highway centerline, will be measured. The Contract Unit Price shall be considered full compensation for all requirements in this specification, including provision of labour, equipment, and materials.
- .2 Supply and Install new "F" Style Concrete Barrier will be measured for payment as the length in lineal metres of barrier that is supplied and installed. The Contract Unit Price shall be considered full compensation for all requirements in this specification, including provision of labour, equipment, and materials.
- .3 Temporary removal and replacement (or protection) of guard rail beyond the work limits if deemed necessary by the Contractor to protect such installations from damage shall be at the Contractors cost and will not be measured for payment.
- .4 The Contractor shall replace all guard rail which is damaged due to the Work such that it is no longer useful for the intended purpose at the Contractors expense.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- .1 "F" Style Concrete Barrier shall be Con-Force Structures Limited Standard Product No. 7-0073 (Full "F" Style Median Barrier 810 mm Depth) or approved equal.

## **PART 3 EXECUTION**

### **3.1 DESCRIPTION OF THE PROCEDURE OF THE WORK**

- .1 Carefully disassemble the existing concrete guard rail prior to the start of scaling or trimming in any area and temporarily or permanently relocate to the specified locations.
- .2 Carefully mark and photograph all temporary openings in the existing guard rail with traffic cones except during active work in that area.
- .3 Replace guardrail that was temporarily relocated within three (3) days of the completion of other work in that area.
- .4 Prepare a level graded and compacted sub-grade surface for permanent guard rail installations using imported granular material if suitable material is not present on site.
- .5 Supply and install new Type "F" guardrail in the specified location within three (3) days of completing other work in that area.
- .6 The disposal site for all damaged concrete guardrail in Glacier National Park is the Eastgate Landslide (kilometre 3.5). The location of this disposal site is shown on the enclosed location plan.

**END OF SECTION**