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SP-11147-06-05	SIGN PLAN STATION 5+180 TO STATION 6+460
SP-11147-06-06	SIGN PLAN STATION 6+460 TO STATION 7+740
SP-11147-06-07	SIGN PLAN STATION 7+740 TO STATION 9+020
SP-11147-06-08	SIGN PLAN STATION 9+020 TO STATION 10+300
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Appendices

Appendix A	Debris Management
Appendix B	Hazard Tree Removal

END OF SECTION

Part 1 General

1.1 ORDER OF PRECEDENCE

- .1 Division 01 takes precedence over any contradictory statements made within any of the technical specification sections.

1.2 DEFINITIONS

- .1 Alberta Transportation is referred to as “AT”.
- .2 “WLNP” shall refer to Waterton Lakes National Park. “The Park” shall refer to any National Park.
- .3 Any reference to “Parks Canada Agency”, “Parks Canada”, “PCA” or “The Owner”, shall refer to Parks Canada Agency and shall include any affiliate or sub group of Parks Canada.
- .4 AT specifications specified for the Work can be found at the following AT website address:
 - .1 http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf
- .5 Changes in Definition, - The following changes in definitions have been made to the “AT Specifications”:
 - .1 Consultant – The word “Consultant” shall mean Departmental Representative or his duly appointed representative.
 - .2 Department – The word “Department” shall mean Parks Canada Agency.

1.3 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.

1.4 PROJECT LOCATION

- .1 The project is located on Akamina Parkway within Waterton Lakes National Park, at the south-west corner of Alberta. The limit of work includes:
 - .1 Akamina Parkway and existing roadside features located on its sides.
 - .2 Damaged and hazardous trees at the discretion of the Departmental Representative.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

- .1 In preparation for and during construction of this project, the Contractor shall review the requirements of Section 01 35 43 – 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 Section 01 35 43 – Environmental Procedures in determining compliance.

- .2 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .3 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, Alberta Transportation Standard Specifications for Highway Construction (Latest Edition) shall apply unless directed by the Departmental Representative.
- .4 Without limiting the scope of work, the work of this Contract generally comprises the following:
 - .1 The supply, mixing, and installation of AT Asphalt Concrete Pavement Mix Type M1 (PG52-34) (EPS) along the Akamina Parkway at locations as shown on the drawings or as directed by the Departmental Representative in accordance with AT – Standard Specifications for Highway Construction, Specification 3.50 – Asphalt Concrete Pavement (EPS).
 - .2 Asphalt pavement removal by milling as detailed in the drawings or as directed by the Departmental Representative.
 - .3 Asphalt pavement removal and disposal as detailed in the drawings or as directed by the Departmental Representative.
 - .4 Perform mix designs for AT Asphalt Concrete Pavement Mix Type M1 using PG52-34 asphalt binder. Mix design is subject to acceptance by the Departmental Representative.
 - .5 ACP thickness to be in accordance with the drawings or as directed by the Departmental Representative. Maximum and minimum lift depths shall be in accordance with AT Specifications and depths shall be approved by Departmental Representative prior to starting of paving.
 - .6 Saw cutting and offsite disposal of existing asphalt pavement.
 - .7 Removal and replacement of drainage culverts.
 - .8 Supply and install of CSP culverts.
 - .9 Installation of P.V.C. drainage pipe with end treatments.
 - .10 Installation of catch basins.
 - .11 Adjustment of catch basins.
 - .12 Construction of concrete curb and median infill.
 - .13 Grading/Construction of trail head parking improvements
 - .14 Deep strength road repairs including: geotextile, granular fill, GBC & ACP
 - .15 Cleaning and reshaping of ditches
 - .16 Clearing and Grubbing
 - .17 Seeding
 - .18 Tree Planting
 - .19 Painting and reinstatement of roadway paint lines and other pavement markings indicated on the design drawings.
 - .20 Supply and installation of parking boulders.

- .21 Supply and installation of W-Beam guardrail.
 - .22 Remove, Salvage and Re-install existing W-Beam guardrail.
 - .23 Remove and dispose of existing guardrail end treatments.
 - .24 Supply and installation of end treatment crash attenuators.
 - .25 Supply and installation of parking curb stops
 - .26 Miscellaneous Additional Work as directed by the Departmental Representative.
- .5 The Contractor will not be permitted to set up an Asphalt plant within Waterton Lakes National Park.
- .6 The asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonnes per hour production, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere.
- .7 There is no power, water or phone at the Waterton Lakes National Park - Akamina Parkway available for Contractor use.

1.6 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.7 WORK BY OTHERS

- .1 Other Contractors may be working within Waterton Lakes National Park. Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative. No claims for delays, lost profit or inconvenience will be entertained.
- .2 Coordinate work of this contract with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.8 WORK SEQUENCE

- .1 Construct Work in stages as defined in Section 01 14 00 – Work Restrictions to accommodate the Owner and the Owner's affiliates continuous use of premises during construction, with a maximum 60 minute delay, and allow Owner/Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Construct Work in stages to provide for intermittent Owner and other Contractor use.
- .3 Maintain fire and emergency access/control on the roadways at all times.
- .4 The Contractor shall prepare a meaningful Gantt chart using Microsoft Project as per Section 01 32 16.07 – Construction Progress Schedule – Bar (Gantt) Chart and submitted as per Section 01 33 00 – Submittal Procedures showing the proposed schedules of major work that shall be submitted to the Departmental Representative one (1) week prior to commencement of any work.

- .1 Substantial completion by **July 15, 2020**
- .2 Complete all work by **July 31, 2020** (Contract Completion Date)

1.9 CONTRACTOR USE OF PREMISES

- .1 Construct Work in accordance to Section 01 14 00 – Work Restrictions.
- .2 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other contractors.
 - .3 Public usage.
- .3 Co-ordinate use of premises under direction of Department Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Department Representative.
- .7 At completion of operations, condition of existing work: equal to or better than that which existed before new work started.

1.10 OWNER FURNISHED ITEMS

- .1 Contractor Responsibilities include, but not limited to:
 - .1 Designate submittals and delivery date for each product in progress schedule.
 - .2 Review shop drawings, product data, samples, and other submittals. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Receive and unload products at site.
 - .4 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
 - .5 Handle products at site, including uncrating and storage.
 - .6 Protect products from damage, and from exposure to elements.
 - .7 Assemble, install, connect, adjust, and finish products.
 - .8 Provide installation inspections required by public authorities.
 - .9 Repair or replace items damaged by Contractor or subcontractor on site.

1.11 EXISTING SERVICES

- .1 The Contractor shall perform utility locates, survey, hydrovac and provide copies to Departmental Representative prior to undertaking any Work.

- .2 Notify Department Representative and utility companies of intended interruption of services and obtain required permission.
- .3 Provide alternative routes for pedestrian and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Department Representative of findings.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Department Representative and confirm findings in writing.
- .7 Protect or maintain existing active services.
- .8 Record locations of maintained, re-routed and abandoned service lines.
- .9 Establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. Co-operate with them at all times and in all places of Work. Keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .10 Notify the Departmental Representative and the Utility companies at least seven days in advance of any activities which may interfere with the operation of such Utilities.
- .11 Immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected, promptly undertake such remedial measures as are necessary at no additional cost to the Utility Owner.

1.12 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Contractor must allow access to Parks Canada and its representatives.
- .4 The Akamina Parkway will be closed to the public during construction.

1.13 CONSTRUCTION SIGNAGE

- .1 No signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN3-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.

- .4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.
- .5 Signage shall be coordinated with other Contractors.

1.14 SETTING OUT OF WORK

- .1 The Departmental Representative will identify location of all work sites. The Contractor shall be responsible for all other survey and layout of work at no additional cost to the Owner.
- .2 At all work sites, the Contractor shall mark accurately, at regular intervals, the location and type of existing painted lines, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark accurately (+ or – 20 mm) and at regular intervals (spaced 15 metres on centre in tangent sections and 7.5m apart on curves), the location of the centreline.
- .3 The Contractor is responsible for the accurate layout of all temporary and final lines at all work sites in this contract.
- .4 Temporary Pavement Marking and layout shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.

1.15 SURVEY REQUIREMENTS

.1 Qualifications of Surveyor

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

.2 Survey Reference Points

- .1 Existing base horizontal and vertical control points are to be supplied by Departmental Representative.
- .2 Locate, confirm and protect control points prior to starting work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes during execution of Work.
- .5 Require surveyor to replace control points in accordance with original survey control.

.3 Field Work Requirements

- .1 Establish new permanent benchmarks as necessary on site, referenced to established benchmarks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.

- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Slope stakes.
- .5 Baseline stakes.
- .6 Culvert layout stakes.
- .7 Establish pipe invert elevations.

.4 Survey Accuracy Requirements

- .1 The minimum Relative Accuracy standard for surveys based on the surveyor's own work is ± 0.02 metres plus 80 parts per million (ppm) at a 95% confidence level. Relative Accuracy means the horizontal or vertical accuracy between any two points on the survey where those points define or control the position of Work.

.5 Records

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work, submitted in the form of an as-built drawing.
- .3 Maintain all Raw Observation Files to be submitted to Departmental Representative upon request.

.6 Informational Submittals

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.16 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Environmental Protection Plan.
- .11 Traffic Accommodation Strategy.
- .12 Quality Management Plan.
- .13 Park Issued Business License(s).
- .14 Restricted Activity Permit(s).

- .15 Health and Safety Plan and Other Safety Related Documents.
- .16 Spill Response Plan.
- .17 Other documents as specified.

1.17 NATIONAL PARKS ACT

- .1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.
- .2 The Contractor and any subcontractors will obtain a business license from the Parks Canada Administration Office in Waterton Lakes National Park prior to commencement of the contract.
- .3 All Contractor's vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from the Departmental Representative, or Parks Canada.
- .4 Contractor is responsible to ensure all subcontractors comply with the National Park Regulations.

1.18 LAWS TO BE OBSERVED

- .1 Perform Work in accordance with the latest edition of all Federal and Provincial Laws, all local bylaws, acts and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of 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

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 32 16.07 – Construction Progress Schedules - Bar (Gantt) Chart.
- .2 Section 01 55 26 – Traffic Control.
- .3 Section 01 35 43 – Environmental Procedures.

1.2 USE OF SITE AND FACILITIES

- .1 Construction shall commence within two weeks of award.
- .2 The Contractor shall provide a schedule to the Departmental Representative indicating the Winter demobilization and remobilization periods. The Contractor is responsible for any damage to site works during the winter shutdown period.
- .3 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .4 During normal working hours, the Contractor will provide for Owner or the Owner's Representative continuous use for vehicular traffic, with a maximum 60 minute delay, along the Akamina roadway. Owner access to all amenities along the roadway, including the Cameron Lake Day Use Area and all hiker Trail-heads and parking lots, must be maintained for this period during each construction year i.e. 2019 and 2020.
- .5 Parks Canada will close the Akamina Roadway to public visitors throughout the duration of construction.
- .6 Emergency access must be maintained at all times through the worksite for emergency crews and PCA staff to be able to respond to emergency situations as they arise in and around the worksite.
- .7 *The road will not be snowplowed by PCA, for construction works. The road may be plowed by the Contractor until December 1. typically, the road is under avalanche protocol from December 1 to May 15. The contractor must demobilize from site if at any time, the relevant area is declared to be at risk of being impacted by an avalanche. Although no guarantee is provided as to when this may occur, in the past access has been impacted after December 1 through until May 15.*

1.3 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.07 – Construction Progress Schedule - Bar (GANTT) Chart.
- .2 The Work Sites specified in these specifications shall only be used for the purposes of the Work. The Work Sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.

- .3 The Contractor shall include in the tender, payment to taxes properly levied by law (Federal, Provincial and Municipal) including the cost of any collection of permits and business licenses.
- .4 No camping in the National Park is permitted. Parks Canada regulations prohibit anyone working within the Park from using public campground facilities.
- .5 The Contractor will be permitted use of the Staging Areas at a location(s) designated by the Departmental Representative for general laydown area, stockpiling aggregate, and general construction staging. Water is available at the Village of Waterton Lake, from a standpipe at the Parks Administration Office. A permit will be required to access water for use by the Contractor.
- .6 The use of other approaches or trailheads as storage areas or for equipment parking is prohibited without approval of Departmental Representative.
- .7 No site is available in Waterton Lakes National Park to set up an asphalt plant.
- .8 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at his cost for the performance and inspection of the Work.
- .9 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and Section 01 35 43 – Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .10 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.
- .11 No work can occur in fish bearing streams prior to August 15th.
- .12 Material other than stripping, clearing debris or parked equipment is not allowed along the right-of-way outside the normal hours of work.
- .13 During the designated working periods specified under Section 01 11 00 – Summary of Work, 1.8 Work Sequence, the Contractor may work 24 hours per day, seven days per week subject to the following restrictions, which shall be identified on the Contractor's Schedule:
 - .1 The Contractor shall adhere to all restrictions and timing windows noted in the Environmental Management Plan.
- .14 No hauling of material during inclement weather will be permitted.
- .15 Unless otherwise approved by the Departmental Representative, no work is permitted before the start of a high traffic event, during the event, or the day after the event. Ensure that two-way traffic is maintained during the work stoppage.

1.4 UTILITIES

- .1 The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from their operations.
- .2 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall co-

operate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.

- .3 The Contractor shall notify the Departmental Representative and the Utility companies at least fourteen (14) days in advance of any activities which may interfere with the operation of such Utilities.
- .4 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .5 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .6 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected; and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.5 SURVEY OF EXISTING CONDITIONS

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

1.6 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafe AB and the Workers Compensation Act of British Columbia and Alberta including, but not limited

to, Occupational Health and Safety Regulations and General Safety Regulations. Within the Site, the Contractor has all the responsibilities of an “employer” under the Workers Compensation Act and the Occupational Health and Safety Regulation and is designated as the “Prime Contractor”. Other contractors will be working within the limits of construction of this project.

- .2 Prime Contractor must comply with Workers Compensation Act and Occupational Health and Safety Regulation Section 20.3 Coordination of multiple employer workplaces.
- .3 Comply with all applicable safety regulations of the Workers’ Compensation Board of Alberta (WCB) including, but not limited to, WCB’s Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations, when working in that province.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .5 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .6 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property.

1.7 USE OF PUBLIC AREAS

- .1 Off-road construction equipment will not be allowed outside the project limit of work, material loading areas, or alternate sites as designated and approved by the Departmental Representative.
- .2 Signs, guardrails, asphalt, granular, embankment and excavation materials may be hauled on existing highway, but this shall be by standard highway trucks not exceeding legal highway load limits unless accepted in writing by the Departmental Representative.
- .3 Flag persons shall be provided as required for staff and worker safety, with all costs incidental to the contract. Traffic control alternatives will be considered during road closure periods.
- .4 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. Access and egress locations for the site shall have rig matting if work is to be completed during wet periods. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that will prevent dropping of materials or debris on the roadways and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. Heavy equipment work shall not be done during saturated ground conditions, as directed by the Departmental Representative. All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.8 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 - Project Management and Coordination, the Contractor shall submit to the Departmental

Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.

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

1.9 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures.
- .2 All components of the Work shall be conducted without equipment entering into wetlands, water bodies, streams and rivers. Refer to Section 01 35 43 – Environmental Procedures for details.
- .3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 – Environmental Procedures and the BIA prepared for the project.
- .4 The Contractor shall note the following restricted work areas:

- .1 Work restricted to existing parking area at McNeely's at Sta. 6+190.
- .2 Work restricted to existing parking area at Oil City at Sta. 7+850.
- .3 Work restricted to roadway only at Rowe Lake Trail head between Sta. 10+384 to 10+406.
- .4 Work restricted on southeast meadow at Little Prairie Trail head between Sta. 12+680 to 12+880.
- .5 Work restricted to roadway only between Sta. 14+090 & 14+200.
- .6 Work restricted off roadway at Cameron Lake Additional Parking 15+227 to 15+366, confirm with Departmental Representative prior to disturbance.

1.10 ACCESS TO ADJACENT PROPERTIES

- .1 Construction operations shall be conducted so as 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PRIME COST SUM

- .1 The Prime Cost Sum is not a sum due to the Contractor. Rather, it is the fixed amount specified under the **Lump Sum Price Item 3 – Prime Cost Sum** to cover unforeseen contingencies.
- .2 Expenditures under the Prime Cost Sum will be authorized in accordance with procedures provided in General Condition (GC) 6, “Delays and Changes in the Work”, and “Allowable Costs for Contract Changes Under General Condition (GC) 6.4.1”
- .3 Do not include in Contract Price, additional contingency allowances for products or installation.
- .4 In addition to GC 6, “Delays and Changes in the Work”, payment for Work under the **“Lump Sum Price Item 3 – Prime Cost Sum”** will be made using negotiated rates or by material, labour and equipment rates as follows:
 - .1 Rental rates will be in accordance with current Alberta Roadbuilders & Heavy Construction Association’s rate schedule, and will be all inclusive and fully operated.
 - .2 Vehicles (ie. Pickup trucks) will be paid either at daily rates as per the Alberta Roadbuilders & Heavy Construction Association’s (most recent) or by mileage using National Joint Council (NJC) rates, whichever is lower. The Contractor will not be permitted to claim both daily rental and mileage rates.
 - .3 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.
 - .4 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
 - .5 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
 - .6 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
 - .7 A claim for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
 - .8 The Departmental Representative’s, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
 - .9 The Contractor shall submit extra work reports to the Departmental

- Representative within 24 hours of the day of extra work.
- .10 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waive any portion of the Contract regardless of any wording to the contrary.
- .11 Unless otherwise provided for in the Contract, payment on a 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.
- .5 Work under the Prime Cost Sum may include, but not be limited to:
- .1 Additional supply and delivery of bituminous materials including asphalt prime, anti-stripping agents, and warm mix A/C admixtures;
- .2 Supply and implementation of full depth reclamation additives;
- .3 Additional supply and installation of asphalt concrete pavement;
- .4 Additional pavement removal;
- .5 Crack filling, pot hole patching and other related minor asphalt repairs;
- .6 Additional Clearing and Grubbing;
- .7 Stripping, excavation and disposal of waste materials as directed by the Departmental Representative;
- .8 Danger tree assessment and removal;
- .9 Relocation or removal and disposal of existing signs, guide posts and other miscellaneous items;
- .10 Additional supply and installation of permanent signs (not construction signs);
- .11 Removal and disposal or plugging of existing culverts;
- .12 Additional supply and installation of permanent lane markings;
- .13 Supply and installation of specialty items at Day Use Areas including, but not limited to, dry toilets, picnic tables, and garbage bins;
- .14 Additional survey resulting from changes made by the Departmental Representative;
- .15 Relocation / protection of existing utilities, including payment of utility service provider costs;
- .16 Utility Pole Relocation;
- .17 Remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract documents;
- .18 Supply and installation of wildlife fencing;
- .19 Additional supply and installation of seeding;
- .20 Additional supply and installation of additional landscaping;

- .21 Additional supply and installation of Riprap;
- .22 Additional road structure repairs;
- .23 Additional drainage improvements; ditching; culvert repairs; and cleaning;
- .24 Sub-drainage not specified in the tender documents;
- .25 Supply and installation of precast concrete barrier;
- .26 Supply and installation of barrier drains;
- .27 Additional installation of crash attenuator;
- .28 Additional removal and disposal of existing guardrail or precast concrete barrier;
- .29 Additional supply and installation of guardrail or precast concrete barrier;
- .30 Additional removal and disposal, and supply and installation of Guide Posts;
- .31 Supply and installation of raised reflective road and barrier markers
- .32 Asphalt EPS unit price adjustments;
- .33 Installation of milled rumble strips;
- .34 Rehabilitation work in gravel pits;
- .35 Miscellaneous rock scaling as directed by the Departmental Representative;
- .36 Supply and installation of rock bolts;
- .37 Shoulder graveling;
- .38 Traffic control equipment additional to is required by the applicable regulations and standards.
- .39 Relocation of existing structures;
- .40 Additional manhole adjustments;
- .41 Additional supply and installation of precast concrete catch basins;
- .42 Additional catch basin adjustments;
- .43 Additional supply and install of cast-in-place concrete headwalls;
- .44 Additional supply and installation of precast concrete parking blocks;
- .45 Processing of blast rock as requested by the Departmental Representative;
- .46 Supply and maintenance of Departmental Representative's office trailer; and
- .47 Miscellaneous work as directed by the Departmental Representative.
- .6 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Project No. 1519-02

Parks Canada Agency

Road Rehabilitation

Akamina Parkway

Waterton Lakes National Park

Section 01 21 00

ALLOWANCES

Page 4

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 SACC R2850D GC 5.10
- .2 Section 01 11 00 – Summary of Work
- .3 Section 01 14 00 – Work Restrictions

1.2 DEFINITION OF OCCUPANCY

- .1 The Contractor shall be permitted to lease and occupy sites where he will be working in Waterton Lakes National Park on the Akamina Roadway, free of charge from the date of award of the contract up and including completion date of construction **July 31, 2020** (Section 01 11 00 – Summary of Work Clause 1.7 – Work Sequence). The sites to be leased by the Contractor include the roadway and areas specified in this contract or as directed by the Department Representative.
- .2 The Contractor will only occupy the project area for Work identified under this Contract.
- .3 The Contractor will not be permitted to set up a camp in the National Park. Parks Canada regulation prohibit anyone working within the Park from using public campground facilities.
- .4 The Contractor's occupancy of the sites will be deemed to have ended, when all of the following conditions are met to the satisfaction of Parks Canada:
 - .1 All the work identified under this Contract has been completed.
 - .2 All sites clean up and any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
 - .3 The Contractor has removed from the Park all trailers and equipment.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 ADMINISTRATIVE

- .1 Attend regularly scheduled project meetings throughout the progress of the work as requested by the Departmental Representative.
- .2 Provide physical space and make arrangements for meetings if requested.
- .3 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .4 Prior to commencing construction, the Contractor will schedule an on-site meeting with the Environmental Surveillance Officer (ESO) to review EIA mitigations. A minimum of 7 days notice will be required for this meeting.

1.3 PRECONSTRUCTION MEETING

- .1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Organizational Chart (including chain of command, subcontractors and engineering services information).
 - .3 Schedule of Work: in accordance with Section 01 32 16.07 – Construction Progress Schedules - Bar (GANTT) Chart (including work plan for each stage of construction).
 - .4 Traffic Accommodation Plan: in accordance with Section 01 55 26 - Traffic Control.
 - .5 Health and Safety Plan: in accordance with Section 01 35 29.06 - Health and Safety Requirements (including emergency response plan and medical surveillance if required).
 - .6 Environmental Protection Plan: in accordance with Section 01 35 43 - Environmental Procedures (including sediment and erosion control plan).
 - .7 Quality Control Plan: in accordance with Section 01 45 00 - Quality Control.

- .8 Product Data, samples and suppliers: in accordance with Section 01 33 00 - Submittal Procedures and Section 01 61 00 – Common Product Requirements.
- .9 Owner-furnished materials.
- .10 Method of surveying during the project.
- .11 Obtaining business license from Parks Canada.
- .12 Requirements for temporary facilities, site signs, offices, utilities in accordance with Section 01 52 00 - Construction Facilities.
- .13 Proposed changes, change orders, procedures, approvals required, time extensions, and administrative requirements.
- .14 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .15 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .16 Monthly progress claims, administrative procedures, photographs, and hold backs.
- .17 Appointment of survey/engineering services.
- .18 Insurances, transcript of policies.
- .19 Other business.

1.4 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule bi-weekly progress meetings.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 The Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within 7 days after meeting.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Corrective measures and procedures to regain projected schedule.
 - .6 Review submittal schedules: expedite as required.
 - .7 Review of quality control.
 - .8 Review of Environmental items.
 - .9 Review proposed changes for effect on construction schedule and on completion date.
 - .10 Other business.

1.5 SUBMITTALS

- .1 Submit product data to Section 01 33 00 – Submittal Procedures for review for compliance with Contract Documents.

- .2 Submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 Process substitutions through Departmental Representative.
- .5 Process change orders through Departmental Representative.
- .6 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.6 CLOSEOUT PROCEDURES

- .7 Notify Departmental Representative when Work is considered ready for Substantial Performance.
- .8 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .9 Comply with Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
- .10 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 14 00 – Work Restrictions
- .3 Section 01 21 00 – Allowances

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 DEFINITIONS

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

1.4 REQUIREMENTS

- .1 Ensure Schedule is practical and remains within specified Contract duration.
- .2 Ensure all Work required for Contract is identified in Project Schedule.
- .3 Include an allowance in Schedule for Work performed under Prime Cost Sum.
- .4 Plan to complete Work in accordance with prescribed milestones and time frame.
- .5 Maximum task duration shall be 20 days. Breakdown activities if maximum duration is reached.

1.5 SUBMITTALS

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

1.6 PROJECT MILESTONES

- .1 **Complete all Work by July 31, 2020 (Contract Completion Date).**

1.7 MASTER PLAN

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

1.8 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Permits.
 - .3 Pre-Mobilization Submittals.
 - .4 Mobilization.
 - .1 Work activities by road segments / locations:

- .1 Ditch cleaning and regrading
- .2 Grass Seeding and other plantings
- .3 Clearing and timber salvage
- .4 Road embankment excavation
- .5 Culvert Replacements
- .6 Catch basin installations
- .7 Catch basin adjustment
- .8 Cold milling asphalt pavement
- .9 Asphalt pavement removal
- .10 Asphalt pavement placement
- .11 Granular material loading, hauling, placing and compaction
- .12 Shouldering Aggregate
- .13 Curb and gutter construction
- .14 Concrete median construction
- .15 Topsoil placement and grading
- .16 Tree placement
- .17 W-Beam guardrail removal and disposal
- .18 W-Beam guardrail supply and installation
- .19 Line painting
- .20 Traffic signage remove and dispose, supply and install
- .21 Additional Work as and when requested
- .22 Quality Control
- .23 Interim Inspection
- .24 Site Clean-up / De-mobilization

1.9 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on weekly basis and when requested by the Departmental Representative reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, providing information on materials, equipment and manpower, providing progress photographs showing examples of work completed that week, defining problem areas, anticipated delays and impact with possible mitigation.

1.10 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings and bi-weekly progress meetings. Identify activities that are behind schedule and provide measures to regain slippage.

Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

Part 2 Products**2.1 NOT USED**

.1 Not used.

Part 3 Execution**3.1 NOT USED**

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 32 16.07 – Construction Progress Schedules - Bar (Gantt) Chart.
- .3 Section 01 35 29.06 – Health and Safety Requirements.
- .4 Section 01 55 26 – Traffic Control.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 01 45 00 – Quality Control.
- .7 Section 01 78 00 – Closeout Submittals.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 ADMINISTRATIVE

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

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 The shop drawings shall be stamped and signed by a Professional Engineer registered in the Province of Alberta, Canada.
- .3 Allow ten (10) days for Departmental Representative's review of each submission.
- .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .6 Indicate materials, methods of construction, explanatory notes and other information necessary for completion of Work.
- .7 Allow 7 days for Departmental Representative's review of each submission.
- .8 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .9 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .10 Submit product data sheets and brochures for requirements requested in specifications Sections and as requested by Department Representative.
- .11 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made and installation of Work may proceed.
- .12 Contractor's responsibility for errors and omissions in submission is not relieved by Department Representative's review of submittals.
- .13 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Department Representative's review.

- .14 Keep one reviewed copy of each submission on Site.

1.5 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with date, origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 CERTIFICATES AND TRANSCRIPTS

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

1.7 REQUIRED CONTRACTOR SUBMITTALS

- .1 General
 - .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
 - .2 Pre-Mobilization Submittals
 - .3 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:
 - .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in Section 01 11 00 – Summary of Work. In addition, for each activity critical elements that could impact on the schedule are to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format.
 - .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers.
 - .3 Plan describing methods the Contractor will have to meet their responsibilities as the Prime Contractor for Safety and Traffic Control within the Work limits and to co-ordinate Work, traffic control, site

access, safety, with other Contractors working in or adjacent to the Contract Work zone.

- .4 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
- .5 Work Plan, describing in detail for each activity by road segment and location, the Contractor's intended methods of construction, and materials, equipment and manpower use to meet stages specified in Section 01 11 00 – Summary of Work. The Work Plan has to be linked to the Project Schedule.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples.
- .7 Traffic Management Plan, in accordance with the requirements of Section 01 55 26 – Traffic Control.
- .8 Environmental Protection Plan (EPP), including an Erosion and Sediment Control Plan, Soil Management Plan and a Weed Management Plan, that meets the requirements of Section 01 35 43 – Environmental Procedures. Submission of EPP must allow 2 weeks for review by the Parks ESO, in accordance with Section 01 35 43 – Environmental Procedures.
- .9 Site Access Plans shall include, but not limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
- .10 Survey Plan describing the Contractor's intended methods of surveying during this project.
- .11 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. Parks Canada will supply the Contractor with a template with contact names and numbers to be used for this purpose.
- .12 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.
- .13 Health and Safety Plan - The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.
- .14 Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 Site specific hazard assessment.
 - .5 General safety rules for project.

- .6 Job specific safe work procedures.
- .7 Inspection policy and procedures.
- .8 Incident reporting and investigation policy and procedures.
- .9 Occupational Health and Safety meetings.
- .10 Occupational Health and Safety communications and record keeping procedures.
- .11 Results of safety and health risk or hazard analysis for site tasks and operation.
- .12 Emergency response plan for a medical emergency including location and directions to the nearest emergency medical facility.
- .15 Submit copies of Material Safety Data Sheets (MSDS).
- .16 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .17 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .18 Alberta One Call and Utilities Coordination Plan, including notifications to Utility Owners.
- .19 The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
- .20 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

.2 Construction Phase Submittals

- .1 Monthly Progress Reports in accordance with Section 01 32 16.07 – Construction Progress Schedule – Bar (Gantt) Chart.
- .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis.
 - .1 Work to be linked to activities by road segment or location identified in project schedule and to provide information on materials, equipment and manpower.
 - .2 Alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc.
 - .3 Environmental monitoring and archaeological monitoring reports when applicable.

- .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each request for payment.
- .4 Progress Photographs:
 - .1 Format: Electronic: jpg files, minimum three (3) mega pixels.
 - .2 Submission requirements: one (1) set of electronic files.
 - .3 Identification: Name and number of project, description of photograph and date.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .6 Submit CD with all electronic pictures as part of closeout package.
- .5 Submit an electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .6 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .7 Submit copies of incident and accident reports.
- .3 Project Completion Submittals
 - .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
 - .2 Quality Control Records – The Contractor shall submit a bound and itemized set of project quality control documentation.
 - .3 Photo CD.
 - .4 Operating and Maintenance manuals.
 - .5 Warranty Management Plan 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.

Project No. 1519-02

Parks Canada Agency

Road Rehabilitation
Akamina Parkway
Waterton Lakes National Park

Section 01 33 00
SUBMITTAL PROCEDURES
Page 7

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 35 43 – Environmental Procedures
- .4 Section 02 81 00 – Hazardous Materials

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Province of Alberta
 - .1 Occupational Health and Safety Act and Regulations

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
 - .3 Contractor's safety policy.
 - .4 Identification of applicable compliance obligations.
 - .5 Definition of responsibilities for project safety/organization chart for project.
 - .6 General safety rules for project.
 - .7 Job specific safe work procedures.
 - .8 Inspection policy and procedures.
 - .9 Incident reporting and investigation policy and procedures.
 - .10 Occupational Health and Safety meetings.
 - .11 Occupational Health and Safety communications and record keeping procedures.
 - .12 Results of site specific safety hazard assessment.
 - .13 Results of safety and health risk or hazard analysis for site tasks and operation.

- .14 Submit copies of incident and accident reports.
- .15 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations, including communication plan in the event of an emergency and the location and directions to access the nearest emergency medical facility.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
- .4 Submit copies of reports or directions issued by Federal, and Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS – Material Safety Data Sheets.
- .7 Complete, sign and submit to Departmental Representative upon award of Contract “Attestation and Proof of Compliance with Occupational Health and Safety (OHS)” form.
 - .1 PCA recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon PCA as owner of the work place. In order to meet those requirements, PCA has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving Contractor(s) to undertake work in PCA work places, including on PCA property.
- .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.
- .9 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

1.7 REGULATORY REQUIREMENTS

- .1 Perform Work in accordance with all relevant legislation. This includes, but is not limited to:
 - .1 Canada National Parks Act.
 - .2 Canadian Environmental Protection Act, 1999.
 - .3 Canadian Environmental Assessment Act, 2012.
 - .4 Species at Risk Act.
 - .5 Migratory Birds Convention Act, 1994.
 - .6 Fisheries Act.
- .2 Work at site will involve contact with Alberta Workplace Safety and Health.

1.8 GENERAL REQUIREMENTS

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

1.9 RESPONSIBILITY

- .1 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.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, and Alberta Occupational Health and Safety Act Regulations.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 UNFORSEEN HAZARDS

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

1.12 HEALTH AND SAFETY CO-ORDINATOR

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

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

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

1.15 BLASTING

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

1.16 POWDER ACTUATED DEVICES

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

1.17 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 All Divisions 01, 02, 03, 10, 31, 32, 33 and 34 Sections

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section includes the implementation of all site specific Environmental Protection Plans (EPP), Soil Management Plans (SMP) and Erosion and Sediment Control Plans (ESC) supplied by the Contractor including; materials, equipment, and labour to carry out all commitments in those plans; and monitoring and maintenance required to continually meet those commitments through project completion.
- .2 **All work outlined in this Section and required to implement the EPP and ESC will be considered incidental and will not be measured or paid for separately.**

1.3 REFERENCE STANDARDS

- .1 Alberta Transportation Erosion and Sediment Control Manual, June 2011.
- .2 Best Management Practices for Amphibian and Reptile Salvages in British Columbia. Ministry of Forest, Lands and Natural Resource Operations (FLNRO), 2016.
- .3 Canada National Parks Act and Regulations.
- .4 Canadian Environmental Assessment Act (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .5 Direction for Permitted Users conducting water-related activities in BNP. Banff Field Unit, Parks Canada Agency, 2016.
- .6 Fisheries Act and Regulations.
- .7 Freshwater Intake End-of-Pipe Fish Screen Guidelines, Fisheries and Oceans Canada (DFO), 1995.
- .8 General Nesting Periods of Migratory Birds, Environment and Climate Change Canada, 2017.
- .9 Parks Canada Agency Standards for managing bats in Protected Heritage Places, Parks Canada Agency, 2018.
- .10 Parks Canada, Banff Field Unit, Pre-Construction Bat Roost Survey Guidelines for Projects Requiring Tree Removal from April to September, Dickinson, H., 2016.
- .11 Parks Canada Management Directive 2.4.1 Integrated Pest Management, December 1998.
- .12 The Federal policy on wetland conservation and implementation guide for federal land managers. Wildlife Conservation Branch. Canadian Wildlife Service. Environment Canada, 1996.
- .13 Waterton Lakes National Park, Best Management Practices for Watershed-Scale Danger Tree Removal, Parks Canada, 2019.

- .14 Waterton Lakes National Park of Canada Management Plan, Parks Canada Agency, 2010.
- .15 Waterton Lakes National Park General Project Best Management Practices, Parks Canada, 2017.

1.4 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 The Contractor is required to prepare and submit a site specific Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures including SMP and ESC plan requirements. The EPP document will be reviewed for compliance and accepted for use on the project by the Departmental Representative in collaboration with the Parks Canada designated ESO.

1.6 NATIONAL PARK REGULATIONS

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

1.7 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2012 and subsequent amendments.
- .2 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the problems.

1.8 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 do not arise from their activities and personal choices. **Employees must attend this briefing before beginning their work at the site.** It is recognized 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 Safety Officer (ESO) through

the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the “environmental briefing” will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.

- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP, valued component mitigations and these specifications. 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.

1.9 EQUIPMENT

- .1 All equipment is to be clean of organic materials and free of invasive species and noxious weeds. Cleaning is to be conducted in an approved location before arrival on site. All equipment that could potentially be in contact with water (ie: hoses, pumps) are to undergo an assessment by the ESO to evaluate potential for equipment to be a vector for invasive aquatic species. If cause for concern is determined by the ESO, any and all equipment that could potentially be in contact with water will be pressure washed or steam cleaned to a temperature and duration specified by the ESO. Procedure is to be observed by ESO or documentation from an approved wash facility is to be submitted prior to arrival to site.

1.10 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 in designated staging areas.
- .2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers’ vehicles or construction machinery and shall instruct workers so that the “footprint” of the project is kept within defined boundaries.

1.11 PROTECTION OF WORK LIMITS

- .1 The Contractor shall ensure that workers and equipment do trespass outside the project limits to the satisfaction of the Departmental Representative and the ESO.

1.12 FIRES

- .1 Fires or burning of waste materials is not permitted with exception to Section 31 11 00 – Clearing and Grubbing.

1.13 DRAINAGE

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Pumped waters shall be dispersed onto vegetated areas and/or into containment devices.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.14 SITE CLEARING AND PLANT PROTECTION

- .1 Temporary erosion and sedimentation controls to be provided, in accordance with Erosion and Sediment Control Plan, including:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to Erosion and Sediment Control Plan, specific to site, that complies with DFO Land Development Guidelines for the Protection of Aquatic Habitat or requirements of authorities having jurisdiction, whichever is more stringent.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation control and restore and stabilize areas disturbed during removal.
- .2 Protect trees and plants on site and adjacent properties as indicated.
- .3 ~~Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.~~
- .4 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes.
- .5 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .6 Minimize stripping of topsoil and vegetation.
- .7 Restrict tree removal to areas indicated or designated by Departmental Representative.
- .8 Identify and clearly mark all trees to be removed prior to start of construction.
- .9 Leave roots mass and stumps in place.
- .10 Maintain temporary erosion and pollution control features installed under this contract.
- .11 Broad-leaved twayblade is known rarely in WLNP, being found previously only at the Lakeshore Trail area, and one additional locality in the Castle River area. This species is present within and adjacent to the Project area associated with the Cameron Lake Additional Parking. Additional mitigation measures may be required in discussion with the ESO once a late June/early July 2019 rare plant survey has been completed. Any direction put forth by the ESO regarding any impacted populations of broad-leaved twayblade will be followed.

- .12 Wildlife (bird, bat and amphibian) protection windows shall be observed for vegetation removal activities in this contract and will guide the timing of the work (refer to Section 1.21).

1.15 EROSION AND SEDIMENT CONTROL

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

1.16 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Develop and implement an erosion and sediment control (ESC) plan to protect the identified wetland(s), watercourses and drainages.

1.17 SPILL PREVENTION AND RESPONSE

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

1.18 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

- .1 All equipment and vehicles will be made available for inspection by the ESO on arrival to WLNP. The Prime Contractor will give 48 hours' notice and schedule equipment inspection with the SO. All equipment must arrive washed/clean and free from all soil and vegetation. Equipment may be sent outside the park for cleaning if vegetation or soil is on the equipment.
- .2 The Contractor shall not complete any fuelling within 100 metres from streams, wetlands, water bodies or waterways.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from streams, wetlands, water bodies or waterways. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in 1.22 of Pollution Control below.
- .5 Equipment used on the project shall be fuelled 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 anywhere within National Parks.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in National Parks. Alternatively, the Contractor may hire a security person employed to prevent vandalism. The Contractor is to ensure gate is locked when not manned and to ensure no other contractor or Parks Canada Highways Dept. staff are locked out.

1.19 OPERATION OF EQUIPMENT

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

chemicals) do not enter any watercourses, to the satisfaction of the Departmental Representative and ESO.

- .2 Operation of construction equipment in water is prohibited.
- .3 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.
- .4 When, in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative and ESO.
- .5 Restrict vehicle movements to work limits.
- .6 Workers private vehicles are to remain within the construction footprint.
- .7 ~~When equipment is operating near a known archaeological site the Contractor is required to supply a qualified Archaeologist registered within the Province of Alberta for archaeological monitoring during the duration of the Work. Supply of an Archaeologist shall be incidental to the Work and no additional or separate payment will be made.~~
- .7 *A qualified Archaeologist registered within the Province of Alberta is required for archaeological monitoring during the duration of excavation at Pullout 11 near the known archaeological site at 5+100 RT (2597R). Similarly, archaeological monitoring is required for any excavation in the adjacent former historic work camp area if used as a laydown, storage or burning location. Supply of an Archaeologist shall be incidental to the Work and no additional or separate payment will be made.*

1.20 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher shall be carried and available for use on each machine and at designated locations at the work site in the event of fire. Basic firefighting equipment recommended (e.g. a water truck; minimum 500 Imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all the Contractors' staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Water for fire prevention/control can be obtained from a hydrant located at the Parks Operations yard. A permit will be required to access water for use by the Contractor.
- .3 A water truck may be necessary and will depend on the timing of the contract (e.g. – not required during winter or snow-covered conditions).
- .4 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.
- .5 Fires or burning of waste material is permitted but may not be guaranteed and may be carried out under a Restricted Activity Permit.

- .6 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The crew should follow the requirements outlined in the Contractor's Emergency Response Plan. The ESO and the Departmental Representative shall be immediately notified of any fire and an Incident Report shall be provided to the Departmental Representative within 48 hours

1.21 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. The Contractor shall review the Environmental Management Plan for further requirements related to wildlife encounters.
- .2 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times. If wildlife get into attractants that have been intentionally or accidentally left out, individuals or the Contractor could be charged under the Canada National Parks Act Regulations.
- .3 The Contractor shall report all wildlife mortality to the ESO and Departmental Representative.
- .4 The Contractor shall follow mitigation measures as outlined in Part 3.13 – VALUED COMPONENT MITIGATION MEASURES of this Section.
- .5 The Contractor activities shall follow the Waterton Lakes National Park General Project Best Management Practices (2017) document for directions.
- .6 The Contractor shall observe all of the following wildlife and bat protection windows and guidelines:
 - .1 Parks Canada Banff Field Unit Pre-Construction Bat Roost Survey Guidelines for Projects Requiring Tree Removal from April 1 to September 30.
 - .2 PCA Standards for Managing Bats in Protected Heritage Places.
 - .3 If work during the active season of bats is unavoidable, the Contractor shall follow the following requirements:
 - .1 A roost search shall be conducted by a qualified biologist, supplied by the Contractor, prior to any woody vegetation clearing occurring between April 1 and September 30.
 - .2 If active roosts are found during this time, and appropriate buffer will be established. No work will occur in the disturbance buffer around an active roost without written consent from the ESO.
 - .3 Monitoring of an active roost location should be conducted until they are no longer occupied, after which Project work can occur.
 - .4 Overall project work to be undertaken during the summer or fall to reduce disturbance of deer and sheep which use various locations along the Project footprint as wintering range later into the snowy part of winter.
- .7 The Contractor shall observe all of the following amphibian and reptile protection windows and guidelines:

- .1 The Contractor shall schedule ground disturbance activities to occur outside frozen ground conditions for work associated with the Cameron Lake Additional Parking area to avoid impacts to hibernating amphibians (if present).
- .2 If vegetation removal is scheduled to occur during non-frozen conditions, the ESO shall be contacted to determine if an amphibian and reptile ground search is required within the wetland area adjacent to the Cameron Lake Additional Parking area prior to equipment activities. If a search is required:
 - .1 To be undertaken within wetland-impacted areas of the Cameron Lake Additional Parking area by a qualified biologist to clear the work area of amphibians and reptiles.
 - .2 To be conducted prior to machinery-related work occurring.
 - .3 If animals are found to be present, an amphibian salvage plan will be included in the contractor's EPP following Best Management Practices for Amphibian and Reptile Salvages in British Columbia (FLNRO, 2016).
- .3 If Work is to occur at the Cameron Lake Additional Parking area during the breeding or summer active season when adult animals may be present, then the following must be implemented:
 - .1 Placement of amphibian and reptile exclusion fencing on all vegetated sides of the Cameron Lake Additional Parking area, at the project limits.
 - .2 If animals are found, execute amphibian salvage plan, as required.
- .8 The Contractor shall observe all of the following bird protection windows and guidelines:
 - .1 Mitigation for impacts to birds is best accomplished by clearing lands for the Project and implementing construction outside the nesting season. Nesting season is defined as April 8 to August 24 (Zone B3) (Environment and Climate Change Canada, 2017). If work during the nesting season is unavoidable then the following is required:
 - .1 A nest search shall be conducted by a qualified biologist, provided by the Contractor, prior to clearing activities that must occur during the March 1 to August 24 time period.
 - .2 If active nests are found during this time, mitigations (e.g. buffers, timing restrictions) will be applied until nests are no longer occupied.
 - .3 No work will occur in the disturbance buffer around an active nest without written approval from the ESO and Departmental Representative.

1.22 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

- .4 Dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable territorial regulations.
- .5 Provide manual or electric fuel systems. Gravity fed fuel systems are not allowed onsite.
- .6 Washing, refueling, servicing, etc. of machinery and storage of fuel will be setback a minimum 100 m from any watercourse, water body, or wetland.

1.23 HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 All historical or archaeological objects found in National Parks are protected under the National Parks Act and Regulations are the property of Parks Canada. Historical artifacts found on the work site shall be protected and immediately reported to the ESO and Departmental Representative. Contractor to wait for instruction before proceeding with work. Additional information provided in Section 3.13 VALUED COMPONENT MITIGATION MEASURES.

1.24 WASTE MATERIALS STORAGE AND REMOVAL

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in National Parks. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers will have lids, and waste loads shall be covered while being transported.
- .4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials.
- .5 All efforts to prevent wildlife from obtaining food, garbage or other domestic wastes shall be made by the Contractor and contract staff while undertaking their work in National Parks. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other attractive products to bear proof containers is mandatory.
- .6 The Contractor and workers shall immediately report any circumstances related to food/garbage and wildlife to the ESO or the Departmental Representative.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.25 WEED MANAGEMENT

- .1 The Contractor shall develop and implement a Project-specific weed management plan pursuant the PCA Integrated Pest Management Directive (PCA, 1998) during all stages

of Project execution. The weed control program should be designed in consultation with WLNP representatives responsible for existing weed management along the Akamina Parkway. Invasive weed management should include but is not limited to pre-project preventative control activities, project-related controls to reduce influx, and post-construction revegetation to reduce incidence of weeds.

- .2 Complete weed control for target/priority species prior to vegetation clearing.
- .3 Due to the high abundance of priority weed species along the first 5.1km of Akamina Parkway, all materials generated up to this point of the parkway must be removed from WLNP for disposal.
- .4 Contractor will wash/clean equipment to removal all soil and vegetative debris before arrival and between Project locations.
- .5 Work in dry conditions to minimize the mixing of soils and weed seed propagules and minimize water activity carrying seeds off-site.
- .6 The Project activities to only occur within defined areas to reduce the spread of weeds.
- .7 Gravel or road bed material is to be free of weeds and come from a source approved by the Departmental Representative.
- .8 Reseed the areas following restoration plan confirmed by a WLNP Vegetation Ecologist upon contract award.

1.26 SITE RESTORATION

- .1 Establish vegetated buffer zones with suitable vegetation to minimum 2 m along edge of watercourse banks as determined by Departmental Representative.
- .2 Reseed the areas following restoration plan confirmed by a WLNP Vegetation Ecologist upon contract award.
- .3 Plant vegetation natural to area, suitable for application without requirement for fertilizers, pesticides and other chemicals.
- .4 Control stream bank erosion in lower section of watercourse with irregular shaped rip rap of size determined by Departmental Representative.
- .5 Control stream bank erosion in upper section of watercourse by planting suitable vegetation as directed by Departmental Representative.
 - .1 Ensure planting occurs within 4 days after work on watercourse is complete.

1.27 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 The Contractor shall ensure trespass outside the project limits does not occur, to the satisfaction of the Departmental Representative and the ESO.
- .2 A Contractor's office, equipment parking, and storage area will be permitted at location(s) as directed by the Departmental Representative.
- .3 No Camp or camping will be allowed within Waterton Lakes National Park.
- .4 The Contractor shall provide toilets and maintain them in a clean and sanitary condition at the work sites. These facilities shall not be used for the disposal of anything but human wastes.

- .5 The National Park Act regulations prohibit anyone working within National Parks from using public campground facilities.
- .6 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.
- .7 Security services at the construction site may be desirable or necessary during the contract, especially during quiet times. Fuel tanks or other potentially deleterious substance containers must be secured by the Contractor to ensure they are tamperproof and cannot be drained by vandals at his own cost.
- .8 Pets shall not be brought to or maintained at the construction site.
- .9 Should the Contractor require/request a water source other than the hydrant located at the Parks Operations Compound, the Departmental Representative, in consultation with the ESO may give direction as to an alternative location to be used under a Restricted Activity Permit. Specific intake measures are required when water is approved to be withdrawn from open watercourses under the Restricted Activity Permit.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 ENVIRONMENTAL PROTECTION PLAN

- .1 The Contractor is responsible for implementing all measures in the EPP.
- .2 A Qualified Environmental Professional (QEP) supplied by the Contractor shall attend site to monitor the construction activity for conformance with the EPP, valued component mitigations and these specifications.

3.2 CLEARING AND GRUBBING

- .1 An Archaeologist shall be supplied by the Contractor and present on site to conduct an archaeological investigation during ~~all~~ clearing and grubbing work near known archaeological sites, as per Section 31 11 00 – Clearing and Grubbing.
- .2 Hazard tree removal activities shall follow Waterton Lakes Nation Park, Best Management Practices for Watershed-Scale Danger Tree Removal.
- .3 The Contractor shall ensure that the substrate or riparian area of streams, rivers or watercourses, whether open water or frozen over shall not be disturbed by tracked, wheeled or self-propelled equipment, (e.g. a skidder or truck). The ESO or Departmental Representative will provide direction in the case of work occurring near any wetland area or watercourses.
- .4 The Contractor shall take all measures to ensure that trees do not fall into streams, rivers, wetlands or water bodies or outside the clearing limits as marked by colored flagging.

Generally, work within a 30 metre buffer of watercourses, water bodies or wetlands requires the close oversight of the ESO or the Departmental Representative. The Contractor is required to provide 48 hours advance notice to the ESO prior to commencing this activity.

- .5 Trees inadvertently felled into streams, rivers, watercourses or outside the clearing limits shall be removed by means (e.g. winch) so as not to damage the substrate or any standing trees left outside the clearing limits. Machinery shall not go outside the clearing limits, or into streams, rivers, watercourses or water bodies to remove felled trees.
- .6 Logs and other salvage materials are to be conveyed to and placed at the storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.
- .7 During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport to disposal site.
- .8 No slash clearing, pickup or grubbing shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .9 Existing areas of vegetation disturbed as a result of this contract shall be rehabilitated using approved topsoil from the park and a native grass seed mix as specified in Section 32 92 19.16 – Hydraulic Seeding.
- .10 Fires or burning of waste material shall be carried out under a Restricted Activity Permit, however may not be guaranteed.

3.3 STRIPPING

- .1 A contingency plan for control of dust generated from the construction site shall be prepared as part of the Contractor's Environmental Protection Plan. In the event of a work program shutdown during inclement weather (e.g. winter conditions unfavourable for construction) erosion control of bared soils or excavated materials stockpiles will be required. The Contractor's EPP will describe measures to be implemented in such a circumstance.
- .2 Stripping close to the any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, fall or are eroded into the water or wetlands. Generally, work within a 30 metre buffer of waterways or wetlands require the close oversight of the ESO and the Departmental Representative.
- .3 No stripping shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .4 Stripped soil (including fine forest litter) materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives discretion, the Contractor may be required to prepare a plan for management of each stripping pile.
- .5 Contractor shall review the Environmental Management Plan for further requirements related to soil stripping activities.

3.4 MATERIAL LOADING, HAULING, PLACEMENT AND GRADE BUILDING

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

3.5 EXCAVATING AND PLACEMENT

- .1 Excavation will be undertaken according to the approved Grading Plan for the ROW.
- .2 Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.
- .3 All sediment control measures shall be implemented by the Contractor prior to the commencement of the work in the vicinity of water bodies, watercourses, and wetlands.
- .4 Special precautions may have to be taken during excavation in the vicinity of intermittent or active drainage channels and archaeological locations. See Part 3.12 – SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION.
- .5 If sediments enter watercourses during any excavation nearby or at its banks, the Contractor shall ensure that sediment levels in the waters of the river or creeks do not exceed specified limits and meet the “desired end result” limits outlined. See Part 3.12 – SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION.
- .6 Placement of rip rap and backfill at creeks shall be undertaken without contacting the watercourse or wetted margins of the stream, unless approved by the Departmental Representative.
- .7 Wildlife (fish, Bird, Bat and amphibian) protection windows shall be observed for watercourses in this contract and will guide the timing of the work, so that stream disturbance is prevented.
- .8 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, 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.

3.6 CULVERT INSTALLATION

- .1 All culverts shall be installed as per the requirements outlined in the Environmental Management Plan for working in or near water that will result in a minimum amount of sedimentation and damage to the riparian area of the watercourse. The Contractor shall prepare a plan for the installation of each culvert, a minimum one (1) week prior to doing the work for approval by the Departmental Representative and ESO.
- .2 The culverts shall be installed using best management practices for placement, including consideration of aquatic ecology.
- .3 It is preferable to install the culvert during periods of low discharge or dry (e.g. during the fall). The use of sediment control measures will be required to ensure that excessive amounts of sediments do not enter watercourses if water is present.

Watercourse crossings located at Station 14+232.7 and Station 14+529.8 have the potential for fish habitat. The updated *Fisheries Act*, associated regulations and new Codes of Practice, are not publicly available. Depending on the timing of Project works and the public release of the updated Fisheries Act, mitigations for work within fish-bearing watercourses may require updates, as applicable. The Contractor shall follow the current mitigation measures during culvert installation to reduce the impact on fish or the fish habitat:

- .1 Undertake appropriate isolations, fish salvage (as required), and turbidity monitoring under the direction of a qualified environmental professional (QEP) in accordance with an obtained PCA permit for capturing and relocating fish.
- .2 If a pump is used during dewatering or to allow continued flow of water around the work, intakes should be sized and screened to prevent fish entrapment and debris blockage; it should follow the Freshwater Intake End-of-Pipe Fish Screen Guidelines (Fisheries and Oceans Canada, 1995).
- .3 Implement appropriate decontamination procedures (PCA, 2016) during work conducted instream, working in soils that are seasonally wetted, or pumping or moving of surface water.

3.7 ASPHALT PLANT OPERATION AND PAVING

- .1 Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of thin fuel oil to prevent the mixture from adhering and causing waste asphalt. The vehicle covers shall be securely fastened. Excess truck box lubricants such as light oil, detergent or lime solutions shall not be allowed to contaminate the mix, and shall be disposed of in an environmentally acceptable manner. Truck box lubricant application shall be carried out in a containment berm.
- .2 Asphalt plant operation must comply with all environmental pollution control regulations applicable in the plant area.
- .3 The Contractor shall be responsible for the purchase and the safe delivery/storage/handling of asphalt cement and emulsions to the asphalt plant site. Excess hot mix or reject asphalt shall be temporarily stored as directed by the Departmental Representative, and removed from the Park, prior to completion of the contract a later date. All costs for removal and disposal shall be the responsibility of the Contractor and no separate payment shall be made.

- .4 Sites from which materials have been removed shall be restored to a neat and presentable condition upon the completion of the work.

3.8 CONCRETE MANAGEMENT

- .1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which addresses concrete delivery, placement and disposal of excess concrete, to the satisfaction of the Departmental Representative and the ESO. This plan shall include the following concrete management elements:
- .2 Concrete mixer truck washout must be contained in an approved facility with wash products moved back to the concrete batching yard for disposal.
- .3 Rolling concrete mixers with surplus concrete in amounts less than one cubic metre of wet concrete may waste this concrete in the grade right-of-way as directed by the Departmental Representative and well away from and in areas that drain well away from watercourses. Surplus amounts in excess of one cubic metre are to be returned to the batching yard.
- .4 Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
- .5 The concrete batching plant must be operated pursuant to applicable provincial and municipal requirements.
- .6 Waste, solidified concrete from rolling concrete mixers in amounts less than 1 cubic meter and waste solidified concrete from construction pour, shall be buried in the grade within 48 hours of the pour, subject to approval and direction from the Departmental Representative.

3.9 CRUSHING

- .1 Excavation, hauling and placing materials associated with a crushing operation shall be conducted within the approved footprint of the total crushing operation. Crushed materials shall be placed at the designated storage site located as identified by the Departmental Representative without spillage or ravelling outside the limits of this location. Any material inadvertently falling outside the work limits is to be moved promptly to within the storage limits. Repair of damage outside the work limits will be at the complete expense of the Contractor.

3.10 FINE GRADING, TOPSOIL PLACEMENT, AND SEEDING

- .1 This contract involves the final shaping of cut slopes, fills and landscapes disturbed in the construction of the Works. Contractor shall consult the Environmental Management Plan for the project requirements related to the replacement of topsoil in reclaimed areas.

3.11 PAVEMENT MARKING AND GUARDRAIL PLACEMENT

- .1 Pavement marking shall be undertaken pursuant to standard methods applied in National Parks for control of paint products, both in transport and handling. The Contractor shall present a description of methods to be employed for transporting and controlling paint and hazardous products, application of paint, cleaning of equipment, containment and

disposal of waste paint and cleaning products, etc. the satisfaction of the Departmental Representative.

- .2 Guardrail installation methods must be approved by the Departmental Representative with the aim of minimizing ground disturbance.

3.12 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 The Contractor shall prepare 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.
- .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.

3.13 VALUED COMPONENT MITIGATION MEASURES

- .1 ~~The Contractor shall supply an Archaeologist to be present on site to perform an archaeological investigation during clearing and grubbing Work near known archaeological sites, as per Section 31-11-00 – Clearing and Grubbing.~~
- .1 The Contractor supplied Archaeologist must flag the **boldface** items identified in the table of known archaeological sites in Part 3.13 – VALUED COMPONENT MITIGATION MEASURES of this section, for avoidance and shall be called upon if the Contractor cannot avoid the flagged features or must remedy those features.*
- .2 Historical artifacts found on the work site shall be protected and immediately reported to the ESO and Departmental Representative. All historical or archaeological objects found in the National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada.
- .3 Known archaeological sites within the Project Limits include, but are not limited to, those identified in the Table below:

Station	Arch Site	Project Impacts	Archaeological Management Requirements
0+000 to 0+100	570R	None anticipated.	Significant Indigenous campsite located outside project footprint. No further work is required.

0+800	1868R	None anticipated.	Bone scatter located outside project footprint. No further work is required.
2+000	1681R	Proposed ditch grading may impact features related to this camp.	Historic workcamp, no features or artifacts on surface. No further work is required.
2+400	2603R	None anticipated.	Indigenous lithic scatter located outside project footprint. No further work is required.
3+740	2594R	No direct project impacts.	Historic workcamp location located adjacent to project footprint. Flag site boundary for avoidance.
4+700	1683R	No direct project impacts.	Historic workcamp location located adjacent to project footprint. No cultural resources noted last year. No further work is required.
5+100	2597R	No direct project impacts. Plans show ditching and slope work to be conducted on both sides of road adjacent to site. Also, possible use for layout and or stockpiling.	Historic workcamp location located adjacent to project footprint, possibly utilized for layout or stockpiling. Flag site boundary for avoidance. As long as there is no ground disturbance, there are no archaeological concerns.
5+800	2619R	Ditching is planned for this location-north side. No direct project impacts.	Historic workcamp. Most of the surface artifacts are located south of road but some to the north. Flag nearby historic survey pin on north side for avoidance.
6+200	1682R	Proposed slope improvements and widening of ditches etc. No direct project impacts.	Historic workcamp located within project footprint. Few surface features and artifacts. Flag nearby historic survey pin for avoidance.
7+000	2598R	No direct project impacts.	Indigenous camp and historic scatter located outside project footprint. No further work is required.
7+300 to 10+200	1508R	Wide variety of project impacts through this stretch –see individual entries below.	General artifact scatter related to the First Oilwell NHS and associated features. Individual impacts and sites noted separately.
7+800 to 7+900	1508R	Parking area improvements at First Oilwell NHS	A scattering of historic artifacts and features related to the First Oilwell NHS. Flag nearby surface artifacts for avoidance.
8+400	1508R	Ditch grading is proposed at this location.	Proximity of First Oilwell NHS related surface artifacts and features to the road. Flag nearby surface artifacts and features for avoidance.

8+450	2655R	Side slope improvement is proposed here.	Insulators have been found upslope of this location. Danger tree cutting and removal has the potential to impact. These features have been recorded and a sample collected. No further archaeological work is required.
9+000	1508R	Parking lot at Lineham trailhead.	Scatter of surface artifacts and features throughout area. Flag nearby surface artifacts and features for avoidance.
9+850	2655R	May be impacted by ditching but low probability. Danger tree removal may impact.	Line of insulators coming down off of ridge. Flagging for avoidance of nearby insulators. Danger tree removal may impact. These features have been recorded and a sample collected. No further archaeological work is required.
11+700	2627R	Side slope work is proposed for the opposite side of road. No impacts anticipated.	Survey marker located within project footprint. Flag nearby survey pin for avoidance.
12+800	2595R 2655R	Construction of a large parking area north and east of the current day use area. Eventual impacts to the existing day use area and parking will be dealt with under separate assessment.	Historic midden and artifact surface scatter (2595R) along road within proposed north parking area development. Surface collection and additional assessment (AIA) is required. No further work is required. Historic Insulator at east end of proposed parking lot (2655R). Danger tree cutting and removal may impact insulator. These features have been recorded and a sample collected. No further work is required.
13+800 to 14+000	2592R	Ditching and slope work activities.	Historic roadbed and scattered historic debris located adjacent to project footprint. No further work is required.
14+300	1680R	No project impacts expected. Project work is located on opposite side of road.	Historic workcamp located adjacent to project footprint. No further work is required.
14+350	2618R	No project impacts are expected.	Historic scatter located adjacent to project footprint. No further work is required.
14+750	2599R	No project impacts are expected.	Historic scatter located adjacent to project area. No further work is required.
15+300	2654R	No project impacts are expected.	Historic camp located on north side of road away from proposed parking area. No further work is required.
15+450	2604R	No project impacts are expected.	Indigenous lithic find located near but outside the project bounds. No further work is required.

3.14 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, environmental laws or regulations, permits, or other elements of Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Do not take action until after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

3.15 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .4 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .5 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .6 Remove waste products and debris caused by Owner or other Contractors.
- .7 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .8 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 All sections in Divisions 01, 02, 10, 31, 32, 33 and 34.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 REFERENCES

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

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit site-specific Quality Control Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Quality Control Plan must include:
 - .1 Contact information for representative responsible for quality control program or subcontractor if applicable.
 - .2 Specific procedure for submitting daily/weekly test results.
 - .3 Testing standards and frequency for all Quality Control Testing.
- .3 All quality control tests and test results calculated, recorded and submitted to Departmental Representative on industry standard worksheets. Tests and test results certified for correctness by those performing the tests and to be signed by Contractor's representative. Original copies of all worksheets, including calculations, submitted to Departmental Representative daily.

1.5 CONTRACTOR QUALITY CONTROL AND QUALITY CONTROL TESTING

- .1 Testing required to provide quality control to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, misc. metals, concrete barriers, and all source acceptance testing; and
 - .2 all testing specified in the Contract Documents; and
 - .3 any other testing required as a condition for deviation from the specified Contract procedures.
- .2 Testing proposed shall be in accordance with the AT – Standard Specifications for Highway Construction (current edition) and subsequent updates for the road construction.

- .3 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
- .1 provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 notify the Departmental Representative when sampling will be conducted;
 - .3 within one Day after completion of testing, submit test results to the Departmental Representative; and
 - .4 identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work
- .6 Minimum requirements for gradation, compaction and moisture testing:

CONSTRUCTION TYPE	TEST TYPE	MINIMUM FREQUENCY OF TESTS ¹
Embankment construction with fine grained or granular soil	Standard Proctor by: ASTM D698	1 per change in material or 1 per week, whichever is more frequent
Embankment construction with fine grained or granular soil	Field Density by: ASTM D1556 ASTM D2167 ASTM D2922	1 per 1000 m2 per lift, spaced randomly across full width of embankment
Culvert Installation	Field Density by: ASTM D2922	Minimum two per 300 mm lift per culvert, spaced through the length and depth of the culvert backfill
GBC	Standard Proctor by: ASTM D698 Field Density by: ASTM D2922	1 per 25,000 m3 of each type of material and whenever the accepted gradation curve is changed. 3 tests per 50 m per lift, on Centerline and Lt & Rt sides
ACP	As per AT – Standard Specifications for Highway Construction Section 3.50, (current edition)	As per AT – Standard Specifications for Highway Construction Section 3.50, (current edition) or as directed by Departmental Representative

¹ QC frequencies may be decreased subject to effectiveness of Contractor QC program and with written approval from Departmental Representative.

.7 Minimum requirements for Portland Cement Concrete testing:

Test Description	Method No.	Frequency
Sampling Concrete	CSA A23.2-1C	Minimum of one per day ⁽¹⁾
Slump	CSA-A23.2-5C	Minimum of one per day ⁽²⁾
Entrained Air	CSA-A23.2-4C	Minimum of one per day ⁽²⁾
Making and Curing Compressive Strength Specimens	CSA-A23.2-3C	Minimum of one per day ⁽¹⁾
Compressive Strength	CSA-A23.2-9C	Minimum of one per day ⁽¹⁾

- ⁽¹⁾ On larger pours a strength test will be taken on approximately each 30 m³ portion of the concrete pour. A compressive strength test will consist of four standard test specimens. One cylinder will be tested at seven days. The 28 day test result will be the average of the remaining three specimens.
- ⁽²⁾ For each compressive strength test a slump test will be performed and the amount of entrained air measured.

- .8 Perform all other quality control and quality control testing as per technical specification sections. Where frequencies are not specified in the technical specification sections, as mutually agreed between the Departmental Representative and the Contractor as necessary to ensure conformance with the specified quality requirements.

1.6 CONTRACTOR'S QUALITY CONTROL PROGRAM

- .3 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .4 The Quality Control Program shall be described in a Quality Control Manual. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00 – Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .5 The Quality Control Manual shall include the following information:
- .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;

- .6 Details of measuring and testing equipment including methods and frequency of calibration;
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Departmental Representative, if the Departmental Representative witnesses the tests; and
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance.
-
- .6 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of his time dedicated to quality matters and who will report regularly to the Contractor's management at a level which shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matters.
 - .7 The Quality Control Manual shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
 - .8 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
 - .9 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.7 DEPARTMENTAL REPRESENTATIVE INSPECTION AND QUALITY ASSURANCE

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions.
- .3 Departmental Representative reserves the right to sample, test, inspect and monitor the quality of material being produced and incorporated into the work at any time and as often as deemed necessary.
- .4 The Departmental Representative is under no obligation to provide the Contractor with test results.
- .5 If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .6 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.8 INDEPENDENT INSPECTION AGENCIES

- .10 Independent Inspection/Testing Agencies will be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .11 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .12 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

1.9 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to all Work.
- .2 Co-operate to provide reasonable facilities for such access.

1.10 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.11 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.
- .4 All costs associated with rejected work to be borne by Contractor.

1.12 REPORTS

- .1 Submit an electronic copy of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

1.13 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

1.14 MILL TESTS

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

Part 2 Products

1.1 NOT USED

- .1 Not Used.

Part 3 Execution

1.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 55 26 – Traffic Control.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed staging area location(s), dimensions of area to be occupied and used by Contractor, number of trailers to be used, avenues of ingress/egress and other site specific details.
- .2 Identify areas which must be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use and prior to Final Completion.

1.4 SITE STORAGE/LOADING

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

1.5 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work or public traffic.
- .2 Build and maintain temporary roads during period of Work as required and at the approval of the Departmental Representative.

1.6 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays if required.

1.7 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.8 SANITARY FACILITIES

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

1.9 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Ensure dust control is adequate to provide safe operation at all times.
- .6 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.
- .8 Construct access and haul roads necessary.
- .9 Location, grade, width, and alignment of detour and haul roads are subject to approval by Departmental Representative.
- .10 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .11 Ensure lighting provides full and clear visibility for full width of haul road and work areas during night work operations.
- .12 Remove, upon completion of work, haul roads designated by Departmental Representative.
- .13 Provide snow removal during period of Work.

1.10 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.

- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Neatly stack stored new or salvaged material not in construction facilities.

1.11 CONSTRUCTION SIGNAGE

- .2 No other signs or advertisements, other than warning and traffic control signs, are permitted on site.
- .3 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321.
- .4 Maintain approved signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and waterways according to requirements of sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation control and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

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

1.2 REFERENCES

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

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit site-specific Traffic Accommodation Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Traffic Accommodation Plan must include:
 - .1 Placement of traffic signs and delineators for each different type of work.
 - .2 Usage of Flag persons and pilot vehicles.

- .3 Procedure for Loading Trucks with grubbing debris or ditch excavation.
- .4 Procedure for Contractor's hauling trucks bypassing traffic control queues.
- .5 Training requirements for Flag persons.
- .6 Quality Control Plan to ensure proper procedures and signage are continually met.

1.4 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force, and as directed by the Departmental Representative, 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:
 - .1 Place equipment in position to minimize interference and hazard to traffic.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to AT Traffic Accommodation in Work Zones Manual (current edition), except where specified otherwise.
- .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic. Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
 - .1 Provide 4 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5 Provide gravelled detours or temporary roads as indicated by the Departmental Representative to facilitate passage of traffic around restricted construction area.
- .6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.
- .7 The contractor shall provide competent flag persons, properly equipped, and trained satisfying relevant Alberta Workplace Safety and Health Regulations.
- .8 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traffic and coordination with adjacent contracts.
- .9 Minimize dust in the construction zone by means of cleaning and watering.
- .10 Temporary barriers and enclosures shall be provided by the Contractor in order to execute the Work expeditiously, and shall be removed from site prior to the date specified for Final Completion in Section 01 11 00 – Summary of Work.

1.5 INFORMATIONAL AND WARNING DEVICES

- .1 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the Traffic Management Plan submitted by the Contractor and approved by the Departmental Representative. All temporary signs that are used for longer than one day shall be mounted on wood posts.
- .2 Place signs and other devices in locations recommended in AT Traffic Accommodation in Work Zones Manual (current edition). Provide intermittent signage if work zones exceed 2.0 km in length.
- .3 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .4 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .5 If situation on site changes, revise Traffic Accommodation Plan to approval of Departmental Representative.
- .6 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.6 CONTROL OF TRAFFIC

- .1 Provide competent flag personnel, trained, and properly equipped to AT Traffic Accommodation in Work Zones Manual (current edition) for situations as follows:
 - .1 When traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 At each end of restricted sections where pilot cars are required.
- .2 All flagpersons shall be trained, certified, and equipped in accordance with Alberta Workplace Safety and Health Regulations and associated regulations.

- .3 Delays to traffic due to contractor's operators: 60 minutes maximum.
- .4 Provide pilot cars at the discretion of the Contractor and approval of the Departmental Representative. Equip pilot cars with orange flashing lights and signs clearly designating vehicles as pilot cars.
- .5 Provide 2-way traffic during non-working hours.
- .6 The Departmental Representative will monitor traffic control measures and may require the Contractor to modify the Traffic Accommodation Plan when deficiencies or concerns are noted. The Contractor will bear the cost of implementing these requirements.
- .7 Traffic shall be safely accommodated at all times, including times of inclement weather.
- .8 Maintain access to property including overhead clearances for use by emergency response vehicles.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 REFERENCE STANDARDS

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

1.4 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

1.5 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental

Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 STORAGE, HANDLING AND PROTECTION

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

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Unload, handle and store such products supplied by Owner.

1.8 MANUFACTURER'S INSTRUCTIONS

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

1.9 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify

Departmental Representative if required Work is such as to make it impractical to produce required results.

- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.10 CO-ORDINATION

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

1.11 CONCEALMENT

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

1.12 REMEDIAL WORK

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

1.13 FASTENINGS

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

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

- .1 Protect and maintain existing active services. When services are encountered, immediately notify applicable utility company and Departmental Representative. Stake off and record location.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCES

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 SURVEY REFERENCE POINTS

- .1 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .2 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

1.5 SURVEY REQUIREMENTS

- .1 **The Contractor will provide all surveying required to complete the work identified in the Contract documents.**

1.6 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 The Contractor shall provide access to and take precautions to prevent damage to services such as railroad facilities, oil pipelines, gas pipelines, water and sewage pipes, electrical and telephone lines and cables, fire hydrants, manholes and catch basins. The Contractor shall determine the exact location of such services and conduct his operations so as to avoid the possibility of damaging them. The Contractor shall pay just claims arising directly or indirectly from damage caused by his Construction operations and shall save harmless the Department from and against all claims arising therefrom.

1.7 RECORDS

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

1.8 SUBSURFACE CONDITIONS

- .1 A geotechnical investigation along the roadway was performed. The existing depths of surfacing structure at each borehole are noted on the plans.

- .2 The information given is known only at the borehole locations. Actual surfacing structure composition and stratigraphy between boreholes may vary.
- .3 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

1.9 CONCEALMENT

- .1 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work

1.2 MEASUREMENT AND PAYMENT

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

1.3 DESCRIPTION

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

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

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Parks Canada Agency

Road Rehabilitation
Akamina Parkway
Waterton Lakes National Park

Section 01 71 13

MOBILIZATION

Page 2

END OF SECTION

Part 1 General

1.1 RELATED SECTION

- .1 Section 01 55 26 – Traffic Control.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 77 00 – Closeout Procedures.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 PROJECT CLEANLINESS

- .1 No waste collection service will be provided by Parks Canada. Arrangements must be made to appropriately dispose of waste at registered waste facilities outside of Waterton Lakes National Park.
- .2 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .3 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .4 Clear snow and ice from access to work areas during active construction periods and when access to environmental protection facilities required outside active construction times.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Provide any on-site bear proof containers required for collection of waste materials and debris.
- .7 Remove waste material and debris from site at end of each working day.
- .8 Dispose of waste materials and debris off site.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, and ensure specified workmanship and operation.
- .8 Remove dirt and other disfiguration from exterior surfaces.
- .9 Sweep and wash clean paved areas.
- .10 Clean drainage systems.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling and reuse.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 74 00 – Cleaning.
- .2 Section 01 78 00 – Closeout Submittals.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, Contractor, and Owner (if required).
 - .2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
 - .7 Final Payment:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

- .1 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 01 71 00 – Examination and Preparation.
- .4 Section 01 77 00 – Closeout Procedures.

1.2 MEASUREMENT AND PAYMENT

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 – Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Environmental Protection Plan.

- .8 Inspection Reports including those for traffic accommodation signage, sediment and erosion control and others as required.
- .9 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.5 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Legibly mark each item to record actual construction on the Contract Drawings and shop drawings including but not limited to:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .4 Legibly mark each item to record actual construction in the Specifications including but not limited to:
 - .1 Manufacturer and product number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Provide digital photos, if requested, for site records.

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

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 55 26 – Traffic Control.
- .2 Section 01 35 43 – Environmental Procedures.

1.2 REFERENCES

- .1 AT – Standard Specifications for Highway Construction, (current edition).

1.3 MEASUREMENT AND PAYMENT

- .1 Payment under this **“Unit Price Item 1, 19 and 29 – Asphalt Pavement Removal”** will include operations involved in milling, brooming, temporary stockpiling, removal and disposal. Payment shall be made as follow:
 - .1 **“Unit Price Item 1a – Cold Milling Asphalt Pavement (20 mm)”**, **“Unit Price Item 1b – Cold Milling Asphalt Pavement (40 mm)”** and **“Unit Price Item 1c – Cold Milling Asphalt Pavement (50 mm)”** will be measured for payment in square metres of asphalt pavement actually removed by cold milling according to these specifications, the contract drawings, or as directed by the Departmental Representative, and shall include all labour, equipment and material to satisfactorily complete this item of work.
 - .2 The Contractor shall take ownership of all millings and be disposed of outside of the National Park. The cost shall be included in the contract price for **“Unit Price Item 1a – Cold Milling Asphalt Pavement (20 mm)”**, **“Unit Price Item 1b – Cold Milling Asphalt Pavement (40 mm)”** and **“Unit Price Item 1c – Cold Milling Asphalt Pavement (50 mm)”**.
 - .3 **“Unit Price Item 1d, 19a and 29a – Asphalt Pavement Removal and Disposal”** will be measured for payment in the field based on horizontal field measurements in square metres of the full depth (approximately 50 mm lift) of asphalt pavement actually removed according to these specifications, the contract drawings, or as directed by the Departmental Representative, and shall be removed offsite and disposed of and shall include all labour, equipment and material to satisfactorily complete this item of work.
 - .4 **“Unit Price Item 1e, 19b and 29b – Sawcutting”** will be measured per linear metre and include full depth saw cutting of existing asphalt or concrete pavement up to 100mm depth. This item shall include all labour, equipment and material to satisfactorily complete this item of work.
 - .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price, Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
 - .6 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.

- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated. Maximum particle size of milled materials shall be 50 mm.

Part 3 Execution

3.1 PREPARATION

- .1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.
- .2 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.
- .3 Have appropriate Traffic Control measures in place for this work.

3.2 REMOVAL

- .1 Remove existing asphalt pavement to lines and grades as indicated or as established by Departmental Representative in field.
- .2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .4 Suppress dust generated by removal process.

3.3 FINISH TOLERANCES

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

3.4 CLEANING

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.
- .2 Waste Management: separate waste materials for reuse.

- .1 The Contractor shall take ownership of all millings and shall be disposed of outside the National Park.
- .2 Asphalt material removed that is not milled or grinded shall be disposed offsite.
- .3 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures.

1.2 MEASUREMENT PROCEDURES

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

1.3 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .4 National Research Council Canada (NRC)
 - .1 National Fire Code of Canada 2015 (NFC).

1.4 DEFINITIONS

- .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into environment.
- .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS SDS in accordance with Section 01 35 29.06 – Health and Safety Requirements to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

- .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.
- .4 Hazardous waste classification: identify waste codes applicable to each hazardous waste material based on applicable federal and provincial acts, regulations, and guidelines. Waste profiles, analyses, and classification submitted to contract offices for review and approval.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
 - .1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.
 - .4 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .5 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
 - .6 Solvents or cleaning agents: non-flammable or have flash point above 38 degrees C.
 - .7 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .8 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
 - .9 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.

- .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
- .6 Store hazardous materials and wastes in secure storage area with controlled access.
- .7 Maintain clear egress from storage area.
- .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 When hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.
 - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
 - .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
- .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

- .1 Description:

- .1 Bring on site only quantities hazardous material required to perform Work.
- .2 Maintain SDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
- .3 Spill Response Materials: provide spill response materials which can be used for absorbing/shoveling and containing hazardous materials.
- .4 Provide personal protective equipment.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
- .3 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .4 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .5 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .6 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .7 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .8 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .9 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .10 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 74 00 – Cleaning.
- .4 Section 32 16 00 – Concrete Walks, Curbs and Gutters.
- .5 Section 33 42 13 – Culverts.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement or payment will be made for concrete reinforcement used and shall be incidental to the Work in Section 32 16 00 – Concrete Walks, Curbs and Gutters, and Section 33 42 13 – Culverts.

1.3 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66-[04], ACI Detailing Manual 2004.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A143/A143M-[07 (2014)], Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .2 ASTM A641/A641M-[09a(2014)], Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .3 ASTM A775/A775M-[16], Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .4 ASTM A 884/A 884M-[14] Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 - .5 ASTM A 1064/A 1064M-[16b], Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .3 CSA Group
 - .1 CSA-A23.1-[14] /A23.2-[14], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-[14], Design of Concrete Structures.
 - .3 CSA-G30.18-[09 (R2014)], Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-[13 (R2014)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-[M92 (R2003)], Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-[M1990 (R2016)], Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-[2004], Reinforcing Steel Manual of Standard Practice.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: in accordance with Section 01 31 19 – Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure Departmental Representative attend.

.1 Verify project requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish, and limitations.

.2 When Chromate solution used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

.3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta of Canada.

.1 Prepare reinforcement drawings in accordance with SP-66, RSIC Manual of Standard Practice.

.2 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.3 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.4 Quality Assurance Submittals:

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

- .2 Mill Test Report: upon request, submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
- .3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.
- .4 Upon request submit to Departmental Representative epoxy coating applicator certificates identified in Quality Assurance.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Handle, transport, store and install epoxy coated reinforcing steel bars to prevent damage to coating. Prevent bar-to-bar abrasion and excessive sagging. Do not drop or drag bars. Store on suitable non-metallic supports. For lifting use nylon lifting slings, padded slings, separators or other means recommended by epoxy coated reinforcing steel supplier.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM 1064/A 1064M.
- .5 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.
- .6 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution minimum 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.

- .1 No restriction applies to temperature of solution.
- .4 Chromate solution sold for this purpose may replace solution described above, provided if of equivalent effectiveness.
 - .1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .7 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .8 Tie wire: 1.5 mm diameter annealed wire, epoxy coated.
- .9 Mechanical splices: subject to approval of Departmental Representative.
- .10 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada SP-66 CSA-A23.1/A23.2.
 - .1 SP-66 unless indicated otherwise.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
 - .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

2.3 SOURCE QUALITY CONTROL

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

Part 3 Execution

3.1 PREPARATION

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

- .1 Cutting or puncturing vapour retarder is not permitted; repair damage and reseal vapour retarder before placing concrete.
- .2 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .3 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
 - .2 Apply thick even film of mineral lubricating grease when paint is dry.
- .4 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .5 Maintain cover to reinforcement during concrete pour.

3.4 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Reinforcing steel.
- .2 Inspection and testing of reinforcing and reinforcing materials carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory certified to CSA A283.
- .3 Ensure test results distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 74 00 – Cleaning.
- .4 Section 32 16 00 – Concrete Walks, Curbs and Gutters.
- .5 Section 33 42 13 – Culverts.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement or payment will be made for cast-in-place concrete used and shall be incidental to the Work in Section 32 16 00 – Concrete Walks, Curbs and Gutters, and Section 33 42 13 – Culverts.
 - .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting not measured but considered incidental to work.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C260/C260M-[10a(2016)] , Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-[11] , Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-[16] , Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C 881/C881M-[15] , Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .5 ASTM C1017/C1017M-[13e1] , Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .6 ASTM C C1059/C1059M-[13] , Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
 - .7 ASTM D412-[16] , Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .8 ASTM D624-[2012] , Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .9 ASTM D1751-[04(2013)e1] , Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .10 ASTM D1752-[04a(2013)] , Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86] , Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA Group
 - .1 CSA A23.1/A23.2-[14] , Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-[06-R2016] , Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-[13] , Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005),

1.4 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
 - .1 GU, GUb and GUL - General use cement.
 - .2 MS and MSb - Moderate sulphate-resistant cement.
 - .3 MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 HE, HEb and HEL - High early-strength cement.
 - .5 LH, LHb and LHL - Low heat of hydration cement.
 - .6 HS and HSb - High sulphate-resistant cement.
- .2 Fly ash types:
 - .1 F - with CaO content maximum 8%.
 - .2 CI - with CaO content 15 to 20%.
 - .3 CH - with CaO minimum 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.5 ADMINISTRATIVE REQUIREMENTS

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

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.

- .3 Site Quality Control Submittals:
 - .1 Provide testing results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.
 - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
 - .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
- .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.
- .3 At least 4 weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
 - .1 Changing source of fly ash without written approval of Departmental Representative is prohibited.
- .4 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .5 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.

- .2 Deviations submitted for review by Departmental Representative.
- .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.9 SITE CONDITIONS

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

Part 2 Products

2.1 PERFORMANCE CRITERIA

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

2.2 MATERIALS

- .1 Portland cement: to CAN/CSA-A5
- .2 Supplementary cementing materials: to CAN/CSA-A23.5
- .3 Water: to CAN/CSA-A23.1
- .4 Air entraining admixture: to CAN/CSA-A266.1
- .5 Chemical admixtures: to CAN/CSA-A266.2. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Curing compound
 - .1 To be spray applied, liquid type conforming to ASTM C309 containing a fugitive dye.
 - .2 To be applied in accordance with manufacturer's recommendations.
 - .3 Other curing methods such as sheet material and burlap mats, subject to Departmental Representative's approval.

- .7 Preformed bituminous impregnated fiber board for expansion joints shall conform to ASTM D-1751 with the same shape as the concrete cross sections and having a minimum thickness of 13mm.
- .8 Concrete to be Exposure class C-2 with the following modifications:
 - .1 Hand-formed curb and gutter, walks, median infill and headwall concrete:
 - .1 Slump: 80mm
 - .2 Air entrainment: 5 to 8%
 - .3 Max aggregate size: 20 mm
 - .4 Min cement content: 335 kg/m³
 - .5 Min 28 day compressive strength: 32 MPa
 - .2 Extruded concrete:
 - .1 Slump: 0 - 25mm
 - .2 Air entrainment: 6 to 9%
 - .3 Max aggregate size: 10 mm
 - .4 Fineness modulus: 2.1 to 2.4
 - .5 Min cement content: 335 kg/m³
 - .6 Min 28 day compressive strength: 32 MPa
- .9 Forms to CAN/CSA-A23.1.11
 - .1 Free from surface defects for all concrete faces exposed to view

Part 3 Execution

3.1 SUBGRADE PREPARATION

- .1 Excavate or fill to design subgrade as indicated on drawings or as directed by Departmental Representative.

3.2 GRANULAR MATERIAL

- .1 Place granular material to design grade shown on drawings and typical sections or as directed by the Departmental Representative.
- .2 Obtain Departmental Representative's approval of compacted base prior to placing forms or control devices for extruding equipment

3.3 FORMWORK

- .1 Ensure steel forms of approved design and free from twists and warp.
- .2 Ensure wood forms of select dressed lumber, straight and free from defects and thoroughly cleaned.
- .3 Use flexible forms for all curves less than 60m radius.
- .4 After obtaining Departmental Representative's approval of compacted base, set forms to line and grade as shown on Contract Drawings, free from waves or irregularities in line or grade.

- .5 Set special isolation forms as required around catch basins, manholes, poles or other objects as shown on drawings or as directed by the Departmental Representative.
- .6 Forms to be to shape, lines and full dimensions of work being formed.
- .7 Adequately brace forms to maintain specified tolerances after concrete is placed.
- .8 Treat forms lightly with approved release agent and remove surplus agent

3.4 INSPECTION

- .1 Immediately prior to placement of concrete, carefully inspect all formwork to ensure forms are properly set at required horizontal and vertical alignment, sufficiently rigid, clean, surface treated and ready for placement of concrete. Obtain Departmental Representative's approval of formwork and compacted base.

3.5 CONCRETE PLACEMENT

- .1 Obtain Departmental Representative's approval before placing concrete. Provide minimum 24 h notice prior to placing concrete.
- .2 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .3 Do not place concrete during rain or on ponded water or frozen base
- .4 Do not place concrete when air temperature appears likely to fall below 5 degrees Celsius within 24 hours, unless specified precautions are taken and approved by Departmental Representative.
- .5 When temperature is below 5 degrees Celsius, maintain all concrete at temperature not less than 10 degrees Celsius for at least 72 hours and protect from freezing for at least another 72 hours or such time as required to ensure proper curing of concrete.
- .6 Schedule concrete placement to ensure sufficient daylight hours available to permit edging and finishing or provide adequate illumination.
- .7 Moisten granular base immediately prior to placing concrete
- .8 Place concrete within 1.5 hours of batching time.
- .9 Place concrete in forms, ensuring no segregation of aggregate and consolidate with approved mechanical vibrator or power screed.
- .10 Place concrete in continuous operation until entire panel or section completed. Do not place fresh concrete on concrete which has achieved partial set.
- .11 Discontinue placement at expansion, construction or isolation joints only.

3.6 WORKMANSHIP

- .1 Strip forms ensuring no damage to concrete.
- .2 Ensure curing procedures consistent with weather and temperature conditions.
- .3 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .4 Do not place load upon new concrete until authorized by Departmental Representative.

- .5 Protect exposed surfaces from weather and vandalism during initial set period
- .6 Where finished product does not conform to specifications and finish quality, remove defective product and replace.

3.7 TOLERANCES

- .1 Maximum horizontal deviation = 6mm
- .2 Maximum vertical deviation = 6mm
- .3 Maximum deflection from horizontal or vertical alignment to be 6mm in 3 m.

3.8 EXPANSION JOINTS

- .1 Form transverse expansion joints at both ends of curb returns and at a maximum spacing of 9m for sidewalks and curb and gutter.

3.9 CONTROL JOINTS

- .1 In sidewalks, construct control joints at a maximum 3m interval.
- .2 In curb and gutter construct control joints at a maximum 3m interval and match with control joints in abutting sidewalk.
- .3 Use proper tool to make cut while concrete is still green or saw cut after concrete has hardened.
- .4 Cut minimum of 1/3 cross sectional area of concrete section.

3.10 ISOLATION JOINTS

- .1 Form isolation joints around all poles, hydrants, manholes and all structures or fixed objects located within the concrete section by using specified joint filling material.
- .2 Form longitudinal isolation joints between sidewalk and abutting curb and gutter, abutting structures using 13mm approved filling material.

3.11 FINISHING

- .1 Finish surface of concrete sidewalks and median infill to smooth surface with magnesium or wood float and brush or broom to provide uniform non-skid surface.
- .2 Broom or brush crossways or as otherwise required to match adjacent finish or as directed by Departmental Representative.
- .3 Grooves or scoring (dummy joints) used for aesthetic purposes as shown on the drawings or as directed by the Departmental Representative to be marked with proper tools and set 15mm deep.
- .4 Round edges with steel edging tool with a width of 50mm around perimeter of each panel or as shown on drawings
- .5 Ensure surface of hand-formed curb and gutter is smooth magnesium or wood float finish. Ensure extruded curb and gutter is smooth finished and hand floated as required to correct irregularities.
- .6 Under no circumstances is concrete to be overworked by trowelling, dusted with dry cement or finished with mortar coat.

3.12 CLEANING

- .1 Clean in accordance with Section 01 74 00 – Cleaning.
- .2 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
- .3 Provide appropriate area on job site where concrete trucks can be safely washed.
- .4 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collection site as approved by Departmental Representative.
- .5 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location to pose health or environmental hazard is prohibited.
- .6 Prevent admixtures and additive materials from entering drinking water supplies or streams.
- .7 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.
- .8 Dispose of waste in accordance with applicable local, Provincial and National regulations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 55 26 – Traffic Control
- .2 Section 01 35 43 - Environmental Procedures

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Payment under this **“Unit Price Item 13 and 37 – Traffic Signage”** will include operations involved in removal, salvage, reinstallation, disposal, supply and install. Payment shall be made as follow:
 - ~~.1 **“Unit Price Item 13a and 37a – Removal and Reinstallation or Disposal of Existing Signs”** will be measured for payment per unit, in accordance to these specifications, the contract drawings, or as directed by the Departmental Representative, and shall include all labour, equipment and material to satisfactorily complete this item of work.~~
 - ~~.2 Disposal of signs shall be disposed by the Contractor off site and shall become property of the Contractor. The cost shall be included in the contract price for **“Unit Price Item 13a and 37a – Removal and Reinstallation or Disposal of Existing Signs”**.~~
 - ~~.3 **“Unit Price Item 13b and 37b – Supply and Install Post (100mm x 150mm)”** will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.~~
 - ~~.4 **“Unit Price Item 13c and 37c – Supply of Signs, Aluminum”** will be measured per square metre of sign supplied. This item shall include all labour, equipment and material to satisfactorily complete this item of work.~~
 - ~~.5 **“Unit Price Item 13d and 37d – Install Sign – Less than 1 m²”** will be measured per square metre of sign installed. This item shall include all labour, equipment and material to satisfactorily complete this item of work.~~
 - .1 **“Unit Price Item 13a and 37a – Removal and Disposal of Existing Signs – One Post”** will be measured for payment per unit, in accordance to these specifications, the contract drawings, or as directed by the Departmental Representative, and shall include all labour, equipment and material to satisfactorily complete this item of work.*
 - .2 Disposal of signs with one post shall be disposed by the Contractor off site and shall become property of the Contractor. The cost shall be included in the contract price for **“Unit Price Item 13a and 37a – Removal and Disposal of Existing Signs – One Post”**.*
 - .3 **“Unit Price Item 13b – Removal and Disposal of Existing Signs – Two Posts”** will be measured for payment per unit, in accordance to these specifications, the contract drawings, or as directed by the Departmental Representative, and shall include all labour, equipment and material to satisfactorily complete this item of work.*
 - .4 Disposal of signs with two posts shall be disposed by the Contractor off site and shall become property of the Contractor. The cost shall be included in the*

contract price for “Unit Price Item 13b – Removal and Disposal of Existing Signs – Two Posts”.

- .5 “Unit Price Item 13c and 37b – Supply and Install Post (100mm x 150mm)” will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .6 “Unit Price Item 13d – Concrete Base – Supply and Install” will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .7 “Unit Price Item 13e – Supply and Install Breakaway Steel Posts – W150x14” will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .8 “Unit Price Item 13f and 37c – Supply of Signs, Aluminum” will be measured per square metre of sign supplied. This item shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .9 “Unit Price Item 13g – Supply of Signs, ASTM-D4956 for Type IX/ XI” will be measured per square metre of sign supplied. This item shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .10 “Unit Price Item 13h and 37d – Install Sign – Less than 1 m²” will be measured for payment per unit. This item shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .11 “Unit Price Item 13i – Install Sign – 1 m² to 3 m²” will be measured for payment per unit. This item shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .12 “Unit Price Item 13j – Install Sign – Greater than 3 m²” will be measured for payment per unit. This item shall include all labour, equipment and material to satisfactorily complete this item of work.*
- .13 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .14 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .15 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 AT Standard Specifications for Highway Construction, latest edition.
- .2 Parks Canada, Exterior Signage Standards and Guidelines – Version 1, March 2007
- .3 Manual on Uniform Traffic Control Devices, 2009

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for signage and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada.
 - .2 Submit catalogue sheets and full size templates.
 - .3 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, mounting methods, schedule of signs.
- .4 Samples:
 - .1 Submit representative sample of each type sign, sign image and mounting method including, but not limited to: graphics, cast letters, sign box installation method, channel letters, and wall plates fixed mounting installation method.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

1.7 QUALITY ASSURANCE

- .1 Welding Certificate in accordance with CSA W47.2.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and with manufacturer's written instruction.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

- .1 Store materials, off ground, indoors, in dry location and in accordance with manufacturer's recommendations in a clean, dry, well-ventilated area.
- .2 Store and protect signs and posts from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 POSTS

.1 Wooden posts:

- .1 Posts shall be No. 2 and better clear grade cedar.
- .2 Post sizes to be supplied shall be 100 mm x 150 mm dimension lumber, in lengths varying according to the sign size and required vertical clearance as indicated in the design drawings. The top of the sign shall be 10 feet above grade.
- .3 At the discretion of the Departmental Representative, all sign posts should have a field drilled breakaway feature as per standard drawing TEB-1.81.

2.2 SIGNS

- .1 The Contractor shall supply the Departmental Representative with certification from the Supplier that the signs conform with the Specifications and shall only purchase signs that are certified by the Supplier to meet the Specifications of the sheeting Manufacturer.
- .2 All signs supplied by the Contractor shall be clearly marked with the following information:
 - .1 Manufacturer's Name or Trade Mark.
 - .2 Date of manufacture.
 - .3 Type of sheeting material.
- .3 The information shall be provided on a weatherproof label, or some other form of permanent marking fixed to the back of the sign near the bottom right-hand corner. The label shall be smaller than 100 mm x 100 mm in size.
- .4 Sign patterns shall conform to the Uniform Traffic Control Devices of Canada Sign Pattern Manual or to Parks Canada, Exterior Signage Standards and Guidelines.
- .5 All lettering on signs shall conform to the series Type Highway Font from the Standard Alphabet for Highway Signs, available from the Federal Highway Administration (CHTO-20), Washington, D.C., 20590, unless otherwise specified by the Uniform Traffic Control Devices of Canada Sign Pattern Manual or the Parks Canada, Exterior Signage Standards and Guidelines.
- .6 If required, the Contractor shall supply cluster frames suitable for the installation of multiple signs of up to 1.5 m². The frames shall be painted with rust resistant aluminum paint or a metal primer and aluminum paint suitable to the Departmental Representative.
- .7 The Contractor shall supply all bolts and other hardware required to mount signs to posts or to frames and the frames to the posts. All bolts and hardware shall be galvanized.

- .8 The reflective sheeting supplied by the Contractor for the signs indicated in the design Drawings shall meet or exceed the performance requirements specified in ASTM-D4956 for Type IX or Type XI Unmetallized Cube Corner Microprismatic Retroreflective Element Material.

Part 3 Execution

3.1 PREPARATION

- .1 Have appropriate Traffic Control measures in place for this work.

3.2 PROTECTION

- .1 Protect existing pavement, concrete curb and barriers, and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL AND INSTALLATION

- .1 Signs shall be removed in accordance with AT Standard Specifications for Highway Construction Section 7.7.
- .2 Manufacturer's Instructions: compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .3 Erect and secure signs plumb and level at elevations indicated.
- .4 Comply with sign manufacturer's installation instructions and approved shop drawings.
- .5 It is the Contractor's responsibility to have all sign locations checked for utilities prior to digging holes for posts. Any adjustments to the locations of signs will be subject to the approval of the Departmental Representative.
- .6 The soil at the bottom of holes shall be thoroughly compacted to provide a firm bearing. Posts shall be set vertically and backfilled with Des. 2, Class 25 Granular Base Course in 150 mm maximum lifts, compacted to 98% standard proctor. The disturbed area around installations shall be restored to the original contours. The signs shall be fixed securely to the post(s) in accordance with the standard drawings.
- .7 The contractor shall confirm the desired signage setbacks with the Departmental Representative prior to installation. All setbacks shall be in accordance with Alberta Transportation standards.
- .8 When a post is removed and replacement is not requested, the Contractor shall backfill the hole in 150 mm maximum lifts compacted to 98% proctor with type 1 (25 mm minus) fill material.
- .9 Posts with rectangular cross-sections shall be installed such that the longer dimension is orientated parallel to the direction of the highway.
- .10 The installed sign shall be clean and not bent or twisted. The reflectorized surface shall be free of scratches and marks and must be securely fastened to the post or frame.

- .11 All hardware shall be stainless steel and tightened to the torque recommended by the sign manufacturer. Nylon washers, the same diameter as the washer (25 mm diameter), shall be used for galvanic corrosion protection.
- .12 A plastic cap shall be installed in on the rear of the sign, along with a drain notch. The cap shall be held in place with a rubber o ring or silicon.
- .13 If required, the new clusters frames shall be installed perpendicular to and facing the approaching traffic lane and shall be securely fastened to the post.
- .14 Existing signs designated for removal and disposal shall become the property of the Contractor.
- .15 Prior to the final acceptance of the Work, all damage or deficiencies from any cause in signs and posts installed under this Contract shall be rectified by the Contractor at his own expense.

3.4 FINISH TOLERANCES

- .1 Finished tolerances shall be in accordance with AT Standard Specifications for Highway Construction Section 7.7.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave signs clean.
 - .2 Remove debris from interior of sign boxes.
 - .3 Touch up damaged finishes.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 **General**

1.1 **RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 22 16 – Cleaning and Reshaping of Ditches

1.2 **MEASUREMENT AND PAYMENT**

- .1 Quantities for payment; for clearing and grubbing will be measured in the field based on horizontal field measurements in hectares of land acceptably cleared and grubbed. Chipping and clearing waste shall be disposed of outside of the National Park, according to these specifications, and shall include all labour, survey, equipment and material to satisfactorily complete this item of Work. Payment for this item will be made under **“Unit Price Item 2, 20 and 30 – Clearing and Timber Salvage”**.
- .2 Removing, hauling and disposing of trees felled prior to the start of the Work by other parties shall be incidental to **“Unit Price Item 2 – Clearing and Timber Salvage”** and shall be disposed of outside of the National Park, according to these specifications, and shall include all labour, survey, equipment and material to satisfactorily complete this item of Work.
- .3 ~~A qualified Archaeologist registered within the Province of Alberta shall be present on-site and conduct an archaeological investigation during all clearing and grubbing Work near known archaeological sites, as approved by the Departmental Representative. The Archaeologist shall be provided by the Contractor and shall be considered incidental to the Work and no additional or separate payment will be made.~~
- .3 *A qualified Archaeologist registered within the Province of Alberta shall be present on site and conduct archaeological monitoring during clearing and timber salvage near known archaeological sites, identified in **bold** in the table in Section 01 35 43 Environmental Procedures, Part 3.13 – VALUED COMPONENT MITIGATION MEASURES. The Archaeologist shall be provided by the Contractor incidental to the Work and no additional payment will be made.*
- .4 Where brushing and tree trimming for operation of equipment is required, it will be considered incidental to the work and no additional or separate payment will be made.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 **REFERENCE STANDARDS**

- .1 Canada National Parks Act.
- .2 Species at Risk Act.
- .3 The Migratory Birds Convention Act.
- .4 DRAFT Waterton Lakes National Park Management Plan for Fire Affected Trees.
- .5 Parks Canada – Waterton Lakes National Park General Best Management Practices including supplementary mitigations.
- .6 Waterton Lakes National Park Best Management Practices for Watershed-Scale Danger Tree Removal.
- .7 Parks Canada EIA Requirement Checklist.

1.4 **DEFINITIONS**

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than 300 mm above ground.
- .2 Grubbing consists of mulching in-place areas previously cleared to not less than 300 mm below existing ground surface and disposing of all material not able to be mulched to the specified size, including previously chipped material, previously uprooted brush, trees and stumps, and surface debris.

1.5 **STORAGE AND PROTECTION**

- .1 Prevent damage to natural features, bench marks, utility lines, water courses which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.
- .2 Trees and brush to be kept separate from the topsoil if being removed from site.

1.6 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling.

Part 2 **Products**

2.1 **NOT USED**

- .1 This section not used.

Part 3 **Execution**

3.1 **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and waterways according to requirements of sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation control and restore and stabilize areas disturbed during removal.

3.2 **PREPARATION**

- .1 Grub areas identified on the plans and as directed by the Departmental Representative.
- .2 ~~The Work in this Section shall be completed with minimal ground disturbance and the clearing alongside Akamina Road shall be completed in frozen ground conditions, or under supervision of a qualified Archaeologist registered in the Province of Alberta, supplied by the Contractor, during dry conditions.~~
- .2 *Work in this Section shall be completed with minimal ground disturbance and the clearing alongside Akamina Road shall be completed in frozen ground conditions or during dry conditions.*
- .3 The Contractor shall work around and not clear or disturb living and healthy trees within the clearing area as indicated by the Departmental Representative.
- .4 Inspect site and verify with Departmental Representative items designated to remain. Identify and mark clearing and grubbing limits in the field.
- .5 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
- .6 Notify utility authorities before starting grubbing.
- .7 Keep roads and walks free of dirt and debris.
- .8 Wildlife timing restrictions will apply. Hazard tree abatement work is not permitted to be completed between April 1, 2019 and August 30, 2019 unless approved, in writing, by the Departmental Representative on a case by case basis. Work may be permitted during this period, where required to maintain the safety of the workers.

3.3 **CLEARING**

- .1 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, underbrush, and rubbish occurring within cleared areas.
- .2 Clear as indicated on the drawings and as directed by Departmental Representative, by cutting at height of not more than 300 mm above ground.
- .3 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.4 **GRUBBING**

- .1 Mulch, grind or chip trees and stumps, roots, previously uprooted brush, previously chipped material, and surface debris on indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Separate, pick, load, haul and deliver chips, debris, roots and stumps left larger than specified size after mulching and dispose of material offsite.
- .4 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 1.5 m³.
- .5 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.
- .6 Grubbing is not required for the clearing and timber salvage sections along the Akamina Parkway.
- .7 Grubbing is required for the expansion of trailheads, Day Use Areas, and drainage improvement sections.

3.5 **REMOVAL AND DISPOSAL**

- .1 Dispose of waste materials and debris outside of Waterton Lakes National Park.
- .2 Cut timber greater than 125 mm diameter to 300 mm lengths and stockpile as indicated by Departmental Representative. Stockpiled timber becomes property of Owner.
- .3 Dispose of cleared and grubbed materials, not mentioned above, as directed by Departmental Representative.
- .4 Burning or burying of cleared and grubbed materials within the National Park will not be guaranteed but may be carried out with a Restricted Activity Permit.
- .5 Remove and dispose of diseased trees as indicated by the Departmental Representative.

3.6 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for stripping of topsoil as approved by the Departmental Representative.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
- .2 Leave Work area clean at end of each day.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 11 00 – Clearing and Grubbing

1.2 MEASUREMENT PROCEDURES

- .1 Quantities for payment, for cleaning and reshaping of ditches will be measured in the field based on horizontal field measurements in linear metre of acceptably cleaned and reshaped ditches, according to these specifications, and shall include removal of loose material, shaping of ditch, disposal of excess material and all survey, labour, equipment and material to satisfactorily complete this item of Work. Payment will be under **“Unit Price Item 5 – Cleaning and Reshaping of Ditches”**.
- .2 No additional or separate payment will be completed for screening, segregating and stockpiling of organic material.
- .3 Where Clearing and Grubbing of existing trees and underbrush is required to establish the grades and lines shown on the drawing, this work will be paid separately in accordance with Section 31 11 00 – Clearing and Grubbing.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 Mobilization / Demobilization”** and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 DESCRIPTION

- .1 Contractor shall clean and re-shape ditches at the locations shown on the Drawings. Ditch cleaning and reshaping shall be to the grades and lines shown on the Drawings and reference Cross Sections, or as directed by the Departmental Representative.
- .2 ~~Excavated material from ditch regrading shall be segregated into organics (topsoil) and common material. Organic material is to be screened to remove waste, clay, rocks and other non-organic material. Organic material shall be processed through 50mm x 50mm screen. Screened organics and common material to be stockpiled separately as directed by the Departmental Representative.~~
- .2 *Excavated material from ditch regrading shall be segregated into organics (topsoil) and non-organic material.*

- .3 Waste material from cleaning of ditches shall be disposed off-site by Contractor and shall be incidental to the Work.
- .4 Excavated material other than boulders from cleaning of ditches between Station 0+000 and Station 5+100 shall be considered waste due to invasive weeds and shall be removed and disposed of outside of Waterton Lakes National Park, as directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures.

1.2 MEASUREMENT AND PAYMENT

- .1 Quantities for payment, for preparing subgrade will be measured in the field based on horizontal field measurements in square metres of acceptably prepared subgrade, according to these specifications, and shall include grading, scarifying, watering, compacting, drying and all survey, labour, equipment and material to satisfactorily complete this item of Work. Payment will be under **“Unit Price Item 4a, 22a and 32a – Prepare Subgrade to minimum 150mm depth”**.
- .2 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .3 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 AT – Standard Specifications for Highway Construction, (current edition).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of existing substrate are acceptable for subgrade preparation.
 - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with subgrade reshaping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SCARIFYING AND RESHAPING

- .1 In accordance with AT – Standard Specifications for Highway Constructions, Section 2.1 (current edition).
- .2 Scarify subgrade to full width as directed by Departmental Representative and to minimum depth of 150 mm.
- .3 Loosened material to be windrowed to the side and the exposed surface thoroughly compacted.
- .4 Material to be handled such that segregation does not occur.
- .5 Blade, mix, and trim material to elevation and cross section dimensions as directed by Departmental Representative

3.3 COMPACTING

- .1 In accordance with AT – Standard Specifications for Highway Constructions, Section 2.1 (current edition).
- .2 Compact to density not less than 98% corrected maximum dry density in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected to optimum value for compaction in accordance with ASTM D698.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- .1 Protect and maintain reshaped surface in condition conforming to this Section until succeeding material is applied.

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Parks Canada Agency

Road Rehabilitation
Akamina Parkway
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END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 34 43 – Environmental Procedures.
- .2 Section 31 11 00 – Clearing and Grubbing.
- .3 Section 33 42 13 – Culverts.

1.2 MEASUREMENT PROCEDURES

- .1 Excavation-Common and Embankment Construction:
 - .1 The Quantity of Excavation Common for which payment will be made shall be determined in cubic metre from survey cross-sections of the area of removal before excavation begins and after excavation is complete. Payment will be made under **“Unit Price Item 3a, 21a and 31a – Common Excavation”** and shall include cost of stripping, excavating, hauling, placing and compacting material for construction.
 - .2 No overhaul will be paid for this Work: Excavation Common.
 - .3 Load, haul and disposal of material from rock scaling and blasting operations: measure in cubic meters from cross-sectional survey at the disposal site.
 - .1 Rock scaling and blasting operations were completed prior to this Work and are not part of this Contract.
 - .2 Excavate material as indicated and as directed by Departmental Representative.
 - .3 Payment for excavating, loading, hauling and disposal of material shall be under **“Unit Price Item 3a – Common Excavation”**.
- .2 Excavation-Rock:
 - .1 The Quantity of Excavation Rock for which payment will be made shall be determined in cubic metre from survey cross-sections of the area of removal before excavation begins and after excavation is complete. Payment will be made under **“Unit Price Item 3b – Solid Rock Excavation - Premium”** and shall include cost removal of solid rock.
 - .2 Measure excavated boulders and rock fragments individually. Determine volume of excavated boulders and rock fragments by measuring three maximum mutually perpendicular dimensions.
 - .3 The cost for excavating, hauling, placing and compacting material will be paid under **“Unit Price Item 3a, 21a and 31a – Common Excavation”**.
 - .4 No blasting will be allowed on site.
 - .5 No overhaul will be paid for this Work: Excavation Rock.
- .3 Excavation-Borrow:
 - .1 The Quantity of Excavation Borrow for which payment will be made shall be determined in cubic metre from survey cross-sections of the area of removal

before excavation begins and after excavation is complete. Payment will be made under **“Unit Price Item 3c –Borrow Excavation”** and shall include cost of stripping, excavating, hauling, placing and compacting material for construction.

- .2 The Contractor shall source the borrow material as required.
- .3 Departmental Representative will take initial measurements after clearing and grubbing is completed and immediately prior to excavation of material to be incorporated into work.
- .4 No overhaul will be paid for this Work: Excavation Borrow.

.4 Excavation-Channel:

- .1 The Quantity of Excavation Channel for which payment will be made shall be determined in cubic metre from survey cross-sections of the area of removal before excavation begins and after excavation is complete. Payment will be made under **“Unit Price Item 3d, 21b and 31b – Channel Excavation”** and shall include cost of excavating, hauling, placing and compacting material for construction.
- .2 Departmental Representative will take initial measurements after clearing and grubbing is completed and immediately prior to excavation of material to be incorporated into work.
- .3 No overhaul will be paid for this Work: Excavation Channel.

.5 Sideslope Improvement:

- .1 The Quantity of Sideslope Improvement for which payment will be made shall be determined in linear metre per side along the Roadway. Payment will be made under **“Unit Price Item 3e – Sideslope Improvement”** and shall include denuding the sideslope of vegetation and topsoil; the supply of borrow material as required; excavating, loading, hauling, placing, finishing; redistribution of denuded topsoil; seeding; and all labour, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.
- .2 All other work including, but not limited to, extending existing culverts; and the removal and reinstallation of existing signs, guide posts, and guardrail, as required, will be paid for at the applicable unit prices bid for the types of work incorporated.

.6 Excavation-Waste:

- .1 The Quantity of Excavation Waste for which payment will be made shall be determined in cubic metre from survey cross-sections of the area of removal before excavation begins and after excavation is complete. Payment will be made under **“Unit Price Item 3f – Waste Excavation”** and shall include cost of excavating, hauling, and dispose of material at a site provided by the Contractor outside of the Park.
- .2 Departmental Representative will take initial measurements after clearing and grubbing is completed and immediately prior to excavation of material to be incorporated into work.
- .3 No overhaul will be paid for this Work: Excavation Waste.

- .7 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 Mobilization / Demobilization”**, and no additional payment will be made
- .8 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2-Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .9 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.
- .10 The Contractor shall be responsible for quantity surveys, and shall provide the Departmental Representative with survey data in both raw format and CSV point files.
- .11 No measurement payment will be made for:
 - .1 No measurement or payment will be made for excavation used for cleaning and reshaping ditches, it will be incidental to the Work in Section 31 22 16 – Cleaning and Reshaping of Ditches and no additional or separate payment will be made.
 - .2 Excavating unnecessarily beyond lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
 - .3 Ripping and/or drilling of material.
 - .4 Scarifying or benching existing slopes or existing road surfaces.
 - .5 Removing and disposing of roots, stumps and other materials excavated during waste operation.
 - .6 Removing unsuitable material from embankment attributable to negligence.
 - .7 Shattering rock to 300 mm below subgrade elevation.
 - .8 Scaling and removing loose rock from rock face.
 - .9 Watering, drying or compacting.
 - .10 Proof rolling.
 - .11 Compaction of material (150 mm) below subgrade horizon in areas of cut.
 - .12 Finishing.

1.3 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM D698-00a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³) (600 kN-m/m³).
- .2 AT – Standard Specification for Highway Construction, (current edition)

1.4 DEFINITIONS

- .1 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped

with reasonable effort with a Caterpillar D9 crawler bulldozer or equivalent to be considered integral with parent mass.

- .2 Boulder or rock fragments measuring in volume [1] cubic metre or more.
- .2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .3 Stripping: excavation of organic material covering original ground.
- .4 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved.
- .5 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .6 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 QUALITY CONTROL

- .1 Regulatory Requirements:
 - .1 Adhere to regulations of authority having jurisdiction when blasting is required.
 - .2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .2 All Quality Control testing by the Contractor.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Products

2.1 MATERIALS

- .1 Embankment materials require approval by Departmental Representative.
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Material used for embankment must meet AT – Standard Specifications for Highway Construction, (current edition).
- .4 Borrow material:
 - .1 Obtain from sources as indicated or as designated by Departmental Representative.
 - .2 Obtain from borrow pit approved by Departmental Representative.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that condition of substrate is acceptable for roadway embankment Work:
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Departmental Representative.

3.2 COMPACTION EQUIPMENT

- .1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.
 - .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
 - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.

3.3 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution.

3.4 STRIPPING (OF TOPSOIL)

- .1 Place top soil and finish grading in accordance with Section 32 91 19.13 – Topsoil Placement and Grading.
- .2 Commence topsoil stripping of areas as directed by Departmental Representative after brush have been removed from these areas.
- .3 Strip topsoil to depths as directed by Departmental Representative. Do not mix topsoil with subsoil. Stripping depth is estimated to be on average 100 mm. The Contractor shall verify topsoil thicknesses during time of construction and shall have no claim against the Owner for differences in topsoil thickness.
- .4 Interim stripping stockpile locations and methods of stockpile shall be the responsibility of the Contractor, with approval by the Departmental Representative.
- .5 Dispose of waste outside Park at site provided by Contractor, as directed by the Departmental Representative.
- .6 Remove clearing and grubbing debris from stripping.
- .7 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim or remove from site if quantity exceeds ability to grade on site.

3.5 EXCAVATING

- .1 General:

- .1 Notify Departmental Representative when waste materials are encountered and remove to depth and extent directed.
 - .2 Sub-excavate 600 mm below subgrade in cut sections unless otherwise directed by Departmental Representative.
 - .1 Compact top 150 mm below sub-excavate to minimum 95% maximum dry density, to ASTM D698 (AASHTO T99).
 - .2 Replace with approved embankment material and compact to specified embankment density.
 - .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as directed by Departmental Representative.
 - .4 The dimensions of the excavations and embankments shall be, in accordance with the typical sections accompanying these specifications, but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.
- .2 Drainage:
- .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
 - .2 Provide ditches as work progresses to provide drainage.
 - .3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.
- .3 Rock excavation:
- .1 Notify Departmental Representative, when material appearing to conform to classification for rock is encountered, to enable measurements to be made to determine volume of rock. Provide 6 hour notification.
 - .2 Shatter rock to 300 mm below subgrade elevation as indicated.
 - .3 All rock on cut face that is loose, hanging or which creates a potentially dangerous situation shall be removed or stabilized during or upon completion of excavation of each lift. Drilling of next lift will not be allowed until this work has been completed. Other methods such as machine scaling, hydraulic splitters or light blasting may be used in lieu of, or to supplement hand scaling.
- .4 Controlled Blasting:
- .1 Will not be permitted.
- .5 Borrow Excavation:
- .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
 - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
 - .1 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
 - .2 Remove waste and stripping material from borrow pits to designated locations.
 - .3 Slope edges of borrow areas to minimum 3:1 and provide drainage as directed.

- .4 Trim and leave borrow pits in condition to permit accurate measurement of material removed.
- .6 Excavated material other than boulders between Station 0+000 and Station 5+100 shall be considered waste due to invasive weeds and shall be removed and disposed of outside of Waterton Lakes National Park, as directed by Departmental Representative.

3.6 SIDESLOPE IMPROVEMENT

- .1 The Departmental Representative may adjust ditch elevations and sideslope ratio to ensure positive drainage.
- .2 Prior to modifying the existing sideslopes, the Contractor shall denude the sideslope of all vegetation and topsoil and windrow the material.
- .3 To ensure a proper bind between the existing and new material, the denuded sideslopes shall be scarified to a depth of 150 mm, or as approved by the Departmental Representative.
- .4 Embankment material, as required, shall be added and compacted to the satisfaction of the Departmental Representative.
- .5 The Contractor shall perform the sidesloping work so that there is sufficient width available to construct base course and/or asphalt concrete pavement to the depths indicated on the Drawings and to maintain a consistent finished pavement width, with uniform sideslope configuration for the full height of the highway grade, all as shown on the Drawings.
- .6 Existing guardrail shall be removed and then reinstalled after the completion of the Work. The Work shall be carried out in accordance with Section 34 71 13.25 – Vehicle W-Beam Guide Rail.
- .7 Existing culverts shall be extended or shortened or grouted as noted on the Drawings or as determined by the Departmental Representative and in accordance with Section 33 42 13 – Culverts.
- .8 The Contractor shall keep the roadway surface free of dirt and debris during sidesloping work. Equipment shall not be driven over culvert ends. Material placement and trimming shall be carried out using methods acceptable to the Departmental Representative.
- .9 The Contractor shall remove and dispose of all rocks and debris within the sidesloping area that are larger than 100 mm in dimension.
- .10 Any sign posts that are damaged as a result of this work shall be replaced at the Contractor's expense.
- .11 Upon completion of the sidesloping work, the Contractor shall uniformly redistribute the windrowed vegetation and topsoil material on the finished sideslopes. All disturbed areas shall be seeded in accordance with Section 32 92 19.16 – Hydraulic Seeding.

3.7 EMBANKMENTS

- .1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.
 - .1 Method used to be pre-approved in writing by Departmental Representative.
- .2 Break up or scarify existing road surface prior to placing embankment material.

- .3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized by Departmental Representative.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
 - .1 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

3.8 COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Embankment material shall be placed in successive uniform layers over the entire area as follows:
 - .1 Material containing less than 25 percent by volume of stones larger than 100 mm shall be placed in 200mm compacted layers.
 - .2 Material containing 25 percent or more by volume of stones larger than 100 mm shall be placed in layers not exceeding the maximum size of the stones. Stones larger than 100 mm shall not be placed within 150 mm of the subgrade elevation.
 - .3 In embankments composed principally of material obtained from rock cuts, the larger stones shall be carefully distributed and the interstices filled with smaller stones and other material to form a compact mass. Such embankments shall be constructed in layers not exceeding 1 metre. The placing of individual rocks and boulder exceeding 1.0 metres in least dimension will be permitted provided they are carefully distributed and the interstices filled with finer material to form a dense and compact mass. Each layer, before starting the next, shall be levelled and smoothed with suitable equipment. Hauling and spreading equipment shall be operated over the full width of each layer.
- .3 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.
- .4 Compact each layer to minimum 95% maximum dry density, ASTM D698 (AASHTO T99). Top 300 mm of subgrade to be compacted to 98% maximum dry density, ASTM D698 (AASHTO T99).
- .5 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.
- .6 For rock placed as fill, compact with large steel wheeled or tracked equipment of sufficient size to break larger particles. Compact until rock fill is stable under compaction equipment and all voids are filled.

3.9 PROOF ROLLING

- .1 Proof roll using a loaded tandem truck with tires inflated to normal operation pressures.
- .2 Proof roll subgrade.

- .3 Make sufficient passes with proof roller to subject surface to three separate passes of loaded tire. Departmental Representative to determine level of proof rolling.
- .4 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove subgrade material to depth and extent as directed by the Departmental Representative.
 - .2 Backfill excavated subgrade with common material and compact in accordance with Part 3.8 COMPACTION in this Section.
- .5 Where proof rolling reveals areas of defective subgrade, remove and replace in accordance with the appropriate sections. Removal of defective subgrade material shall be the Contractor's responsibility.

3.10 FINISHING

- .1 Shape entire roadbed to within 25 mm of design elevations.
- .2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.
- .3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.
- .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- .5 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.
- .6 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.11 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

3.12 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by Departmental Representative.
- .2 Provide silt fences and erosion protection as required to mitigate and prevent impacts to adjacent properties.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 31 37 00 – Riprap.
- .4 Section 33 42 13 – Pipe Culverts

1.2 MEASUREMENT AND PAYMENT

- .1 Geotextile will be measured in the field based on horizontal field measurements in square metres of acceptably installed geotextile including necessary overlap. Payment for geotextiles shall be full compensation for all labour, equipment, materials and incidentals required to complete the Work. Payment shall be made under **“Unit Price Item 3g and 21c– Woven Geotextile Filter Fabric Class 2 – Supply and Install”**.
- .2 No measurement or payment will be made for supply and installation of geotextile used at culverts, it will be incidental to the Work in Section 33 42 13 – Pipe Culverts and no additional or separate payment will be made.
- .3 No measurement or payment will be made for overlap of material and shall be incidental to the Work.
- .4 No measurement or payment will be made for Silt fences, include in other items of work.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D4595-86(2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D4716-01, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

- .4 ASTM D4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-M89 (April 1997), Textile Test
 - .2 Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .3 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .4 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .5 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .6 No.6.1-93, Methods of Testing Geotextiles and Geomembranes – Bursting Strength of Geotextiles under No Compressive Load.
 - .7 No.7.3-92, Methods of Testing Geotextiles and Geomembranes – Grab Tensile Test for Geotextiles.
 - .8 No. 10-94, Methods of Testing Geosynthetics - Geotextiles – Filtration Opening Size.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or
 - .2 Welded Structural Quality Steel/Structural Quality Steel.
 - .3 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 AT – Standard Specifications for Highway Construction, (current edition)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 MATERIAL

- .1 Geotextile: woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 3.8 m minimum.
 - .2 Length: 76 m minimum.
- .2 Physical properties:
 - .1 Minimum Grab Strength: to ASTM D4632, minimum 1,100 N
 - .2 Minimum Puncture Resistance: to ASTM D4833, minimum 400 N
 - .3 Tear Strength: to ASTM D4533, minimum 400 N
 - .4 Elongation: to ASTM D4632, minimum 50%
 - .5 Sewn Seam Strength: to ASTM D4632, minimum 990 N
 - .6 Permittivity: to ASTM D4491, minimum 0.02 per sec
 - .7 Apparent Opening Size: to ASTM D4751, maximum 0.60 mm
 - .8 Ultraviolet Stability: to ASTM D4355, 50% retained strength after 500 hrs of exposure
- .3 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A123/A123M.
- .4 Factory seams: sewn in accordance with manufacturer's recommendations.
- .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- .6 Silt Fence.
 - .1 Silt fences may be composed of woven or non-woven synthetic fabrics, approved commercially available products are as follows:
 - .2 Amoco: "1198 Silt fence"
 - .3 Terrafix: "Terrafence"
 - .4 Belton Industries Inc: "Beltech Silt Fence"
 - .5 Or approved equal.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .4 Join successive strips of geotextile by pinning with securing pins at 500 mm intervals or by retaining overlap in place by placing of weights.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.3 SILT FENCE/GEOSYNTHETIC BERMS

- .1 Install as per the manufacturer's instructions and recommendations.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for recycling and reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.
- .2 Do not overload soil or aggregate covering on geotextile.

Project No. 1519-02

Parks Canada Agency

Road Rehabilitation
Akamina Parkway
Waterton Lakes National Park

Section 31 32 19.16
GEOTEXTILE SOIL
STABILIZATION
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END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 31 32 19.16 – Geotextile Soil Stabilization
- .3 Section 33 42 13 – Pipe Culverts

1.2 MEASUREMENT PROCEDURES

- .1 Payment for geotextile soil stabilization under the rip-rap will be considered incidental and will not be measured or paid for separately.
- .2 No measurement or payment will be made for rip-rap used around installed culverts and shall be incidental to the Work in Section 33 42 13 – Pipe Culverts.
- .3 Measurement and payment for “**Unit Price Item 12 – Class 1 Rip Rap**” will be by field measurement for cubic metre of material incorporated into the work from survey cross-sections of the area prior to placement and after placement is complete and shall include all labour, equipment and material required to satisfactorily complete this item of work.
 - .1 Loading, hauling and placing will be incidental to the Work. No overhaul will be paid for this Work.
- .4 Measurement and payment for “**Unit Price Item 10b - Rock Check Dam**” will be per unit installed and shall include all labour, equipment and material required to satisfactorily complete this item of work.
 - .1 Loading, hauling and placing will be incidental to the Work. No overhaul will be paid for this Work.

1.3 REFERENCES

- .1 AT – Standard Specifications for Highway Construction, (current edition).
- .2 AT – Standard Specifications for Bridge Construction, (current edition).
- .3 Erosion and Sedimentation Control Best Management Practices (BMPs), Alberta Transportation, March 2003.

Part 2 Products

2.1 STONE

- .1 Stone to be approved by Departmental Representative and the ESO prior to delivery to site.
- .2 Random rock riprap shall consist of a graded mixture of sound, durable stone or pit-run gravel.
- .3 The gradation of culvert rip rap shall be such that 50 percent of the rip rap consists of material having a least minimum dimension of 250 mm.

- .4 The gradation of Class 1 Rip Rap shall be in accordance with the Alberta Transportation Standard Specifications for Bridge Construction.

2.2 GEOTEXTILE FILTER

- .1 Geotextile soil stabilization: in accordance with Section 31 32 19.16 – Geotextile Soil Stabilization.

2.3 ROCK CHECK DAMS

- .1 Stone to be approved by Departmental Representative and the ESO prior to delivery to site.
- .2 The Aggregate used shall have a mean diameter (D_{50}) of between 75 mm and 150 mm and must be large enough to remain in place during high velocity flow situations.

Part 3 Execution

3.1 PLACING

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface in accordance with Section 31 32 19.16 – Geotextile Soil Stabilization and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
- .4 Place rip-rap to thickness and details as indicated.
- .5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
- .6 Rip-rap to be machine or hand placed as appropriate for location and conditions of placement or as directed by the Departmental Representative.
- .7 Machine placing:
 - .1 Place rip-rap using suitable equipment.
 - .2 Do not run equipment on finished rip-rap surfaces.
- .8 Hand placing:
 - .1 Use larger stones for lower courses and as headers for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface evenly, free of large openings and neat in appearance.

3.2 ROCK CHECK DAMS

- .1 Construct rock check dams as per the Alberta Transportation Erosion and Sedimentation Control Best Management Practices.
- .2 Excavate a trench key a minimum of 0.15 m in depth at the rock check structure location.
- .3 Place geotextile fabric over footprint area of the rock check dam.

- .4 Construct structure by machine or hand.
- .5 Structure extends from one side of the ditch to the other.
- .6 Structure shall be constructed so that the centre of the crest is depressed to form a centre flow width which is a minimum of 0.30 m lower than the outer edges.
- .7 Height of the structure shall be less than 0.8 m in height to avoid impounding large volumes of runoff.
- .8 Minimum 3H:1V downstream slope.
- .9 Minimum 2H:1V upstream slope.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures.

1.2 MEASUREMENT AND PAYMENT

- .1 No measurement will be made under this section for granular material incorporated into the placement and backfill of culverts.
 - .1 Including granular backfill costs for culverts in Section 33 42 13 – Pipe Culverts.
- .2 No separate payment for:
 - .1 Supply, installation, maintenance and calibration of weigh scales and a scale house.
 - .2 Supply and application of water to achieve compaction.
 - .3 Material used to repair failures caused by the Contractor's construction equipment or activities, or due to faulty workmanship.
 - .4 Material placed outside of the limits of the design cross-section.
- .3 Accepted granular base course will be measured in tonnes based on scale tickets and paid under **“Unit Price Item 6a, 23a and 33a – Granular Base Course Des. 2, Class 25”**. Payment shall be compensation in full for all labour, equipment and material required to satisfactorily complete this item of work.
 - .1 Loading, hauling, placing, compacting, conditioning and drying will be incidental to the Work. No overhaul will be paid for this Work.
- .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCES

- .2 AT – Standard Specifications for Highway Construction, (current edition).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Submit granular base course sieve analysis for approval by Departmental Representative prior to production of base course.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 QUALITY ASSURANCE

- .1 As Per AT – Standard Specifications for Highway Construction, (current edition).

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Granular material removed from detour roads shall become property of the Contractor and shall disposed of as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular base course: material in accordance with the following requirements:
 - .1 AT, Standard Specifications for Highway Construction – Des. 2, Class 25, Granular Base Course

Designation		2
Class (mm)		25
Percent Passing Metric Sieve (CGSB 8-GP-2M)	80 000	-
	50 000	-
	40 000	-
	25 000	100
	20 000	82 – 97
	16 000	70 – 94
	12 500	-
	10 000	52 – 79
	8 000	-
	5 000	35 – 64
	1 250	18 – 43
	630	12 – 34
	315	8 – 26
	160	5 – 18
	80	2 - 10
% Fracture By Weight (2 Faces)		All +5000 60 +

Plasticity Index (PI)	NP – 6
LA Abrasion Loss Percent Max.	50 %

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular base course installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Supply and place granular base course in areas identified on the plans and as directed by the Departmental Representative.
- .2 Temporary Erosion and Sedimentation Control:
 - .1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 SURFACE PLACEMENT AND INSTALLATION

- .1 Place granular base after subgrade surface is inspected and approved in writing by Departmental Representative.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.

.3 **Compaction Equipment:**

- .1 Ensure compaction equipment is capable of obtaining required material densities.

.4 **Compacting:**

- .1 Compact to density not less than 100 % corrected maximum dry density to ASTM D698.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.5 **Proof rolling:**

- .1 Proof Roll as directed by Departmental Representative.
- .2 For proof rolling use standard roller of 45 400 kg gross mass with four pneumatic tires each carrying 11 350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
- .3 Obtain written approval from Departmental Representative to use non-standard proof rolling equipment.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade, repair as directed by Departmental Representative.
- .6 Where proof rolling reveals defective base remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 20 mm of established grade and cross section but not uniformly high or low.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
- .1 Upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 The supply and application of tack coat will be considered incidental and will not be measured or paid for separately.
- .2 Water added to emulsified asphalt will not be measured for payment.

1.2 REFERENCE STANDARDS

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect asphalt tack coats from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.
- .3 Deliver, store and handle materials in accordance with ASTM D140.
- .4 Provide, maintain and restore asphalt storage area.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

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

2.2 EQUIPMENT

- .1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.
- .2 Pressure distributor:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distribute in uniform spray without atomization at temperature required.
 - .2 Equipped with meter, registering travel in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow metre graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .1 Measure temperature to closest whole number.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
 - .8 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt tack coat installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 APPLICATION

- .1 Apply asphalt tack coat only on clean and dry surface.
- .2 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method approved by Departmental Representative.
- .3 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, but not to exceed 0.5 L/m², plus or minus 0.2 L/m².
- .4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .5 Apply asphalt tack coat only when air temperature greater than 10 degrees C and when rain is not forecast within 2 hours minimum of application.
- .6 Apply asphalt tack coat only on unfrozen surface.
- .7 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .8 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
 - .1 Control traffic in accordance with Section 01 55 26 – Traffic Control.
- .9 Keep traffic off tacked areas until asphalt tack coat has set.
- .10 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .11 Permit asphalt tack coat to set before placing asphalt pavement.
- .12 Submit summary report within 7 days minimum of date of application and include information as follows:
 - .1 Total area tack coated.
 - .2 Quantity of tack coat used.
 - .3 Mean application rate.
 - .4 Actual product quantity used when using equipment on pressure distributors.
 - .5 Dipstick measurements or electronic printouts are acceptable.
- .13 Carry out measurements in presence of Departmental Representative upon request.

- .14 Inspect tack coat application to ensure uniformity.
 - .1 Re-spray areas of insufficient or non-uniform tack coat coverage as directed by Departmental Representative.
 - .2 Ensure tack coating performed using hand held devices is consistent in appearance with adjacent areas of machine applied material.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

END OF SECTION

Part 1 General

1.1 PRELIMINARY AND GENERAL

- .1 This Section describes the materials, equipment, professional standards, and end product requirements for the construction of hot mix asphalt pavement
- .2 End Product Specifications contain the acceptance and payment criteria based on the results of specified sampling and testing. Payment of the Contract Unit Prices for the asphalt pavement product is contingent on the product meeting the QC Plan, professional standards and quality requirements of this Section and is subject to payment adjustments upward and downward in accordance to the provisions provided in these End Product Specifications (EPS).
- .3 When used in this Section:
 - .1 “acceptance” means agreement with past actions or decisions made, within the scope of the Contract.
 - .2 “authorization” means formal approval for future actions, frequently changing the Contract requirements.

1.2 GENERAL DESCRIPTION OF THE WORK

- .1 Generally, the work associated with the construction of asphalt pavement and shouldering by EPS consists of the following:
 - .1 Preparing a Quality Control Plan for review before commencing the Work and providing at the production site a testing facility to provide the data needed to implement that plan;
 - .2 Supplying, screening, crushing, processing and improving aggregate to produce asphalt mix aggregate;
 - .3 Supplying and delivering asphalt cement;
 - .4 Preparing mix designs which, once reviewed and accepted by the Departmental Representative, become the basis for the accepted Job Mix Formula;
 - .5 Heating the asphalt mix aggregate and mixing it with asphalt cement to produce asphalt mix that meets the Job Mix Formula;
 - .6 Hauling, placing, compacting and finishing the asphalt mix, including all lanes, shoulders, turning lanes, pullouts, pass-throughs and approaches as indicated on drawings and as directed by the Departmental Representative.
- .2 The Contractor shall provide an end product conforming in professional standard, quality and accuracy of detail to the QC Plan and the dimensional and tolerance requirements of the contract. Where no tolerances are specified, the standard of workmanship shall be in accordance with normally accepted good practice and the provisions of this Section. Payment is subject to upward or downward adjustments based on quality acceptance tests performed by the Departmental Representative and calculations performed by the Contractor with respect to application rate.

1.3 DEFINITIONS

- .1 Actual Asphalt Content – Actual asphalt content is the amount of asphalt cement in the mix as determined by the Department's Quality Assurance Program.
- .2 Additives – solid or liquid materials to enhance the properties of the liquid asphalt cement or mix.
- .3 Aggregate – the crushed or screened gravel.
- .4 Asphalt Cement (AC) – a bitumen-based liquid binder used in asphalt pavement.
- .5 Asphalt Content – Asphalt Content means the percentage of asphalt cement in the mix expressed as percentage by weight of the total aggregate in the mix determined by the Oven Test procedure.
- .6 Asphalt Mix (AM) – hot plant mixture of asphalt cement and aggregate.
- .7 Asphalt Mix Aggregate (AMA) – the processed crushed aggregate just prior to the addition of asphalt cement.
- .8 Asphalt Mix Design (AMD) – the asphalt mix design that is developed through the initial trials and testing to determine and optimize the Job Mix Formula for the end product of the asphalt mix.
- .9 Asphalt Pavement (AP) – compacted asphalt mix.
- .10 Cutback Asphalt – asphalt cement which has been blended with light petroleum distillates.
- .11 Design Asphalt Content – The asphalt content upon which the Job Mix Formula is initially established.
- .12 Driving Lane – A driving lane shall mean a single lane in any area of the pavement other than a shoulder or a barrier flare.
- .13 Emulsified Asphalt – asphalt cement that has been blended with water and emulsifying agents to form aqueous emulsions, including anionic type, cationic type and high float type.
- .14 End Product Specification (EPS) – A specification whereby the Contractor is responsible for the workmanship and quality control of the construction processes, and whereby the Department reviews the workmanship and may perform the specified quality assurance sampling and testing of the end product for the purpose of determining acceptance/rejection and payment.
- .15 Job Mix Formula (JMF) – The asphalt mix “recipe”, proposed by the Contractor in accordance with 2.3.4 or an accepted variation in accordance with 2.3.10 and accepted by the Department, establishing the aggregate proportions, gradation, and the asphalt content to be used for production of asphalt mix.
- .16 Lift – A layer of asphalt mix laid in a single application then compacted.
 - .1 Top Lift – The uppermost Lift, forming the final running surface.
 - .2 Lower Lift – Any Lift below Top Lift.
 - .3 Bottom Lift – The lowest Lift (excluding Level Course).

- .17 Lot and Sub-Lot – A Lot is a portion of the work being considered for acceptance and for the determination of payment adjustments. For density, AC content, gradation and smoothness, each Lot is comprised of a number of Sub-Lots, each of which is sampled, and then aggregated to determine the acceptability of the Lot. Lot and Sub-Lot sizes are defined in the appropriate payment adjustment provisions of this Section.
- .18 Reject Mix – asphalt mix that is deemed unacceptable for use in the project.
- .19 Sample Mean – the arithmetic mean of a set of test results constituting the sample.
- .20 Smoothness – a measure of the longitudinal profile of the pavement surface, measured as International Roughness Index (IRI).
- .21 Surplus Aggregate – aggregate surplus to the works, in split or un-split stockpiles which singly or combined will meet the asphalt mix aggregate gradation.
- .22 Random Sample – a set of test measurements taken, one each from a number of separate areas or Sub-Lots within a Lot, in an unbiased way.
- .23 Voids in Mineral Aggregate (VMA) – VMA represents the space available to accommodate the effective volume of asphalt (asphalt not absorbed into the aggregate) and the volume of air voids necessary in the mixture.

1.4 MEASUREMENT PROCEDURES AND UNIT PRICE ADJUSTMENTS

- .1 Accepted asphalt concrete pavement will be measured in tonnes based on scale tickets and paid under **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”**. Payment shall be compensation in full for supply of asphalt concrete mix including all materials, supply of asphalt cement, processing, plant mixing, loading, hauling, supply and application of prime/tack coat, paver laying, compacting, finishing surface, raking, interim lane marking, quality control testing, safety and maintenance, labour and equipment to complete the Work in accordance with the Contract Documents.
 - .1 Highway overlay paving, paved letdowns and mill infill shall be measured and paid under **“Unit Price Item 7a – Asphalt Concrete Pavement (EPS) – AT Mix Type M1”**.
 - .2 Side road and Day Use Area paving shall be measured and paid under **“Unit Price Item 7b, 24a and 34a – Asphalt Concrete Pavement (EPS) – AT Mix Type M1 (Trailheads, DUAs)”**.
- .2 Applicable payment adjustments (additions or subtractions as applicable) shall be in accordance with AT – Standard Specifications for Highway Construction, Section 3.50 – Asphalt Pavement Construction (EPS) with the exception of Testing and Evaluation of Finished Pavement Surface Smoothness Using International Roughness Index (IRI) Criteria which shall be as defined in Alberta Transportation’s Special Provision SP_S301, and any current Special Provisions. Payments shall be under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
 - .1 Smoothness testing to be arranged by the Departmental Representative.
- .3 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternatively electronic calibrated silo scales, at the plant by the Contractor shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement**

- (EPS)” and no additional payment will be made to the Contractor. The Contractor shall provide a scale person, as required, at their cost.
- .4 Preparing asphalt mix designs (including anti-stripping test), in accordance with Section 01 45 00 – Quality Control and Section 01 33 00 – Submittal Procedures, shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
 - .5 Supply and delivery of paving aggregates shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made to the Contractor.
 - .6 The movement of equipment and crew, shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”**. A move is defined as the Contractor moving equipment and crew to the next section to pave after having completed, in its totality, the previous section.
 - .7 Cleaning of existing pavement prior to paving is incidental to the Works and no additional payment will be made.
 - .8 No overhaul will be considered for payment under this contract.
 - .9 The Contractor shall provide Scale person and Checker to confirm quantities on a daily basis.
 - .10 Supply and delivery of asphalt cement shall be incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”**.
 - .11 Anti-stripping agent(s) and other additives, if required and accepted by the Departmental Representative, shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
 - .12 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 10% in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and as approved by the Departmental Representative. Any costs associated with this process including labour, equipment or materials shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”**.
 - .13 Asphalt Concrete Pavement placing at milled tie-in location is considered incidental to the Work and no additional payment will be made.
 - .14 Adjustment of existing utility access and manhole lids as accepted by the Departmental Representative shall be incidental to the Work.
 - .15 Reestablishment of existing facilities on finished ACP surface, including restrooms and garbage cans, will not be measured separately for payment and shall be considered incidental to **“Unit Price Item 7, 24 and 34 – Asphalt Concrete Pavement (EPS)”**.
 - .16 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
 - .17 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made to the Contractor.

- .18 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.
- .19 There will be no additional costs incurred by Parks Canada due to any delays with the asphalt work as a result of inclement weather.

1.5 QUALITY CONTROL

- .1 General - Quality Control shall be performed by the Contractor in accordance with Section 01 45 00 – Quality Control and the requirements of this Section.
- .2 Quality Control Plan
 - .1 The QC Plan shall be submitted in accordance with the timelines established in Section 01 33 00 – Submittal Procedures.
 - .2 The Quality Control Plan must include a detailed description of the means by which the Contractor shall use the quality control test results to ensure that the workmanship, asphalt materials, aggregate, mix production, paving and pavement compaction processes will be controlled to keep the product within the specified limits. The Quality Control Plan must clearly show the flow of information from the quality control laboratory to the individuals who shall make the actual adjustments to the processes and equipment to affect this control. The plan will show time allowance for each step, the names and positions of all the people involved, and a clear description of the responsibilities of each.
- .3 Quality Control Testing and Inspection
 - .1 The Contractor shall provide and maintain equipment and qualified personnel to perform all laboratory testing, field testing and inspection necessary to determine and monitor the characteristics and properties of all the materials produced and incorporated into the work. They shall also monitor the workmanship of the final product in accordance with the Quality Control Plan as most recently submitted.
 - .2 The Contractor shall provide a testing facility(s) that meets the requirements necessary to carry out all the test procedures listed within this Section. The facility(s) must have the equipment specified under the appropriate test designation to perform the tests. The Departmental Representative shall have access at all times to the quality control facility(s).
- .4 Quality Control Records
 - .1 Quality Control inspections shall be recorded on check sheets and/or diaries at the time of inspection.
 - .2 The results from Quality Control testing shall be reported on test logs immediately after each test is completed. The Contractor shall report all test results on Contractor-supplied forms acceptable to the Departmental Representative.
 - .3 For the purposes of confirming delivery of asphalt mix to the road and the calculation of material application rates, **the Contractor shall provide a full time Road Checker during all times of asphalt placement** to collect the weigh tickets for each load received at the placement operation. The Road Checker's Summary shall include, but not be limited to, the following information:

- .1 Truck Number.
- .2 Weigh Ticket Number and Net Weight of load.
- .3 Date, time and location by station of delivery.
- .4 Material Application Rate Dimensions and Calculations. Calculation frequency minimally shall be for every 10 loads.
- .5 Notes pertaining to the paving of any appurtenances (letdowns, intersections, tapers, etc.).
- .5 Final Quality Control Testing Reports
 - .1 Prior to the issuance of a Completion Certificate, the Contractor shall provide the Departmental Representative with:
 - .1 a summary of all aggregate quality control test results;
 - .2 copies of all quality control test results for asphalt mix properties and compaction; and
 - .3 copies of all quality control charts.

Part 2 Products

2.1 MATERIALS

- .1 Materials used shall be in accordance with AT – Standard Specifications for Highway Construction, Section 3.50 – Asphalt Pavement Construction (EPS).
- .2 PG 52-34 asphalt binder shall be used.
- .3 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 10% in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and as approved by the Departmental Representative.

Part 3 Equipment

3.1 EQUIPMENT AND PLANT

- .1 The asphalt plant shall be located outside of the WLNP boundary for this project.
- .2 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling ponds or drainage system will not be permitted. Asphalt plant located outside the park must comply with all environmental pollution control regulations applicable in the asphalt plant area.

Part 4 Execution

4.1 WORK METHODOLOGY

- .1 Execution of the Work shall be in accordance with AT – Standard Specifications for Highway Construction, Section 3.50 – Asphalt Pavement Construction (EPS).
- .2 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.
- .3 ACP thickness to be in accordance with the design drawings or as directed by the Departmental Representative. Base Repairs will be completed in accordance with the Contract Drawings or as directed by the Department Representative. The limits of overlay, mill and fill and base repair areas shall be reviewed and approved by the Department Representative following the survey layout of the project chainage and prior to the onset of the work.
- .4 Longitudinal joints shall be offset a minimum of 150 mm from one lift to the next. Longitudinal joints on the top lift shall be centered in the roadway.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures.

1.2 MEASUREMENT AND PAYMENT

- .1 Accepted granular surfacing material will be measured in tonnes based on scale tickets and paid under **“Unit Price Item 6b and 33b – Granular Surfacing Des. 4, Class 20 (100mm Depth)”**. Payment shall be compensation in full for all labour, equipment and material required to satisfactorily complete this item of work.
 - .1 Loading hauling, placing, compacting, conditioning and drying will be incidental to the Work. No overhaul will be paid for this Work.
- .2 Granular material incorporated into placement and backfill of culverts is excluded from this item for payment.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .4 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 AT – Standard Specifications for Highway Construction, (current edition).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Submit granular surfacing material sieve analysis for approval by Departmental Representative prior to production of base course.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 QUALITY ASSURANCE

- .1 As Per AT- Standard Specifications for Highway Construction, (current edition).

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.

- .2 Granular material removed from detour roads shall become property of the Contractor and shall be disposed of as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Gravel Surfacing Aggregate: material in accordance with the following requirements:
- .1 AT, Standard Specifications for Highway Construction – Des. 4, Class 20, Gravel Surfacing Aggregate.

Designation		4
Class (mm)		20
Percent Passing Metric Sieve (CGSB 8-GP-2M)	80 000	-
	50 000	-
	40 000	-
	25 000	-
	20 000	100
	16 000	-
	12 500	-
	10 000	35 – 77
	8 000	-
	5 000	15 – 55
	1 250	0 – 30
	630	-
	315	-
	160	-
	80	0 – 12
% Fracture By Weight (2 Faces)	All +5000	40 +
Plasticity Index (PI)		NP – 8
LA Abrasion Loss Percent Max.		N / A

Part 3 Execution**3.1 PLACING AND COMPACTION**

- .1 Place and compact granular surfacing material to the lines and grades shown on the drawings
- .2 Avoid any damage to asphalt surface during placement and compaction
- .3 Compact to density of not less than 100% maximum dry density in accordance with ASTM D 698.

3.2 SITE TOLERANCES

- .1 Finished aggregate surface to be within plus or minus 20mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 55 26 – Traffic Control.
- .3 Section 01 35 43 – Environmental Procedures.
- .4 Section 01 74 00 – Cleaning.

1.2 MEASUREMENT FOR PAYMENT

- .1 Removal of existing concrete curb and gutter will be measured in the field based on horizontal field measurements in linear metres of removed and disposed of concrete curb and shall be paid under **“Unit Price Item 14a – Concrete Curb Removal and Disposal”**. Payment shall be compensation in full for all survey, material, equipment and labour required to access, remove, and dispose the existing concrete curb outside the National Parks, grade the area as necessary and clean up the work sites.
- .2 Construction of concrete curb will be measured in the field based on horizontal field measurements in linear metres of acceptably installed concrete curb and shall be paid under **“Unit Price Item 14b – Concrete Curb – Supply and Install”**. Payment shall be compensation in full for all survey, material, equipment and labour required to complete the work.
- .3 Construction of solid concrete medians will be measured in the field based on horizontal field measurements in square metres of acceptably installed solid concrete median and shall be paid under **“Unit Price Item 14c – Solid Concrete Medians”**. Payment shall be compensation in full for all survey, material, equipment and labour required to complete the work.
- .4 No additional payment will be made for defective work that requires replacement to meet specifications.
- .5 Traffic Control required during work identified under this Section shall be included under **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .6 Mobilization and demobilization required for this Work shall be included under **“Lump Sum Price Item 1 - Mobilization / Demobilization”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 AT – Standard Specifications for Highway Construction, (current edition)
- .2 ASTM International

- .1 ASTM C117-[13], Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C136/C136M-[14], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM C 309 [03], Liquid Membrane Forming Compounds for Curing Concrete.
- .4 ASTM D1751, Standard Specification For Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .5 ASTM D698-[12e2], Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600 kN-m/m³).
- .3 CSA Group
 - .1 CSA-A23.1-[14] /A23.2-[14], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 [2015].
 - .2 CSA B651-[2012] Accessible Design for the Built Environment.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit WHMIS MSDS in accordance with Section 02 81 01 – Hazardous Materials.
 - .2 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, and limitations.
- .3 Inform Departmental Representative of proposed source of materials and provide access for sampling minimum 4 weeks prior to commencing work.
- .4 If materials have been tested by independent testing laboratory within previous 2 months and have passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

Part 2 Products

2.1 WASTE MATERIALS

- .1 Once removed from its existing location, all existing concrete curb and gutter shall become the property of the Contractor who shall dispose of it outside the National Parks in an approved facility.

2.2 MATERIALS

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

- .4 Granular base: in accordance with Section 32 11 23 – Aggregate Base Courses.
- .5 Non-staining mineral type form release agent: chemically active release agents containing compounds reacting with free lime to provide water-soluble soap.
- .6 Fill material: in accordance with Section 32 11 23 – Aggregate Base Courses.

Part 3 Execution

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 24 13 – Roadway Embankment and Section 32 11 23 – Aggregate Base Courses.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
 - .1 Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150 mm layers and compact to minimum 95 % of maximum dry density to ASTM D698.

3.2 GRANULAR BASE

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base in maximum 150 mm layers to minimum 95 % of maximum density to ASTM D698.

3.3 CONCRETE

- .1 Obtain Departmental Representative approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom side to side across sidewalk.
- .4 Provide edging as indicated with 10 mm radius edging tool.
- .5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Departmental Representative can be demonstrated. Hand finish surfaces when directed by Departmental Representative.

3.4 TOLERANCES

- .1 Finish surfaces to within 6 mm in 3 m as measured with 3 m straightedge placed on surface.

3.5 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete stiff, but still plastic, at intervals of 3 m.
- .2 Install expansion joints as directed by Departmental Representative at intervals of 3 m except where shorter spacing is necessary for closures, but no section shall be less than 1 m in length.
- .3 When sidewalk adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.6 ISOLATION JOINTS

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 00 – Cast-in-Place Concrete.
- .3 Seal isolation joints with sealant approved by Departmental Representative.

3.7 CURING

- .1 Immediately after finishing, the concrete shall be protected against moisture loss by the application of an approved curing compound. The application rate and method of application shall be in accordance with the Manufacturer's recommendations.
- .2 Curing compounds shall be applied by spraying with pressure equipment. To ensure complete coverage, approximately one-half the quantity for a given area shall be applied in one direction and the remainder applied at right angles to this direction.
- .3 Curing compounds shall not be used on a surface where a bond is required with additional concrete to be placed later, or where a sealing compound is specified to be used. In such cases the concrete surface shall be moist cured by using wet burlap or polyethylene film.

3.8 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Departmental Representative.
 - .1 Compact and shape to required contours as directed by Departmental Representative.

3.9 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 45 00 – Quality Control

1.2 MEASUREMENT PROCEDURES

- .1 Payment for the supply and installation of Precast concrete parking curbs shall be made under “**Unit Price Item 16 and 28 – Standard Concrete Parking Curb / Bumper Stops**”, and will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 - Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .3 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**” and no additional payment will be made.
- .4 Environmental mitigations required in accordance with Section 01 35 43 –Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 REFERENCES

- .1 City of Lethbridge Standard Construction Specifications, (current edition)
 - .1 Parks and Open Space Specification Drawings (current edition)

1.4 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Standard concrete parking curb / bumper stops shall be as per City of Lethbridge Standard or equivalent as approved by Departmental Representative.
- .2 Cement to CAN3-A5, type 10 grey white.
- .3 Water and aggregates to CAN2-A23.1.
- .4 Air entraining admixture to CAN 3-A266.1.

- .5 Reinforcing steel to CAN3 G30.12, deformed, Grade 400, unless indicated otherwise by the Departmental Representative.
- .6 Concrete to CAN3-A23.1, minimum 30MPa compressive strength at 28 days, for Class A exposure.
- .7 Curb anchors: steel dowels or pins to CAN3 G30.12, minimum 15 mm diameter x 500 mm length.

2.2 FABRICATION

- .1 Fabricate to CAN3-A23.4, precast reinforced concrete curbs.
- .2 Finish to be standard grade.
- .3 Fabricate to location, size, and dimension as per City of Lethbridge Standard or equivalent as approved by Departmental Representative.

Part 3 Execution

3.1 PREPARATION

- .1 Have appropriate Traffic Control measures in place for this work.

3.2 PROTECTION

- .1 Protect existing pavement, concrete curb and barriers, and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 INSTALLATION

- .1 Installation of all appurtenances shall be in accordance with manufactures specifications, contract drawings or as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Environmental Procedures.
- .2 Section 01 55 26 – Traffic Control
- .3 Section 02 81 00 - Hazardous Materials.
- .4 Section 32 12 16 - Asphalt Concrete Pavement (EPS).

1.2 MEASUREMENT AND PAYMENT

- .1 Line painting of dividing line shall be measured in the field based on horizontal field measurements in linear kilometres along the centre of each acceptably placed paint line regardless of width or line-gap ratio and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8a – Roadway Lines – Supply and Paint (Lane Dividing line) (yellow)”**.
- .2 Line painting of dividing line shall be measured in the field based on horizontal field measurements in linear metres along the centre of each acceptably placed paint line regardless of width or line-gap ratio and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8b – Roadway Lines – Supply and Paint (Lane Dividing line) (white)”**.
- .3 Pavement Message arrows shall be measured per unit and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8c and 25a – Pavement Message - Arrows.”**
- .4 Pavement Message pedestrian crossing shall be measured per unit and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8d – Pavement Message – Pedestrian Crossing”**.
- .5 Pavement Message gore area shall be measured per unit and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8e – Pavement Message – Gore Area”**.
- .6 Parking Line painting shall be measured in the field based on horizontal field measurements in linear metres along the centre of each acceptably placed paint line regardless of width and payment shall be considered full compensation for all survey, equipment, labour, and materials required to complete the Work. Payment will be made under **“Unit Price Item 8f and 25b – Parking Lines – Supply and Paint (white)”**.
- .7 Traffic Control required during work identified under this Section shall be included under **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.

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

1.3 REFERENCE STANDARDS

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit to Departmental Representative following material sample quantities at least 4 weeks prior to commencing work.
 - .1 Two 1L samples of each type of paint.
 - .2 One 1kg sample of glass beads.
 - .3 Sampling to CGSB1 GP 71.
 - .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

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

2.2 SUPPLY, STORAGE AND HANDLING

- .1 Storage and handling shall meet the requirements of Section 01 35 43 – Environmental Procedures and Section 02 81 00 – Hazardous Materials.
- .2 The Contractor shall make all arrangements for the supply and delivery of paint and glass beads and shall provide the Departmental Representative with records of all materials received and/or returned, on a daily basis.
- .3 The Contractor shall provide, maintain and reclaim all material storage sites.
- .4 No paint formulation shall be diluted or mixed with a different formulation or with any other material, without the specific approval of the Departmental Representative.
- .5 The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.
- .6 The Contractor shall be responsible for the proper cleanup of waste or spilled material, and the proper disposition of containers.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation prior to pavement markings installation.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

3.2 EQUIPMENT REQUIREMENTS

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

3.3 TRAFFIC CONTROL

- .1 In accordance with Section 01 55 26 – Traffic Control and Contractor's Traffic Management Plan.

3.4 APPLICATION

- .1 Pavement markings: laid out by Contractor.
- .2 Marking Dimensions:
 - .1 All edge lines, lane lines, continuity lines and directional dividing lines to be 100 mm in width.
 - .2 Directional dividing line for dashed lines to consist of 3 metre dashes and 6 metre gaps.
 - .3 Edge line markings to be 100mm from edge of pavement surface.
- .3 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .4 Apply traffic paint evenly at rate of 3 m²/L.
- .5 Do not thin paint unless approved by Departmental Representative.
- .6 Paint lines of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 0.5 kg/L of painted area immediately after application of paint.

3.5 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings as directed by Departmental Representative.

3.6 QUALITY CONTROL INSPECTION PLAN

- .1 The Contractor is responsible for quality control inspection throughout every stage of the work to ensure that materials and workmanship comply with the requirements of this specification.

- .2 The Contractor shall develop and submit a Quality Control Inspection Program (QCIP) that addresses all the elements that affect the quality of the line painting including, but not limited to:
 - .1 Paint Application Rates,
 - .2 Glass Bead Application Rates,
 - .3 Pavement Surface and Atmospheric Conditions, and
 - .4 Line Widths, Line Lengths and Space Lengths.
- .3 The Contractor shall maintain records of QCIP data, complaints from the public, and other details relevant to the Work and shall provide these records to the Departmental Representative daily.

3.7 ROADWAY OPERATION

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

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.
- .3 Waste Management: separate waste materials for recycling and reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 55 26 – Traffic Control
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 01 45 00 – Quality Control

1.2 MEASUREMENT PROCEDURES

- .4 Payment under this **“Unit Price Item 17 – Site Furnishings”** will include operations involved in supply and install. Payment shall be made as follow:
 - .1 **“Unit Price Item 17a – Relocation of Existing Waste Bins”** will be measured for payment per unit, and shall include all labour, equipment and material necessary to remove, load, transport and unload existing waste bins within the project limits to the Parks Canada Operations Compound to the satisfaction of the Department representative.
 - .2 **“Unit Price Item 17b – Parking Boulders Supply and Install”** will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.
 - .3 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
 - .4 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
 - .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 PARKING BOULDERS

- .1 All parking boulders shall be approximately 1m in length by 0.5 meters high by 0.5 metres wide.

Part 3 Execution

3.1 PREPARATION

- .1 Have appropriate Traffic Control measures in place for this work.

3.2 PROTECTION

- .1 Protect existing pavement, concrete curb and barriers, and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 INSTALLATION

- .1 Installation of parking boulders shall be in accordance with contract drawings or as directed by Departmental Representative.

3.4 RELOCATION

- .1 Prior to completion of the project, the Contractor shall collect all Waste Bins along the roadway and deliver them to the Parks Operations Compound.

END OF SECTION

Part 1 General

1.1 MATERIAL SUPPLIED BY DEPARTMENTAL REPRESENTATIVE

- .1 Topsoil to be native organic soils stripped from the contract work area and stockpiled adjacent to the Work.
- .2 Excavated material other than boulders between Station 0+000 and Station 5+100 shall be considered waste due to invasive weeds and shall be removed and disposed of outside of Waterton Lakes National Park, as directed by Departmental Representative.
- .3 An existing soil pile is located at Station 5+100 that shall be used for any required topsoil or revegetation within the project limits, as indicated by Departmental Representative.
 - .1 Any remaining soil from the pile at Station 5+100 shall be removed and disposed of by the Contractor outside of the National Park.

1.2 MEASUREMENT AND PAYMENT

- .1 Preparation of sub-grade for placing of topsoil will not be measured for payment.
- .2 Topsoil stripping and stockpiling will not be measured for payment.
- .3 Placing and spreading topsoil from topsoil stripped from the side slope and ditches will not be measured for payment.
- .4 Topsoil placement and finishing will be measured in the field based on horizontal field measurements in square metre as measured in place as acceptably installed within the areas indicated on the Drawings or as approved by the Departmental Representative. Payment for topsoil placement shall be full compensation for all survey, labour, equipment, materials and incidentals required to load, haul from stockpiles, place, fine grade, and prepare the topsoil materials for planting in accordance with the requirements of the Specifications, Drawings and direction of the Departmental Representative. Payment will be made under **“Unit Price Item 15a, 27a and 38a – Topsoil Placement”**.
- .5 Payment for stripping will be made in accordance with Section 31 24 13 – Roadway Embankments.
- .6 If required, Payment for supply and application of soil amendments, including fertilizer will be incidental to the Work and no additional or separate payments will be made.
- .7 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .8 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .9 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 REFERENCES

- .1 Agriculture and Agri-Food Canada
- .2 The Canadian System of Soil Classification, Third Edition, 1998.
- .3 Canadian Council of Ministers of the Environment
- .4 PN1340-[2005], Guidelines for Compost Quality.
- .5 Canadian Green Building Council (CaGBC)
- .6 U.S. Environmental Protection Agency (EPA)/Office of Water
- .7 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .8 AT – Standard Specifications for Highway Construction, (current edition)

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 – Project Meetings.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products**2.1 TOPSOIL**

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Contain no toxic elements or growth inhibiting materials.
 - .2 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.

- .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .3 Consistence: friable when moist.
- .2 Native topsoil to be stripped from on-site sources.
- .3 An existing soil pile is located at Station 5+100 that shall be used for any required topsoil or revegetation within the project limits, as indicated by Departmental Representative.
- .1 Any remaining soil from the pile at Station 5+100 shall be removed and disposed of by the Contractor outside of the National Park.
- .4 Contractor shall minimize the duration topsoil is stored in piles and shall place topsoil as soon as possible after completion of grading work. In addition to the following. The Contractor shall consult the Environmental Management Plan for additional requirements for placing and handling topsoil.
 - .1 Minimize soil movement and handling to protect existing native seed bank.
 - .2 Do not compact topsoil. Lumpy, loose topsoil that contains sticks, rocks and vegetation is preferred to a manicured 'urban' finish. Maintain structure (i.e., rocks, roots, woody debris) in topsoil. Topsoil will be placed at a minimum of 125 mm thickness.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush weeds and grasses.
- .2 Strip topsoil to depths as directed by Departmental Representative.
 - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Interim stripping stockpile locations and methods of stockpile shall be the responsibility of the Contractor, with approval by the Departmental Representative.
- .4 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 125 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 125 mm.
- .3 Replace and spread all removed topsoil on disturbed areas as directed by Departmental Representative.
- .4 125 mm for seeded areas.
- .5 750 mm for shrub beds.
- .6 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

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

3.6 ACCEPTANCE

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

3.7 SURPLUS MATERIAL

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

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 55 26 – Traffic Control
- .3 Section 01 35 43 – Environmental Procedures.

1.2 DESCRIPTION OF WORK

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

1.3 MEASUREMENT AND PAYMENT

- .1 Hydraulic Seeding will be measured in the field based on horizontal field measurements in square metre acceptably installed seed, complete with fertilizer. Payment for any required seeding as directed by the Departmental representative shall be paid under “**Unit Price Item 15b, 27b and 38b – Seeding**”.
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 Maintenance of the seeded areas will not form a part of the Contractor’s work once seeding is acceptable as determined by the Departmental Representative.
- .4 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**”, and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no separate payment will be made.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.
- .3 Submit in writing 14 days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.

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

.4 Samples:

.1 Submit 0.5 kg container of each type of fertilizer used.

.5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.

.2 Inoculant containers to be tagged with expiry date.

.2 Storage and Handling Requirements:

.1 Store fertilizer in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 SEED

.1 Seed mix by weight:

20% Smooth Wild Rye (*Elymus Claucas*)

20% Bluebunch Wheatgrass (*Agropyron Spicatum*)

10% Mountain Brome (*Bromus Carinatus*)

8% Foothills Rough Fescue (*Festuca Campestris*)

8% Rocky Mountain Fescue (*Festuca Saximontana*)

8% Idaho Fescue (*Festuca Idahoensis*)

2% Inland Bluegrass (*Poa Interiors*)

2% Smooth Ryegrass (*Elymus Glaucus*)

2%	Wild Strawberry	(<i>Fragaria Virginiana</i>)
2%	Yarrow	(<i>Achillea Millifolium</i>)
2%	American Vetch	(<i>Vicia Ameericana</i>)
2%	Canadian Milkvetch	(<i>Astragalus Canadensis</i>)
2%	Yellow Hedysarum	(<i>Hedysarum Sulphurescens</i>)
2%	Pearly Everlasting	(<i>Anaphalis Margaritacea</i>)
2%	Fireweed	(<i>Epilobium Angustifolium</i>)
2%	Heart-Leaved Arnica	(<i>Arnica Cordifolia</i>)
2%	Sticky Purple Geranium	(<i>Geranium Viscosissimum</i>)
1%	Northern Bedstraw	(<i>Galium Boreale</i>)
1%	Veiny Meadowrue	(<i>Thalictrum Venulosum</i>)
1%	Canada Anemone	(<i>Anemone Canadensis</i>)
1%	Goldenrod	(<i>Solidago Missouriensis</i>)

- .2 Seeding rate to be 20 kg/ha for hydraulic seeding.
- .3 Seed tags to be retained and given to the Departmental Representative.
- .4 Seed mix shall be free of Scentless Chamomile, Downy Brome, Smooth Brome and Canada Thistle.
- .5 Depending on seed availability, the Park Vegetation Ecologist may consider substitutions
- .6 Percentage of individual species within mixes are approximate and may vary depending on seed availability. A number of native species that are available only in limited quantities commercially have been included in the seed mixes. These seed mixes are to be used conditional on availability of individual species; modifications/replacements are allowed, subject to approval by the WLNP Vegetation Ecologist.
- .7 Prior to seed purchase, certificates of seed analysis will provided to the Vegetation Ecologist for approval.
 - a. Do **NOT** purchase seed until written approval is obtained
 - b. Certificates of Analysis must include both the common and include the scientific name following the CANADENSYS nomenclature system; indicate if the seed is a cultivar, ecovar, or wild native; geographic origin (seed source); date of collection; method of seed storage; germination, viability and vigour; and indicate all other species occurring including agronomic, weed, and native

species; and date of the analysis. The contact information for the Seed Supplier will be included.

- .8 All seed is subject to testing by PCA prior to use.

2.2 WATER

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

2.3 SOIL STABILIZER/TACKIFIER/MULCH

- .1 GPEC Flextera high performance flexible growth medium (HP-FGM) or approved equivalent.

Part 3 Execution

3.1 GENERAL SEEDING

- .1 Contractor shall advise Departmental Representative prior to the start of seeding operations.
- .2 Contractor shall mechanically remove any weeds prior to seeding. Weed removal method to be approved by Departmental Representative prior to commencement. This will be incidental to the work.
- .3 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous project to prevent site contamination.
- .4 Seeding shall be done upon completion of stripped soil material/chip compost placement.
- .5 Contractor shall not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil, or soil covered with snow, ice or standing water.
- .6 Contractor shall hydraulic seed only during dry weather conditions with no rain forecasted for the next 24 hours and ensuring a seasonably dry seedbed to provide for proper curing of soil stabilizers/tackifier. Contractor shall check weather conditions to ensure soil stabilizer has sufficient time to cure prior to heavy rainfall.
- .7 Contractor shall carry out seeding in locations as shown on Drawings or, as directed by Departmental Representative.
- .8 Seeding shall be done between May 1, 2019 and September 15, 2019.

3.2 HYDRAULIC SEEDING

- .1 The following application rates are the minimum required for hydraulic mulch application:
 - .1 Seed Mix as identified in Section 2.1: 20 kg/hectare
 - .2 Mulch/Soil Stabilizer/tackifier: 3,900 kg/hectare
 - .3 Water: 30,000 L minimum.
- .2 Hydraulic mulch will be clean of previous seeds and vegetation to prevent contamination. Native seed to be broadcast spread prior to mulching
- .3 Apply during warm temperature (>10 °C), if possible.

- .4 The Contractor shall measure quantities of materials by weight, or weight calibrated Contractor to calculate and submit applicable area of coverage per tank load of slurry in accordance with Section 01 33 00 – Submittal Procedures.
- .5 Contractor shall physically stake and identify limits of tank coverage prior to seeding to the satisfaction of Departmental Representative.
- .6 Each tank load of slurry shall be fully applied within the designated boundaries for each load as staked volume measurement, to the satisfaction of the Departmental Representative.
- .7 The Contractor shall fill the tank half full with required water and add mulch while continuing to fill with water. All material is to be added into the hydraulic seeder under agitation. The Contractor shall pulverize mulch with tackifier and charge slowly into seeder.
- .8 The Contractor shall charge soil stabilizer/tackifier into seeder after all other material is well mixed in seeder. Contractor shall mix slowly to avoid foaming but thoroughly to complete slurry.
- .9 The Contractor's equipment shall have an agitation system for slurry capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and mechanical method:
 - .1 Pumps shall be capable of maintaining a continuous non-fluctuating flow of solution.
 - .2 Equipment shall be capable of seeding up to 150 m distance from hydraulic seeder using hand operated hoses and appropriate nozzles.
- .10 The Contractor shall apply slurry when wind velocities will not affect the application and cause the mixture to be blown.
- .11 The Contractor shall apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed. Ensure good contact of slurry with soil with minimal air pockets.
- .12 The Contractor shall use the correct nozzle(s) for application and use hoses to access difficult to reach surfaces and to control application.
- .13 The Contractor shall ensure that the application is uniform and the surface is evenly covered. Contractor shall blend into retained landscape for approximately 1 metre.
- .14 The Contractor shall clean all structures, appurtenances and natural features not designated to be seeded of any overspray, to the satisfaction of the Departmental Representative.
- .15 The Contractor shall ensure that at all times during the seeding, that no vehicles are parked within the path of public travel and the Contractor shall provide warning devices as directed by the Departmental Representative to ensure safe operations.

3.3 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Contractor shall not be responsible for maintenance of seeded areas during establishment period.

3.4 CONSTRUCTION COMPLETION ACCEPTANCE

- .1 Seeded areas will be accepted by the Departmental Representative provided that all coverage rates are confirmed and seed is uniformly distributed.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
 - .1 Clean and reinstate areas affected by Work.
 - .2 Upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Departmental Representative.

3.7 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Seeded areas are free of rutted, eroded, bare or dead spots.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.8 MAINTENANCE DURING WARRANTY PERIOD

- .1 The Warranty Period shall last one (1) year after the seeding work in this Section is completed and accepted by the Departmental Representative.
- .2 Perform following operations from time of acceptance until end of warranty period:
 - .1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 32 91 19.13 – Topsoil Placement and Grading
- .3 Section 32 92 19.16 – Hydraulic Seeding

1.2 MEASUREMENT AND PAYMENT

- .1 Planter bed preparation will be measured in the field based on horizontal field measurements in square metre of acceptably prepared planter bed. Payment for planter bed preparation shall be paid under **“Unit Price Item 15c and 38c – Planter Bed Preparation”**.
- .2 Planter bed mulch will be measured in the field based on horizontal field measurements in square metre of acceptably placed mulch. Payment for planter bed mulch shall be paid under **“Unit Price Item 15d and 38d – Planter Bed Mulch”**.
- .3 Lodge Pole Pine installation will be measured per unit of planting acceptably installed. Payment for Lodge Pole Pine shall be paid under **“Unit Price Item 38e – Lodgepole Pine – Supply and Install”**.
- .4 Douglas Fir installation will be measured per unit of planting acceptably installed. Payment for Douglas Fir shall be paid under **“Unit Price Item 38f – Douglas Fir – Supply and Install”**.
- .5 Trembling Aspen installation will be measured per unit of planting acceptably installed. Payment for Trembling Aspen shall be paid under **“Unit Price Item 38g – Trembling Aspen– Supply and Install”**.
- .6 Canada Buffalo Berry installation will be measured per unit of planting acceptably installed. Payment for Canada Buffalo Berry shall be paid under **“Unit Price Item 38h – Canada Buffalo Berry – Supply and Install”**.
- .7 Western Snowberry installation will be measured per unit of planting acceptably installed. Payment for Western Snowberry shall be paid under **“Unit Price Item 38i – Western Snowberry – Supply and Install”**.
- .8 Shrubby Cinquefoil installation will be measured per unit of planting acceptably installed. Payment for Shrubby Cinquefoil shall be paid under **“Unit Price Item 38j – Shrubby Cinquefoil – Supply and Install”**.
- .9 Common Juniper installation will be measured per unit of planting acceptably installed. Payment for Common Juniper shall be paid under **“Unit Price Item 38k – Common Juniper – Supply and Install”**.

- .10 Prickly Rose installation will be measured per unit of planting acceptably installed. Payment for Prickly Rose shall be paid under **“Unit Price Item 38I – Prickly Rose – Supply and Install”**.
- .11 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .12 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made.
- .13 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCES

- .1 Definitions:
 - .1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.
- .2 Reference Standards:
 - .1 Agriculture and Agri-Food Canada (AAFC).
 - .1 Plant Hardiness Zones in Canada.
 - .2 Waterton Lakes National Park of Canada Management Plan, June 2010.
 - .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling: obtain approval from Vegetation Ecologist and Departmental Representative of schedule seven 7 days in advance of shipment of plant material.
- .2 Schedule to include:
 - .1 Quantity and type of plant material.
 - .2 Shipping dates.
 - .3 Arrival dates on site.
 - .4 Planting Dates.

1.5 QUALITY ASSURANCE

- .1 Qualifications: The work shall be installed in accordance with Parks Canada Environmental Management Plan.

1.6 DELIVERY, STORAGE AND HANDLING

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

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
 - .2 Protect plant material from damage during transportation:
 - .1 Delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
 - .2 Delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
 - .3 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.
- .3 Storage and Handling Requirements:
 - .1 Immediately store and protect plant material which will not be installed within 1 hour in accordance with supplier's written recommendations and after arrival at site in storage location approved by Vegetation Ecologist and Departmental Representative
 - .2 Protect stored plant material from frost, wind and sun and as follows:
 - .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil and watering to full depth of root zone.
 - .2 For pots and containers, maintain moisture level in containers.
 - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
 - .3 Store and manage hazardous materials in accordance with manufacturer's written instructions.

1.7 WARRANTY

- .1 The Warranty Period shall last one (1) year after the work in this Section is completed and accepted by the Departmental Representative.
- .2 Contractor hereby warrants that plant material as itemized on plant list will remain free of defects until the Final Warranty Inspection.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.
- .4 Departmental Representative reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

Part 2 Products

2.1 PLANT MATERIAL

- .1 Type of root preparation, sizing, grading and quality: comply with Waterton Lakes National Park of Canada Management Plan, June 2010.
- .2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .3 Trees: with straight trunks, well and characteristically branched for species.
- .4 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.
- .5 Collected stock: maximum 40 mm in caliper, with well-developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.
 - .1 During collection, ensure 10% maximum seed crop (or plants) are collected from healthy population of many individuals, and from several plants of same species.
 - .2 Leave remainder for natural dispersal and as food for dependent organisms.

2.2 WATER

- .1 Free of impurities that would inhibit plant growth.

2.3 TRUNK PROTECTION

- .1 Guy lines: 2 mm braided nylon strap.
- .2 Stakes: Painted t-bars, 1,800 mm.

2.4 SOURCE QUALITY CONTROL

- .1 Obtain approval from Vegetation Ecologist and Departmental Representative of plant material prior to purchase.
- .2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for planting installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Vegetation Ecologist and Departmental Representative

- .2 Inform Vegetation Ecologist and Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after approval from the Vegetation Ecologist and Departmental Representative.

3.2 PRE-PLANTING PREPARATION

- .1 Proceed only after receipt of written acceptability of plant material from Vegetation Ecologist and Departmental Representative.
- .2 Remove damaged roots and branches from plant material.
- .3 Locate and protect utility lines.
- .4 Notify and acquire written acknowledgment from utility authorities before beginning excavation of planting pits for trees and shrubs.

3.3 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Preparation of planting beds in accordance with Section 32 91 19.13 – Topsoil Placement and Grading.
- .2 For individual planting holes:
 - .1 Stake out location and obtain approval Vegetation Ecologist and Departmental Representative prior to excavating.
 - .2 Excavate to depth and width as indicated.
 - .3 Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material outside of the National Park.
 - .4 Scarify sides of planting hole.
 - .5 Remove water which enters excavations prior to planting. Notify Vegetation Ecologist and Departmental Representative if water source is ground water.

3.4 PLANTING

- .1 For bare root stock, place 50 mm backfill soil in bottom of hole.
 - .1 Plant trees and shrubs with roots placed straight out in hole.
- .2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball.
 - .1 Do not pull burlap or rope from under root ball.
- .3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
- .4 Plant vertically in locations as indicated.

- .1 Orient plant material to give best appearance in relation to structure, roads and walks.
- .5 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts.
 - .1 Tamp each lift to eliminate air pockets.
 - .2 When two thirds of depth of planting pit has been backfilled, fill remaining space with water.
 - .3 After water has penetrated into soil, backfill to finish grade.
 - .2 Form watering saucer as indicated.
- .6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .7 Water plant material thoroughly.
- .8 After soil settlement has occurred, fill with soil to finish grade.

3.5 TRUNK PROTECTION

- .1 Install trunk protection on trees as indicated.
 - .1 Install flagging tape to guys as indicated.
 - .2 Stake beyond edge of root ball. Bars should be hammered down into solid footing (at least 400 mm into sub-soil base).

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Dispose of waste materials and debris outside of Waterton Lakes National Park.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 03 20 00 – Concrete Reinforcing
- .3 Section 03 30 00 – Cast-in-Place Concrete
- .4 Section 31 24 13 – Roadway Embankments
- .5 Section 31 32 19.16 – Geotextile Soil Stabilization
- .6 Section 31 37 00 – Riprap
- .7 Section 32 11 23 – Aggregate Base Courses
- .8 Section 32 12 16 – Asphalt Concrete Pavement (EPS)

1.2 DESCRIPTION

- .1 Contractor shall supply and install corrugated steel pipe culverts at the locations indicated on the Drawings or as directed by the Departmental Representative.

1.3 MEASUREMENT AND PAYMENT

- .1 Remove and dispose of culverts with a diameter less than 800 mm will be measured in the field based on field measurements in linear metre of acceptably removed and disposed of pipe including hardware and backfill and shall be paid under “**Unit Price Item 11a and 36a – Culverts – Remove and Dispose (< 800mm dia.)**”.
- .2 Remove and dispose of culverts with a diameter equal to or greater than 800 mm will be measured in the field based on field measurements in linear metre of acceptably removed and disposed of pipe including hardware and backfill and shall be paid under “**Unit Price Item 11b – Culverts – Remove and Dispose (≥ 800mm dia.)**”.
- .3 Supply and installation of 400mm diameter C.S.P. culverts will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under “**Unit Price Item 11c and 26a – Culverts – Supply and Install (400mm dia. C.S.P.)**”. Payment shall be compensation in full for all material, equipment and labour required to complete the work including, but not limited to, the C.S.P. culvert, rip rap, granular backfill, and non-granular backfill.
- .4 Supply and installation of 500mm diameter C.S.P. culverts will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under “**Unit Price Item 11d – Culverts – Supply and Install (500mm dia. C.S.P.)**”. Payment shall be compensation in full for all material, equipment and labour required to complete the work including, but not limited to, the C.S.P. culvert, rip rap, granular backfill, and non-granular backfill.

- .5 Supply and installation of 600mm diameter C.S.P. culverts will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under **“Unit Price Item 11e and 36b – Culverts – Supply and Install (600mm dia. C.S.P.)”**. Payment shall be compensation in full for all material, equipment and labour required to complete the work including, but not limited to, the C.S.P. culvert, rip rap, granular backfill, and non-granular backfill.
- .6 Supply and installation of 800mm diameter C.S.P. culverts will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under **“Unit Price Item 11f – Culverts – Supply and Install (800mm dia. C.S.P.)”**. Payment shall be compensation in full for all material, equipment and labour required to complete the work including, but not limited to, the C.S.P. culvert, rip rap, granular backfill, and non-granular backfill.
- .7 Supply and installation of 1000mm diameter C.S.P. culverts will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under **“Unit Price Item 11g – Culverts – Supply and Install (1000mm dia. C.S.P.)”**. Payment shall be compensation in full for all material, equipment and labour required to complete the work including, but not limited to, the C.S.P. culvert, rip rap, granular backfill, and non-granular backfill.
- .8 Measure supply and installation of cast in place headwalls including reinforcement and rip rap per unit installed. Payment will be made under **“Unit Price Item 11h – Cast In Place Headwalls – Supply and Install”**.
- .9 **“Unit Price Item 11i and 36c – Debris Racks”** will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .10 No separate payment will be made for couplings and fittings.
- .11 Import, placement, and compaction of bedding material and embankment backfill material shall be incidental to this work and no additional payment will be made to the Contractor.
- .12 Import and placement of rip rap material shall be incidental to the work and no additional payment will be made to the Contractor.
- .13 Supply and installation of geotextile used at culvert locations shall be incidental to the work and no additional payment will be made to the Contractor.
- .14 Excavation for the types of materials encountered will be paid under **“Unit Price Item 3 – Road Embankment”**, in accordance with Section 31 24 13 – Roadway Embankment.
- .15 Asphalt removal for culvert installation will be paid under **“Unit Price Item 1 – Asphalt Pavement Removal”**, in accordance with Section 02 41 13.14 – Asphalt Pavement Removal.
- .16 Granular Base Course required for surfacing for culvert installation will be paid under **“Unit Price Item 6 – Load, Haul, Place & Compact Granular Material”**, in accordance with Section 32 11 23 – Aggregate Base Courses.

- .17 Asphalt Concrete Pavement required for surfacing for culvert installation will be paid under **“Unit Price Item 7 – Asphalt Concrete Pavement (EPS)”**, in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).
- .18 Traffic Control required during work identified under this Section shall be included under **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .19 Mobilization and demobilization required for this Work shall be included under **“Lump Sum Price Item 1 - Mobilization / Demobilization”** and no separate payment will be made to the Contractor.
- .20 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.4 REFERENCE STANDARDS

- .1 AT – Standard Specification for Highway Construction, (current edition)
- .2 CSA W59/AWS D1.5, Welded Steel Construction (Metal Arc Welding)

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certification: to be marked on pipe.
- .4 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.

- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Remove from site and dispose of packaging material at appropriate recycling facilities outside of the National Parks.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Section 01 35 43 – Environmental Procedures.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CAN/CSA-G401.
- .2 All CSP culverts 1200 mm or less to be galvanized (min 610 g/m²)
- .3 Previously installed pipe shall not be used. All pipe supplied shall be clearly marked with the following information at intervals of not more than 3 m.
 - .1 Manufacturer's Name or Trade Mark
 - .2 Nominal Thickness and Type of Metal
 - .3 Plate/Metal Coating (for non-standard coating)
 - .4 Specification Designation
 - .5 Plant Designation Code
 - .6 Date of Manufacture
- .4 Cut Ends:
 - .1 All cut edges of a sloped or square end section shall be made smooth by grinding so that all of the burrs are removed. Any damaged protective coating shall be recoated with appropriate material in accordance with CSA G401.
- .5 Couplers:
 - .1 Annular corrugated couplers for pipe greater than 300 mm in diameter shall be of sufficient width to cover at least two outside crest corrugations on each reocorrugated end.
- .6 Coupler Bands:

- .1 Coupler bands for pipe greater than 800 mm in diameter shall have a minimum of three bolts.
- .7 Recorrugated Ends:
 - .1 Helically corrugated metal pipe shall have ends recorrugated to provide annular corrugations for couplers.
- .8 Minimum length of annular corrugated culvert ends 300 mm.
- .9 Minimum wall thickness to be 2.0 mm for culverts 1200 mm or less in diameter.
- .10 Minimum 6 metre section lengths for new culvert installations.
- .11 Corrugations to be 68 mm x 13 mm for culverts 1200 mm or less in diameter.

2.2 GRANULAR BEDDING

- .1 As per Section 32 11 23 – Aggregate Base Courses, and AT – Standard Specifications for Highway Construction, Section 2.4 (current edition).

2.3 RIP RAP

- .1 As per Section 31 37 00 – Riprap, and AT – Standard Specifications for Highway Construction, Section 2.5 (current edition).

2.4 CAST-IN-PLACE CONCRETE

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

2.5 METAL BARRIER GATES

- .1 General: Metals are to be free from defects impairing strength, durability and appearance and be of the best commercial quality for the purpose specified. All materials are to be new. All exposed fastenings are to be of the same material, colour, and finish as the metal to which applied; unless otherwise noted.
- .2 Steel: Conforming to CSA G40.21M, with minimum yield strength of 350 MPa.
- .3 Welding electrodes to CSA W48 series.
- .4 Steel to be unfinished, but clean of mill scale, oil, deleterious substances, and all other surface contaminants.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe. Do not backfill until pipe grade and alignment checked and accepted by Departmental Representative.

3.2 PREPARATION

- .1 All work to be in accordance with the EPP, BIA and the specifications.
- .2 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and waterways according to requirements of sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Beaver dams that are required to be removed to facilitate culvert or beaver deceiver installation shall be removed under the direction of the ESO.
 - .1 Beaver dams are to be removed in such a way as to release water slowly, in 20 cm increments.

3.3 INSTALLING CORRUGATED STEEL PIPES

- .1 Cofferdams
 - .1 Constructed of clean, non-erodible materials such as sand bags, aquadam-type installations, steel or wood walls, concrete blocks, clean rip-rap etc.
 - .2 Earthen fill material containing fine sediments will not be accepted unless, prior to its placement within the watercourse, it is fully contained using a non-erodible material that will prevent the release of sediment throughout installation, use and removal of the cofferdam.
 - .3 Cofferdams to be sealed appropriately to prevent leaking.
 - .4 Stream flows must be maintained through isolation to ensure upstream pooling does not occur. Constant pumping, or a temporary diversion culvert is required.
- .2 Dewatering

- .1 5 working days' notice to be provided prior to dewatering each fish-bearing culvert site to allow ESO/Departmental Representative to schedule and perform fish salvage.
- .2 Pump intakes to be fitted with appropriate fish screen.
- .3 Culvert Removal
 - .1 Remove culverts and dispose of sections to an approved location outside of the National Parks.
 - .2 Accommodate emergency vehicles at all time during the removal of a culvert. Adequate control and traffic flow to be maintained.
- .4 Bedding
 - .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
 - .2 Culvert invert elevations to be adjusted to ensure a minimum 0.6 m cover between the top of the road surface and the top of the culvert.
 - .3 Place geotextile on prepared surface in accordance with Section 31 32 19.16 – Geotextile Soil Stabilization and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
 - .4 Place 300 mm minimum thickness of approved granular material on bottom of excavation and compact to 98% of corrected maximum dry density to ASTM D698 and dry to at least the optimum moisture content.
 - .5 Supply and install clay plug, if required, as shown on site specific culvert installation drawings on upstream end.
 - .6 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
 - .7 Place bedding in unfrozen condition.
- .5 Laying Corrugated Steel Pipe Culverts
 - .1 Begin pipe placing at downstream end.
 - .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
 - .3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.
 - .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.
- .6 Joints
 - .1 Match corrugations or indentations of coupler with pipe sections before tightening.
 - .2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.
 - .3 Insert and tighten bolts.
 - .4 Repair spots where damage has occurred with appropriate coating paint approved in writing by Departmental Representative.
- .7 Backfilling

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place backfill material, approved in writing by Departmental Representative, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
 - .1 Compact each layer to 98% corrected maximum dry density to ASTM D698 taking special care to obtain required density under haunches.
- .3 Protect installed culvert with compacted fill before heavy equipment is permitted to cross.
- .4 Remove and replace any culvert material damaged by Contractor's operations at no extra cost.
- .5 Place backfill in unfrozen condition.
- .6 Backfill in accordance with AT – Standard Specifications for Highway Construction, Section 2.4 (current edition).
- .7 Place rip rap in accordance with AT – Standard Specifications for Highway Construction, Section 2.5 (current edition).
- .8 Surfacing Structure
 - .1 Place 300 mm of Des. 2, Class 25, Granular Base Course up to 50 mm below the original roadway surface **for through road culverts**.
 - .1 Compact the layer to 100% corrected maximum dry density to ASTM D698.
 - .2 Place 50 mm of Asphalt Concrete in accordance with Section 32 12 16 – Asphalt Paving (EPS) to the original roadway surface.

3.4 CAST-IN-PLACE HEADWALLS

- .1 Construct cast-in-place headwalls as indicated on the drawings and as directed by Departmental Representative.

3.5 RIPRAP ENDWALLS

- .1 Construct riprap endwalls as indicated on the drawings and as directed by the Departmental Representative. CSP to be beveled to match slope as directed by Departmental Representative.
- .2 Fish-bearing culverts to have thalweg (low flow channel) and dissipation pool delineated through riprap as noted in reference documents and as directed by ESO. Some hand placing of riprap will be required.

3.6 METAL DEBRIS RACKS

- .1 Installation of Metal Debris Racks:
 - .1 Only welders approved by the Canadian Welding Bureau shall be permitted to perform weldment. Their qualification shall be current and available for examination by Departmental Representative.
 - .2 Perform required field welding. Conform to the requirements of CSA W59 or AWS D1.5.

- .3 Perform necessary excavation, installation, and backfilling of the debris rack as per the drawings.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 00 – Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 The crushing and burying of existing culverts is not permitted within the project area. The Contractor shall remove and properly dispose of all culverts excavated during the execution of work.
- .5 Clean the entire length of new culverts.
 - .1 The method of removing material must be approved by the Departmental Representative prior to commencement of the Work.
 - .2 Removed material as directed by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Section 32 11 23 – Aggregate Base Courses

1.2 DESCRIPTION

- .1 Materials and installation for construction of new catch basins, catch basin leads and end treatments

1.3 MEASUREMENT AND PAYMENT

- .1 Supply and installation of Catch Basin structures will be measured for each complete unit constructed and payment will be made under **“Unit Price Item 35a – Catch Basin – Supply and Install”**.
- .2 The supply of gratings, frames and ancillary materials and hardware will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 35a – Catch Basin – Supply and Install”**.
- .3 Supply and installation of 300mm diameter PVC CB leads will be measured in the field based on field measurements in linear metre of acceptably installed pipe and shall be paid under **“Unit Price Item 35b – P.V.C. CB Lead – Supply and Install (300mm dia.)”**. Payment shall be compensation in full for all material, equipment and labour required to complete the work.
- .4 Supply and installation of P.V.C. end treatments will be measured per unit installed and shall be paid under **“Unit Price Item 35c – P.V.C. End Treatment – Supply and Install”**. Payment shall be compensation in full for all material, equipment and labour required to complete the work.
- .5 Granular materials used during backfill shall be deemed incidental to the work and no additional or separate payment will be made.
- .6 Adjustment of existing catch basins will be measured for each unit adjusted and payment will be made under **“Unit Price Item 10a – Catch Basin – Adjustment”**.
- .7 Traffic Control required during work identified under this Section shall be included under **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .8 Mobilization and demobilization required for this Work shall be included under **“Lump Sum Price Item 1 - Mobilization / Demobilization”** and no separate payment will be made to the Contractor.

- .9 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.4 REFERENCES

- .1 AT – Standard Specifications for Highway Construction, (current edition).

1.5 STAGED CONSTRUCTION

- .1 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required, until catch basin structure is complete.

Part 2 Products

2.1 MATERIALS

- .1 Granular bedding and backfill shall be Des. 2, Class 25 granular material, as per Section 32 11 23 – Aggregate Base Courses.
- .2 PVC Pipe:
 - .1 300 mm diameter PVC gravity sewer pipe conform to ASTM D3034, SDR35, CSA certified as meeting latest revision CSA B182.2.
 - .2 Pipe interior to be smooth and glossy.
- .3 Catch Basins:
 - .1 600 mm diameter round top catch basin, as per the Design Drawings.
 - .2 Precast section to conform to ASTM C478.
 - .3 All joints in precast sections to be sealed with flexible butyl rubber sealant, or equivalent as approved by the Departmental Representative.
- .4 P.V.C. end treatments shall be Armtec series 1.5 pro-eco-lite headwall with trash grate and security grid or approved equivalent by Departmental Representative.

2.2 GRANULAR BEDDING

- .1 As per AT – Standard Specifications for Highway Construction, Section 2.4 (current edition).

2.3 RIP RAP

- .1 As per AT – Standard Specifications for Highway Construction, Section 2.5 (current edition).

Part 3 Execution

3.1 LAYOUT

- .1 Obtain approval of Departmental Representative before installing catch basins.

3.2 INSTALLATION AND EXECUTION

- .1 Installation and execution of work as per the Design Drawings.
- .2 All subgrade materials must be a minimum 98% compaction.
- .3 No gravel required if the base is set on undisturbed soil.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 55 26 – Traffic Control.
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 45 00 – Quality Control.

1.2 MEASUREMENT AND PAYMENT

- .1 Payment for the supply and installation of flexible guide post delineators shall be made under **“Unit Price Item 18 – Flexible Guide Post Delineators”**, and will be measured for payment per unit, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 REFERENCE STANDARDS

- .1 AT – Standard Specifications for Highway Construction (current edition)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for guide posts and paint and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Alberta, Canada.
- .4 Samples:
 - .1 Notify Departmental Representative at least 2 weeks prior to commencing Work of proposed source of guide posts and provide access for inspection.
 - .2 Submit to Departmental Representative at least 2 weeks prior to commencing Work samples of following materials proposed for use:
 - .1 One 1 L container of each type of paint.

- .5 Sustainable Design Submittals:
 - .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial and post-consumer content, and total cost of materials for project.
 - .4 Regional Materials: submit evidence that project incorporates required percentage 10% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect guide posts from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Stockpile guide posts as directed by Departmental Representative.

Part 2 Products

2.1 ROUND PLASTIC POSTS

- .1 The flexible guide posts shall return to upright positions following repeated impacts and passages of vehicles over them. Such collisions shall not cause serious damage to the post or vehicle. Failure to conform to the requirements specified herein shall be cause for rejection.
- .2 General
 - .1 The posts shall be of uniform quality and workmanship and be free from defects.
 - .2 The Contractor shall provide a complete report of the physical properties of the post to the Departmental Representative. This report shall include properties such

as low temperature impact resistance, after-impact recoverability and weather resistance.

.3 Specifications - Dimensions, Colour and Construction

- .1 The round posts shall have a minimum outer diameter of 90 mm and an overall length of 1.97 metres.
- .2 The top 250 mm of the post length shall be black and the remainder shall be white.
- .3 The post shall be straight. Straight is defined as having no point along the length of the post any more than 6 mm removed from a perfectly straight edge placed parallel to any side of the post.
- .4 Round posts shall be open at the top and bottom.
- .5 The surface of the post shall be smooth and free from irregularities or defects.
- .6 The surface of the post shall not be affected by cleaning using scrapers, detergent and water, or solvent.
- .7 The black portion of the post shall accept and hold securely high-intensity reflectorized sheeting applied to its surface area with heavy-duty stainless steel staples, glue or other adhesives deemed suitable by the manufacturer.
- .8 If one piece construction is not used, then the connections between the pieces shall be at least as strong as if constructed of a single piece. The strength shall exist at temperatures ranging from -50°C to 50°C.
- .9 The reflective portion of round posts shall be visible from all directions and shall be of sufficient size so as to be recognizable in the dark as a guide post reflector. The reflective portion of semi-flat posts shall be visible to traffic.

.4 Weather Resistance and Durability

- .1 The post shall not be seriously affected by ozone, exhaust fumes, asphalt or road oils, dirt, vegetation, deicing salts or any other types of air contamination or materials likely to be encountered after installation.
- .2 The post shall withstand without serious damage all elements likely to be encountered after installation including hot (50°C) or cold (-50°C) temperatures, rain, snow, hail, abrasion and physical abuse.

.5 Strength and Flexibility

- .1 The posts shall resist, without breaking, tearing, shattering or other serious damage, one highway vehicle impact at a speed of 100 km/h at a test temperature of -33°C.
- .2 The post shall not bend, warp or distort when installed at temperatures up to 50°C or installed in wind velocities up to 120 km/h.

.6 High-Intensity Reflectorized Sheeting

- .1 Each post shall have a 50 mm wide reflective sheeting material fastened between 100 mm and 150 mm from the top of the post. The reflective sheeting shall be green when the Guide Post is used to mark the edges of approaches located on curves, and white in all other instances. When green is required, white sheeting

shall be screen printed green using a process recommended by the sheeting manufacturer.

- .2 The reflective sheeting material shall be high-intensity encapsulated glass bead reflective sheeting meeting or exceeding the minimum requirements as specified in ASTM-D4956, performance requirement Type III and Class I pressure sensitive adhesive backing requirements.

Part 3 Execution

3.1 INSTALLATION

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

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures

1.2 DESCRIPTION

- .1 Removal and disposal of W-Beam Guardrail at locations shown in the Contract Documents or directed by the Departmental Representative.
- .2 Supply and installation of Strong Post W-Beam Guardrail with metal posts at locations identified in the Contract Documents or as directed by the Departmental Representative. The Contractor shall not install replacement guardrail until approved by the Department Representative.
- .3 Supply and installation of impact absorbing guardrail end treatments at locations as directed by the Departmental Representative.
- .4 Work includes:
 - .1 Mobilization / Demobilization
 - .2 Survey, layout and staging
 - .3 Traffic Accommodation
 - .4 Removal and disposal of existing W-Beam guardrail, posts and hardware
 - .5 Supply and installation of Strong Metal Post W-Beam guardrail, posts, and hardware
 - .6 Supply and installation of impact absorbing guardrail end treatment
 - .7 Supply and installation of reflectors and guide posts
 - .8 Backfilling of holes and incidental grading
 - .9 Cleanup

1.3 MEASUREMENT AND PAYMENT

- .1 Supply and installation of Strong Metal Post W-Beam Guardrail in accordance with the Contract Documents. The Measurement and Payment Procedures shall be the number of linear metres of complete strong metal post w-beam guardrail including rails, posts and spacer blocks supplied, assembled, installed, and accepted by the Departmental Representative, and shall be inclusive of all costs of labour, materials, tools and equipment to satisfactorily complete this work. Payment will be made under “**Unit Price Item 9a – W-Beam Guardrail - Supply and Install (Nu-Guard-31)**”.
- .2 W-Beam Guardrail (rails and posts) removal, including end terminals, will be measured in linear metres and shall be paid under “**Unit Price Item 9b – W-Beam Guardrail - Remove and Dispose**”. Payment shall be compensation in full for all material, equipment and labour required to dismantle the W-Beam rails, remove posts, dispose of the rails, hardware and posts outside the National Parks, backfill post holes, grade the

area as necessary and clean up the work sites. Contractor to supply disposal ticket(s) to Departmental Representative for approval of disposal site(s) prior to its disposal.

- .3 Supply and installation of Impact Absorbing Guardrail End Treatments in accordance with the Contract Documents and manufacturers requirements. The measure for payment shall be by each end treatment supplied, assembled, installed and accepted by the Departmental Representative, and will be inclusive of all costs of labour, materials, tools and equipment to satisfactorily complete this work. Payment will be made under **“Unit Price Item 9c – End Treatment (Soft Stop TL-3) – Supply and Install”**.
- .4 Site preparation, including but not limited to shoulder widening, grading and levelling to the standard required by the manufacturer of the Impact Absorbing Guardrail End Treatment shall be considered incidental to **“Unit Price Item 9a – W-Beam Guardrail - Supply and Install (Nu-Guard-31)”**, and no separate or additional payment will be made.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 - Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control for survey, installation or removal of W-Beam Guide Rail and end treatments shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor

1.4 REFERENCE STANDARDS

- .1 AT - Standard Specifications for Highway Construction (latest edition)
- .2 AT – Roadside Design Guide (latest edition)
- .3 CSA G40.20 and G40.21-M87 - Structural Quality Steels
- .4 CSA G164-M - Hot Dip Galvanizing of Irregularly Shaped Articles
- .5 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .6 CSA 080-M - Wood Preservation,
- .7 AASHTO Standard Designation M-180-841 "Corrugated Sheet Steel Beams for Highway Guardrail
- .8 ARTBA Technical Bulletin No. 268-B
- .9 NLGA Standard Grading Rules for Canadian Lumber
- .10 Alberta Transportation Drawing RDG-B1.5 Rev 1 - W-Beam Strong Post TL-3 Fleet 350 Energy Absorbing Terminal
- .11 Alberta Transportation Drawing TEB 3.16a Rev 3 – Typical Strong Post W-Beam of Modified Thrie Beam Guardrail Placement at Bridge Approaches (Two-Lane Highway)
- .12 Alberta Transportation Drawing TEB 3.11a Rev 1 – Strong Post W-Beam Blocked Out Terminal End Treatment Wing End

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS SDS – Safety Data Sheets in accordance with Section 02 81 00 – Hazardous Materials.
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Manufacturer's Instructions: submit manufacturer's storage and installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.6 QUALITY CONTROL

- .1 As per Section 01 45 00 – Quality Control.
- .2 Provide certification by Professional Engineer licensed to practice in Alberta, that the Strong Metal Post W-Beam Guardrail system and Impact Absorbing Guardrail End Treatment meets the Contract requirements prior to delivery of materials. Certification to include mill certifications and galvanizing thickness test results performed by independent laboratory retained by the Contractor.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Protection:
 - .1 Store materials in accordance with manufacturer's recommendations
 - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Products**2.1 WASTE MATERIALS**

- .1 All existing guardrails, posts and hardware shall become the property of the Contractor who shall dispose of it outside the National Parks in an approved facility. Contractor to

supply disposal ticket(s) to Departmental Representative for approval of disposal site(s) prior to its disposal.

2.2 MATERIALS

- .1 Guardrail and end treatments supplied shall be in accordance with AT Standard Specifications for Highway Construction, Section 5.25 – Supply of Thrie and W-Beam Guardrail and AT Roadside Design Guide.
- .2 Nu-Guard 31 steel post guardrail system shall be used for all new sections of guardrail.
- .3 Nu-Guard 31 steel posts shall have a nominal post length of 2.3 m, or as directed by the Departmental Representative.*
- .4 End treatment impact attenuators shall be SoftStop End Terminals, and shall meet the requirements of NHRCP Report 350 and/or MASH 2009 TL-3.

2.3 RAILS AND TERMINAL ELEMENTS

- .1 W-beam guardrail shall consist of rail sections fabricated to develop a continuous beam strength with the necessary safety end feature components.
- .2 All rail sections and other components shall match the design profiles and dimensions of the AASHTO/ARTBA hardware requirements for full interchangeability of similar components regardless of the manufacturer.
- .3 The name or trademark of the manufacturer, the metal thickness and the year of production shall be clearly and permanently stamped on each component clear of the splicing overlap and on the face opposite the traffic side.
- .4 The rails and terminal elements shall be manufactured from open hearth, electric furnace or basic oxygen semi-spring steel sheet and hot dip galvanized after fabrication, all in general accordance with the AASHTO Standard Designation M180-841 and shall conform to the relevant TEB and RDG drawings.
- .5 Rails shall be punched for splice and post bolts in strict conformity with the AASHTO Standard to the designated number and centre-to-centre spacing of posts. No punching, cutting or welding will be permitted on site except for special details in unforeseen and exceptional cases with the prior approval of the Departmental Representative.
- .6 If any guardrail installation requires curved W-beam rails, the Contractor shall form these to fit the radius of the existing highway.
- .7 The rails and terminal elements shall be manufactured according to the following standards:
 - .1 Metal properties of the base metal for the rails shall conform to the following requirements:
 - .1 Minimum Yield Point: 345 MPa
 - .2 Minimum Tensile Strength: 483 MPa
 - .3 Minimum Elongation: 12% in 50 mm length
 - .4 Sheet thickness shall be in accordance with Table 1 (Class A, Type 2) of AASHTO Standard M180-841 with a nominal base metal thickness of 2.8 mm (2.67 mm minimum).

- .5 Sheet width for the W-beam rail shall be 483 mm, with a permissible tolerance of minus 3.2 mm.
- .6 Welding for the fabrication of terminal elements shall conform to the requirements of CSA-W59M. Rails and terminal elements shall be hot dip galvanized after fabrication, in accordance with CSA-G164M.
- .7 Drainage Slots: Cast-in as shown on drawings.

2.4 BOLTS, NUTS AND WASHERS

- .1 Bolts, nuts and washers shall conform to ASTM-A307, and shall be hot dip galvanized in accordance with CSA-G164M (Drawing TEB 3.06).

Part 3 Execution

3.1 PREPARATION

- .1 Removal and disposal of existing guardrail sections and posts outside of the Park.
- .2 Backfill holes and perform minor grading as necessary.
- .3 Excavate accumulated granular material, load, haul, and dispose of material at a suitable disposal facility outside of the Park or as directed by Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Guardrail, post and hardware shall be installed in accordance with AT Standard Specifications for Highway Construction, Section 2.19 – Guardrail and Guide Posts.
- .3 The Contractor shall replace rotten or missing posts during remove, salvage and reinstallation of guardrail.
- .4 End treatment impact attenuators shall be installed in accordance with the Manufacturer's specifications and as directed by Departmental Representative.

3.3 DELIVERY

- .1 Materials shall be inspected by the Contractor during delivery to ensure that they are free of defects.
- .2 Materials are to be stored in a secure location prior to installation as designated by the Departmental Representative.
- .3 Contractor to verify all W-Beam quantities in the field prior to ordering new W-Beam.

3.4 INSTALLATION

- .1 Strong Metal Post W-Beam Guardrail and Impact Absorbing Guardrail End Treatments shall be installed permanently along the road embankment in accordance with the AT Standard Drawings and these Contract Documents.
- .2 The installed top of rail height shall be in accordance with AT Specifications.

- .3 Contractor shall perform the layout of the Strong Post W-Beam Guardrail and Impact Absorbing Guardrail End Treatments.

3.5 FIELD QUALITY CONTROL

- .1 Prior to installing any guardrail, the Contractor shall provide the Departmental Representative with a copy of the manufacturer's certificate verifying that materials supplied conform to Section 16 of CSA G40.20M, for each of the mechanical and chemical tests.
- .2 Inspection of W-Beam Guardrail Material:
 - .1 Hot dip galvanized coating shall be smooth, free of beading or sharp projections at edges. Coating adherence shall prevent the peeling of any portion of the zinc coating so as to expose the base metal by cutting or prying with a stout knife under considerable pressure (bond check). A magnetic gauge will be used for checking thickness in accordance with ASTM Standard E316.3(c).
 - .2 Warped or otherwise deformed rails and terminal elements will be rejected, as will those with injurious defects or excessive roughness of the zinc coating.
 - .3 When the rail is laid on a flat surface, the warpage shall not be greater than 5 cm.
 - .4 Inspection of Posts and Blocks:
 - .1 The Departmental Representative may verify the penetration and retention of the preservative by the assay method.
 - .5 Posts and blocks shall be subject to inspection by the Departmental Representative when the bundles are opened immediately prior to use. Contractor shall carry out all the necessary quality control to ensure Strong Metal Post W-Beam Guardrail are supplied and installed as per these specifications.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning. On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by guide rail installation.

END OF SECTION

APPENDIX

A

Debris Management

WLNP Hazard Tree Debris Removal Guidelines

- 1) During the breeding bird window (April 8 to August 24), debris is to be removed immediately following cutting. Outside this window, debris can remain on ground longer but must be removed prior to ground thaw in spring.
- 2) Do not remove smaller branches and materials < ¾" diameter that are detached and on the ground. No raking or scraping of the ground to remove branches < ¾" is required.
- 3) If chipping occurs, chips must be removed and disposed of outside WLNP.
- 4) No removal of sawdust is permitted.
- 5) The WLNP Field Unit will flag trees that are further from the roadway with orange flagging tape. These trees are not to be removed and are to be left in place. Do not remove trees flagged with red flagging tape.
- 6) Do not operate machinery off hardened surfaces to remove debris, except by prior approval of the EA Coordinator. Any ground disturbance in areas of known archaeology site must be approved by the PCA Archaeologist.
- 7) All material is to be removed either by hand or machine such that ground disturbance is minimized. All larger material must be lifted and removed and not dragged along the ground. If required, larger material may be bucked into sections of sufficient size to allow for removal by lifting (e.g., highline). If lifting is required, this must be pre-approved by the EA Coordinator and PCA Archaeologist.
- 8) The qualified hazard tree assessor may propose trees to be left on site, subject to approval by the EA Coordinator.
- 9) Material may be placed on hardened surfaces prior to loading.

APPENDIX

B

Hazard Tree Removal



Parks
Canada

Parcs
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Waterton Lakes National Park

Best Management Practices for Watershed-Scale Danger Tree Removal

March 2019

Version 1.0

Canada





**Parks Canada Waterton Lakes National Park Best Management Practices for Watershed-Scale
Danger Tree Removal**

Recommendation & Approval – Version 1.0

<p>Prepared by:</p>  <p>Jennifer Carpenter</p> <p>Environmental Assessment Coordinator, Waterton Lakes National Park / Bar U Ranch National Historic Site, Parks Canada Agency</p>	<p>Date:</p> <p>Feb 5 2019</p>
<p>Recommended by:</p>  <p>Dennis Madsen</p> <p>Resource Conservation Manager, Waterton Lakes National Park, Parks Canada Agency</p>	<p>Date:</p> <p>Feb 4/19</p>
<p>Approved by:</p>  <p>Salman Rasheed</p> <p>Superintendent, Waterton Lakes National Park / Bar U Ranch National Historic Site, Parks Canada Agency</p>	<p>Date:</p> <p>March 5, 2019</p>





Introduction

The *Best Management Practices (BMP) for Watershed-Scale Danger Tree Removal* identifies a suite of mitigation measures to address potential effects from project activities related to danger tree removal in Waterton Lakes National Park such that that no significant adverse residual environmental effects are expected.

Management Context

This BMP was prepared to support the *Waterton Lakes National Park Danger Tree Management Plan*. This Management Plan outlines the approach for how danger trees are managed in WLNP and is consistent with the Wildlife Tree Committee of British Columbia's Wildlife/Danger Tree Assessor Parks and Recreation Sites Module. The Module is a well-established standard that provides the most appropriate guidance for the types of land use, tree species and terrain that exist in WLNP.

In addition, the BMP supports routine tree removal and brush thinning as a component of fuel reduction to reduce the hazard of wildfire to infrastructure, facilities, and townsites.

Application

The BMP impact assessment pathway is applied when there is a suite of routine, repetitive projects or activities, with well understood and predictable effects. This fulfils Parks Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land, see the [Guide to the Parks Canada EIA Process](#).

The *BMP for Danger Tree Removal* can be applied in the following ways ensure no significant adverse residual effects occur from danger tree removal activities:

- **Direct application:** Use the standard mitigation measures in the BMP when the proposed project activities are entirely within the scope of the BMP and all standard mitigation measures can be followed.
- **Application with supplemental mitigations:** Additional mitigations or minor modifications to the standard mitigations are required to provide project-specific clarifications or direction (e.g., clarify critical timing windows, Species at Risk (SAR) or cultural resource considerations).
- **Application as part of a Basic Impact Analysis (BIA) or Detailed Impact Analysis (DIA):** Where one or more BMPs may not address all of the potential adverse effects of a proposed project, the BMP(s) can be applied as part of a BIA or DIA.

If the Field Unit Superintendent or designate determines that with application of the standard mitigation measures in this BMP and any project-specific supplemental mitigations outlined in the Parks Canada EIA Requirement Checklist, *the project is unlikely to result in significant adverse environmental effects*, then the BMP impact assessment pathway may be applied to a proposed project.

Definition

For the purposes of this BMP, a danger tree is one that has been identified for intervention following the processes outlined in the *Waterton Lakes National Park Danger Tree Management Plan*.



Scope

Project activities covered under the scope of this BMP are limited to fuel reduction and danger tree removal within approximately 1 ½ tree lengths of existing Park infrastructure including roads, buildings, trails, campgrounds and Day Use Areas.

Safety of workers and the public is paramount during all operations. Site security, worker safety and visitor safety are not included in the scope of this document. The Contractor will be required to submit a Safety Plan for approval by the Project Manager prior to project initiation. If there is conflict between safety practices and the mitigation measures in this BMP, consult with the Environmental Assessment Officer to determine if this BMP is appropriate for the Project, or if review and revision of the BMP is warranted.

Exceptions

There are specific circumstances when the standard mitigations in this BMP would not apply or must be used in conjunction with additional analysis and supplemental mitigations, including the following:

- Danger tree removal in Zone I – Special Preservation or in designated Environmentally Sensitive Sites (e.g., Maskinonge Area).
- Work has potential to affect individuals, residences or critical habitat of a Species at Risk listed in Schedule 1 of the *Species at Risk Act* (SARA) (e.g., Little Brown Myotis, Half-moon Hairstreak).
- Work is proposed within a riparian zone (i.e. within 30 m of the high water mark) of any watercourse, lake, pond, river, or wetland.
- Removal of trees that are known to be infected with disease or infested with pests (e.g., Mountain pine beetle).
- Work involves the off-road use of mechanized falling methods such as harvesters and feller-bunchers or heavy machinery to move large logs or pile debris.
- Work results in a significant change in land use (e.g., new project development) or is beyond 1 and 1/2 tree lengths of existing infrastructure.
- Work involves excavation of soil.
- Work has the potential to directly impact a known cultural resource such as work is occurring in a known archaeological site or could impact an object such as a Culturally-Modified Tree. Additional analysis and consultation with the Cultural Resource Management Advisor is required.
- Work related to the maintenance of FortisAlberta infrastructure and facilities is subject to the Environmental Protection Plan for Operation and Maintenance off Electrical Power Distribution Facilities in Waterton Lakes National Park and is outside the scope of this BMP.
- Tree removal completed by leaseholders in the Waterton Townsite is managed through a Vegetation Removal Restricted Activity Permit and is outside the scope of this BMP.



- Any circumstances where the BMP does not address known environmental issues associated with the proposed work, the potential environmental impacts of the proposed work are not fully understood, or when additional review is in the public interest.

Responsibilities

The **Environmental Assessment Officer (EAO)** will review proposed danger tree removal activities and advise the proponent if the work falls within the scope of this BMP. The **EAO** will also determine whether supplemental mitigation measures are required, and will identify those in consultation with Field Unit subject matter experts. The **EAO** will provide a recommendation as to whether application of the mitigation measures in the BMP will adequately address all of the potential adverse effects of the project. The **EAO** will summarize this information in the Parks Canada EIA Requirement Checklist and present the completed BMP and EIA Checklist to the Resource Conservation Manager for review.

The **Resource Conservation Manager** will review the Parks Canada EIA Requirement Checklist and review if the BMP is a suitable EIA pathway for the scope of work outlined by the Project Manager.

Project Managers are responsible for ensuring all mitigation measures applicable to the work are added to the terms and conditions of any permits or contracts issued for the project and recommend the EIA Checklist.

The **Field Unit Superintendent (FUS)** or designate will approve the use of this BMP as the appropriate EIA pathway for the work based on the analysis provided by the EAO. The FUS or designate may determine that this BMP alone is not sufficient to make a determination of significance or may not adequately prevent significant adverse environmental effects. In these cases, the FUS will recommend an alternate EIA pathway or request additional analysis.

Potential Effects on Valued Components

Potential adverse effects from fuel reduction and danger tree management activities are well understood and predictable. Components of the environment that may be impacted are identified as Valued Components. Potential effects from danger tree removal on Valued Components are summarized in **Table 1** below.



Table 1 Potential Adverse Effects on Valued Components from Danger Tree Removal Activities

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities
Soil and Land Resources	<ul style="list-style-type: none">• Slope instability, due to soil exposure or improper log handling.• Rutting, admixing and/or soil erosion.• Soil contamination (e.g. leaks and accidental spills).
Air Quality	<ul style="list-style-type: none">• Decreased ambient air quality (i.e. from dust, equipment emissions, etc.).• Short-term increase of ambient noise levels.
Aquatic Resources	<ul style="list-style-type: none">• Impacts to surface and groundwater quality (e.g., surface run-off; storm-water drainage that may occur due to erosion of bare ground; sedimentation; transportation of debris; or contamination from leaks and accidental spills)• Alteration of riparian habitat through loss of shade, leaf litter, and nutrient inputs.
Vegetation	<ul style="list-style-type: none">• Damage or removal of non-target species or individuals.• Introduction of non-native species populations, or expansion of existing populations, particularly in ditches or areas where soil is disturbed• Changes in understory species composition including potential for choking of understory due to improper debris management.• Increased wind effect on remaining trees.• Increased fuel loading from improper debris management practices.
Wildlife	<ul style="list-style-type: none">• Alteration of wildlife movement and foraging patterns due to short term sensory disturbance.• Medium term changes to microhabitat.• Damage to nests, dens, roosts; disruption and/or mortality of breeding animals and their young.• Increased potential for human-wildlife conflict during removal activities or resulting from proliferation of food plants after removals.
Cultural Resources	<ul style="list-style-type: none">• Impacts to archaeological resources (known or potential).
Visitor Experience	<ul style="list-style-type: none">• Temporary decreased quality of visitor experience due to temporary area closures, operation of equipment, traffic disruption and sensory disturbance.• Aesthetic impacts, including removal of important tree screens on roads and trails.



Standard Mitigation Measures

Mitigation measures in **Table 2** are developed to reduce potential effects on VCs from danger tree and fuel reduction management activities. Where certain mitigations are not feasible for a specific project, supplemental or modified mitigation measures will be developed in consultation with the EAO (Environmental Assessment Officer).

The following general mitigation measures will also apply to every project:

1. All potential danger trees must be assessed following the requirements of the *Waterton Lakes National Park Danger Tree Management Plan*.
2. No work is permitted outside the project boundaries unless approved by the EAO.
3. Workers are responsible for avoiding culturally and environmentally sensitive areas as identified in the supplemental mitigations.
4. Burning of felled debris is not permitted.
5. Broadcast dispersal of wood chips is not permitted.
6. Tree felling will only occur during daylight hours.
7. Tree removal within two tree lengths of power lines requires consultation with the appropriate utility company.
8. All employees must attend an environmental briefing with the EAO before beginning work at the site to review and explain the mitigations that are conditions of the project approvals. Employees must attend this briefing before beginning their work at this site. Notice of at least one business day must be given to the EAO to schedule the briefing.
9. All equipment and vehicles will be made available for inspection by the EAO on arrival to WLNP. Notice of at least one business day must be given to the EAO to schedule the inspection.
10. All contractors and sub-contractors require a valid Parks Canada business licence.
11. All contractors require a valid Restricted Activity Permit for Vegetation Removal.
12. All work must adhere to the *Canada National Parks Act* and *Regulations* and any other applicable legislation.



BMP for Watershed-Scale Danger Tree Removal

Table 2 Standard Mitigation Measures to Address Potential Adverse Effects on Valued Components from Danger Tree Removal Activities

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
Soil and Land Resources	Slope instability, due to soil exposure or improper log handling.	Where appropriate, fallers may position fallen logs to assist in stabilizing slopes and reducing potential for erosion.
		Flush-cut stumps and brush unless using stumps; leave stump and roots in place. Flush-cutting means cutting trees, stumps, or vegetative growth to within 75 mm of the ground, leaving the root structure undisturbed.
	Rutting, admixing and/or soil erosion.	Conduct tree removal when ground is frozen or firm and dry.
		Avoid ground disturbance by using low-impact harvesting methods.
		Minimize full removal and retain vegetation when possible to reduce erosion.
		Outside landscaped areas retain some whole logs on-site as coarse woody debris to provide erosion control, moisture retention and microsites for regeneration and site diversity. The goal for woody material volumes is approximately 40 m ³ /ha with coverage targets of 10-25% of the disturbed area, (50-100 trees per 100 m x 100 m area). Do not leave woody materials in piles that could pose a fire danger or leave mats of chips on site. If chipping occurs, chips must be removed and disposed of outside WLNP. During fuel reduction projects, lower woody debris objectives may be set by the Fire Management Officer and outlined in the supplemental mitigations.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Soil contamination (e.g. leaks and accidental spills).	Use biodegradable chain oils and lubricants. Perform refueling and maintenance of chainsaws over impervious mini-berms with spill pads onsite.
		If contamination is found, cease work immediately and if necessary, implement the Emergency Response Plan.
		A spill kit capable of handling 110% of the total fuels on-site must be available at worksite and all personnel trained in its use.
		In the event of a spill, implement spill response procedures immediately. Report all spills greater than 5 liters, and any spills in water to the Parks Canada EAO (or designate). Spills will be remediated to the satisfaction of Parks Canada.
Air Quality and Noise	Decreased ambient air quality (i.e. from dust, equipment emissions, etc.).	Equipment must be in good working order, free of leaks (e.g. fuel, oil and grease) and fitted with standard air emission control and spark arrestor devices prior to arrival on site.
		Minimize idling of engines at all times.
	Schedule work during periods with lower wind speeds.	
	Short-term increase of ambient noise levels.	Refer to mitigation measures intended to reduce the impact of noise levels on the Wildlife and Visitor Experience valued components.
Aquatic Resources	Impacts to surface and groundwater quality (e.g., surface run-off; storm-water drainage that may occur due to erosion of bare ground; sedimentation;	In consultation with the EAO, trees should be felled to mimic natural pattern, including into and across watercourses, riparian zones and wetlands. Care must be taken to avoid unnatural debris piling or sediment release. Tree must only be felled into sensitive areas if they are to remain there.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	transportation of debris; or contamination from leaks and accidental spills).	Do not block culverts or ditches with debris and brush.
		Logs and other salvage materials shall not be skidded through wetlands, waterways or water bodies.
	Alteration of riparian habitat through loss of shade, leaf litter, and nutrient inputs.	Vehicle and equipment refueling must take place at licensed facilities (i.e., gas station), or on impervious surfaces (e.g., paved surfaces) > 100 m from waterbodies and watercourses. The refueling location should be determined in consultation with the EAO.
		Do not store fuel, lubricants, petro-gels or oils within 100 m of waterbodies and watercourses unless approved by the Parks Canada EAO due to site-specific limitations. In this case, the contractor must submit a secondary containment and a spill prevention plan.
Vegetation	Damage or removal of non-target species or individuals.	Use non-permanent markings such as temporary marking paint or biodegradable flagging tape to identify trees for removal and remove on project completion. Do not spray paint or scar trees that will not be removed.
		Minimize damage to root systems of remaining plants and trees by not stockpiling materials within drip line of retained trees and restricting vehicle and equipment access and disturbance of the area.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Introduction of non-native species populations, or expansion of existing populations, particularly in ditches or areas where soil is disturbed	In areas with known weed infestations, reduce weed spread through vegetation removal prior to seed set, typically before June 1 or by completing weed control that reduces risk of transfer (e.g., remove seed heads).
		Clean equipment (e.g., brushed off/compressed air) prior to moving it from a weed infested to a non-weed infested work area. Workers must brush soil and seeds off protective clothing and boots each workday.
		Restore disturbed areas, as soon as practical following tree removal to promote re-establishment of native vegetation, reduce erosion, and control of non-native plant species. See supplemental mitigations section for restoration requirements applicable to the scope and scale of individual projects. Note that all seeding in WLNP is subject to strict controls and requires Certificates of Analysis be provided to Parks Canada for approval. Do not purchase seed until written approval for individual lots is obtained.
		Machinery must arrive on site in a clean and dry condition and be maintained free of fluid leaks, vegetative material (i.e., invasive species, noxious weeds) and soils from off-site. All construction equipment from outside WLNP will be washed prior to arrival to minimize the risk of introducing weeds or aquatic invasive species.
	Changes in understory species composition including potential	Where possible within the objectives of removal, maintain overstory and canopy cover to reduce shrubby growth and changes in understory.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	for choking of understory due to improper debris management.	Unless approved by the EAO due to site specific limitations, retaining chippings onsite is not permitted. If chipping is approved, the chip depth is to be a maximum of 5 cm (2 inches), spread over area no greater of 5m x 5m per hectare so as to not cover underlying vegetation, prevent new native seedlings from sprouting, and cause soil/seed bank sterilization.
	Increased wind effect on remaining trees.	Retain strong rooted, long-lived wind firm trees, and tree clumps to minimize wind throw.
	Increased fuel loading from improper debris management.	See debris management requirements in the soil and land resources section.
Wildlife	Alteration of wildlife movement and foraging patterns due to short term sensory disturbance.	If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area and away from areas of potential conflict.
	Medium term changes to wildlife microhabitat.	Logs left on-site should include a wide range of sizes and lengths. Logs should lie flat on the soil surface with branches intact as long as they do not provide ladder fuels into the forest canopy.
	Damage to nests, dens, roosts; disruption and/or mortality of nesting animals and their young.	Avoid work during the following sensitive species timing windows: Breeding Birds: April 1 to August 31 Bat General Activity Period: April 1 to October 31



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
		If work cannot be rescheduled outside this time period, or an immediate safety issue requires work inside this period see supplemental mitigations section.
		If previously unidentified sensitive features are found, notify the EAO immediately (e.g., raptor nest).
		Following the guidance of the WLNP Danger Tree Management Plan, avoid unnecessary removal of high value wildlife trees. If a high value wildlife tree, the assessor must consider prescription alternatives to complete removal of the tree (see Appendix 1).
		Notify the Parks Canada Dispatch (1-888-WARDENS) of any potential wildlife conflict (e.g., aggressive behaviour, persistent intrusion), distress, entrapment or mortality. In the case of aggressive behaviour or persistent intrusion, stop work and evacuate the area.
		Contractor will make bear spray, bear spray training, and wildlife awareness training mandatory to all workers on site.
		No feeding, baiting or luring of any wildlife (including bears, small mammals, birds); do not approach or harass wildlife in any way. Notify the EAO immediately if wildlife obtain garbage or human food. If wildlife get into attractants that have been intentionally or accidentally left out, individuals or the contractor could be charged under the Canada National Parks Act Regulations.



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Increased potential for human-wildlife conflict due to growth of berry shrubs in understory.	<p>Parks Canada will notify the human wildlife conflict specialist of project scope and monitor if additional vegetation management to reduce berry growth is required.</p> <p>*Parks Canada is responsible for implementation of this mitigation.</p>
Cultural Resources	Impacts to archaeological resources (known or potential).	<p>Parks Canada will consult with the CRM advisor to determine whether there are any known cultural resources and or archaeological sites within the proposed work area.</p> <p>Any additional mitigations will be identified in the supplemental mitigations section for individual projects.</p>
		<p>All work in WLNP is subject to the accidental finds clause whereby on finding any unexpected Cultural Resources or potential Cultural Resources (e.g., Telegraph Poles, culturally modified trees, bison bones), workers shall stop work in the immediate area and notify the SO. Parks Canada's Terrestrial Archaeology section will provide advice and assessment of significance and determine requirements to mitigate the chance find. Crews will be made aware of the Accidental Finds Procedure during the environmental briefing with the EAO prior to beginning work.</p>
Visitor Experience	Temporary decreased quality of visitor experience due to temporary area closures, operation of equipment and sensory disturbance.	<p>Parks Canada will consult with the Visitor Experience and External Relations Managers in advance of any anticipated access impacts to visitor facilities and if necessary for the scope of work, ensure an appropriate communications plan is developed.</p> <p>*Parks Canada is responsible for implementation of this mitigation.</p>



BMP for Watershed-Scale Danger Tree Removal

Valued Component	Potential Adverse Effects from Danger Tree Removal Activities	Mitigation Measure
	Aesthetic impacts, including removal of important tree screens on roads and trails.	<p>In areas frequented by visitors, assessors must consider aesthetics when determining prescriptions (refer to Appendix 1).</p> <p>Leave doglegs or screening at road and trail intersections. Where tree removal will result in the loss of important tree screens on roads and trails, discuss alternative options to satisfy clearing requirements with Parks Canada.</p>



Appendix 1 Site Specific Prescriptions

As identified in the mitigations, the certified assessor will recommend site-specific prescriptions where danger tree removal is to occur in areas with key objectives for visitor experience, wildlife and wildlife habitat or environmentally sensitive areas, as required. Potential prescription options may include, but are not limited to, the following table:

Management Objective	Site Specific Consideration or Constraint	Potential Prescription
Visitor Experience	Tree stumps are not part of a desired visual landscape.	<ul style="list-style-type: none"> • Cut stumps flush to ground level. • Cover stumps or dust them with ash to make them less visible. • In the front country, a stump grinder may be an option. • Position felled branches and stems with the cut end away from the trail or facility to reduce the appearance of a modified landscape. • Fell trees parallel to trails to reduce the appearance of a modified landscape.
	Non-formalized social trails have caused trail braiding.	<ul style="list-style-type: none"> • Cover trail with tree debris to prevent additional trail braiding.
Wildlife and Wildlife Habitat	Wildlife use (e.g., bat, bird, mammal, etc.) use is confirmed or suspected and tree is not an imminent threat to safety.	<ul style="list-style-type: none"> • Leave tree as is. Consider area closure or move target. Delay tree removal until the end of the timing window.
	Wildlife use (e.g., bat, bird, mammal, etc.) use is confirmed or suspected and tree is an imminent threat to safety.	<ul style="list-style-type: none"> • Confirm species and whether there is alternative nesting / roosting habitat in the vicinity. • If the species using the tree is a Species at Risk, consider an Authorization to destroy critical habitat or residence. • Modify tree if possible, including removing only the hazard item on the tree (e.g., branch or dangerous top).
Environmentally Sensitive Areas	Danger tree removal in environmental sensitive areas (e.g., within 30m of watercourses or water bodies).	<ul style="list-style-type: none"> • In areas with a possible target or imminent threat to safety, ensure trees are felled by hand and debris is not to be left within 30m of a watercourse or water body.