

## TABLE OF CONTENTS

Pages

### Division 00 - Procurement and Contracting Requirements

Section 00 01 10 - Table Of Contents .....	2
Section 00 01 15 - Drawing List .....	1

### Division 01 - General Requirements

Section 01 11 00 - Summary Of Work .....	3
Section 01 27 00 - Measurement and Payment .....	11
Section 01 28 00 - Site-Specific Work Restrictions .....	2
Section 01 28 01 - General Work Restrictions .....	5
Section 01 29 00 - Alternatives .....	1
Section 01 31 19 - Project Coordination .....	3
Section 01 32 16 - Construction Progress Schedule .....	3
Section 01 33 00 - Submittal Procedures .....	2
Section 01 35 29 - Health And Safety Requirements .....	3
Section 01 35 43 - Environmental Procedures .....	8
Section 01 41 00 - Regulatory Requirements .....	1
Section 01 45 00 - Quality Control .....	3
Section 01 52 00 - Construction Facilities .....	2
Section 01 55 26 - Traffic Accommodation .....	2
Section 01 61 00 - Common Product Requirements .....	4
Section 01 71 00 - Examination And Preparation .....	3
Section 01 74 19 - Waste Management And Disposal .....	2
Section 01 77 00 - Closeout Procedures .....	2
Section 01 78 00 - Closeout Submittals .....	5

### Division 02 - Existing Conditions

Section 02 41 13 - Selective Site Demolition .....	3
Section 02 41 14 - Asphalt Paving Removal .....	2

### Division 03 - Concrete

Section 03 10 00 - Concrete Forming And Accessories .....	2
Section 03 20 00 - Concrete Reinforcing .....	2
Section 03 30 00 - Cast-in-Place Concrete .....	5

### Division 05 - Metals

Section 05 12 33 - Structural Steel .....	4
Section 05 50 00 - Metal Fabrications .....	3

### Division 06 - Wood, Plastics and Composites

Section 06 15 00 - Wood Fabrications .....	2
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Division 31 - Earthwork

Section 31 05 16 - Aggregate and Rock Materials .....	6
Section 31 36 00 - Gabions .....	2

Division 32 - Exterior Improvements

Section 32 00 01 - Subgrade Preparation .....	1
Section 32 00 02 - Granular Base Course .....	2
Section 32 00 03 - Asphalt Concrete Pavement .....	11
Section 32 12 13 - Asphalt Prime Coat .....	3
Section 32 17 23 - Pavement Markings .....	2
Section 32 33 00 - Site Furnishings .....	4
Section 32 44 00 - Trail Construction .....	4
Section 32 55 00 - Stone Work .....	5
Section 32 91 19 - Sod Placement and Final Grading .....	2
Section 32 91 20 - Seeding .....	2

END OF TABLE

**Part 1            General**  
**1.1             DRAWING LIST**

Drawing No.	Title
1	Cover Sheet
2	Overall Plan
3	Removal Plan 1 of 3
4	Removal Plan 2 of 3
5	Removal Plan 3 of 3
6	Plan 1 of 3
7	Plan 2 of 3
8	Plan 3 of 3
9	Enlargement Plan
10	Detail 1 of 4
11	Detail 2 of 4
12	Detail 3 of 4
13	Detail 4 of 4
14	Trail Railing Notes
15	Trail Railing Details
16	Bridge General Notes
17	Upper Bridge General Arrangement
18	Upper Bridge Typical Sections
19	Upper Bridge Abutment Foundation Details
20	Upper Bridge Abutment Bearing Details
21	Upper Bridge Bridge Pier Details Steel Alternative
22	Upper Bridge Bridge Pier Details Concrete Alternative
23	Upper Bridge Framing Schematics 1 of 2
24	Upper Bridge Framing Schematics 2 of 2
25	Upper Bridge Frame Details
26	Upper Bridge Railing Details
27	Upper Bridge Typical Ramp Sections
28	Upper Bridge Ramp Pier Details
29	Upper Bridge Ramp Details
30	Existing Bridge Modifications Middle Bridge
31	Existing Bridge Modifications Lower Bridge
32	Existing Bridge Modifications Bauerman Creek Bridge
33	Existing Bridge Modifications Details

**END OF SECTION**

**Part 1            General**

**1.1                DEFINITIONS**

- .1        'PCA' refers to Parks Canada Agency.
- .2        'WLNP' refers to Waterton Lakes National Park.
- .3        'RRC' refers to Red Rock Canyon.
- .4        'Work' refers to the provision of all labour, services, material and equipment as necessary for the Contractor to complete and perform their obligations in accordance with the Contract.
- .5        'Consultant' refers to Dillon Consulting Limited (Dillon).
- .6        'Owner' or 'Departmental Representative' refers to the Parks Canada Agency (PCA) Project Manager or their duly authorized representative.
- .7        'ESO' refers to a PCA Environmental Surveillance Officer.
- .8        'BMP' refers to Best Management Practices. BMP's are documents prepared by PCA that outline specific measures to be taken when carrying out various activities within WLNP.

**1.2                PROJECT LOCATION**

- .1        The project is located in the province of Alberta within WLNP. It is located along the Red Rock Parkway approximately 14 km from the intersection with Highway 5, approximately 5 km from the entrance to WLNP.

**1.3                WORK COVERED BY CONTRACT DOCUMENTS**

- .1        Read this section in conjunction with Drawings and other specifications.
- .2        The general scope of work includes, but may not be limited to, the following:
  - .1        Mobilization and demobilization
  - .2        Traffic accommodation
  - .3        Waste management and disposal
  - .4        Reconstruction of RRC trail, Upper Loop
  - .5        Reconstruction of RRC trail, Lower Loop
  - .6        Construction of drainage features, RRC trail, Lower Loop
  - .7        Reconstruction of steel railing, RRC trail, Upper Loop
  - .8        Removal of timber railing, RRC trail, Upper Loop
  - .9        Removal and replacement of Upper Bridge
  - .10       Modifications to Middle Bridge
  - .11       Modifications to Lower Bridge
  - .12       Modifications to Bauerman Creek Bridge
  - .13       Modifications to Bauerman Creek / Lower Bridge approach area
  - .14       Reconstruction of stone stair at Middle Bridge

- .15 Construction of new plazas and picnic areas
- .16 Picnic area trail improvements
- .17 Construction of gabion walls
- .18 Reconstruction of rest areas, Upper Loop trail
- .19 Construction of heavy rock features

#### **1.4 COMPLETE PROJECT**

- .1 Unless specifically stated otherwise, the Contractor shall supply all transportation, labour, materials, tools, equipment and all other incidentals required to complete the Work. The intent is that the Contractor provides a complete product.
- .2 Where it is clear from the contract documents that a particular element of Work is required, but payment terms for that element is not explicitly identified in the specifications, that element of the Work shall be considered to be incidental to the overall project. No separate or additional payment for such elements will made.

#### **1.5 SITE ACCESS**

- .1 Some parts of the Work may require specialized access, including, but not limited to, the need for helicopters for moving personnel, equipment and/or materials.
- .2 The Contractor shall be responsible for assessing and estimating the means and methods required for successful completion of the Work.
- .3 No separate or additional payment will be made with respect to site access.

#### **1.6 ARCHEOLOGICAL MONITORING**

- .1 PCA will provide required archeological monitoring.
- .2 Locations where monitoring is required will be identified by the Departmental Representative at the project start-up meeting.
- .3 Provide the Departmental Representative with a minimum of two (2) weeks' notice prior to starting work at locations where archeological monitoring is required.

#### **1.7 OTHER INFORMATION**

- .1 Following Contract award, AutoCAD versions of the project drawings will be made available to the Contractor. This is intended to allow geometry information on the Drawings to be accessible for direct use during surveying activities to be completed by the Contractor.

#### **1.8 PROJECT SCHEDULE**

- .1 Work shall be completed by December 31, 2021.

#### **1.9 DOCUMENTS REQUIRED**

- .1 Maintain at job site one copy of each of the following documents:
  - .1 Drawings.
  - .2 Specifications.
  - .3 Addenda.

- .4 Environmental Protection Plan.
- .5 Reviewed shop drawings.
- .6 List of outstanding shop drawings.
- .7 Change orders.
- .8 Other modifications to Contract.
- .9 Approved work schedule.
- .10 Health and Safety Plan and other safety related documentation.

**END OF SECTION**

**Part 1            General**

**1.1            PRICING ASSUMPTIONS**

- .1        The prices bid for various items of work, unless specifically noted otherwise, shall include the supply of all labor, material, plant, equipment, transportation, profit and overhead necessary to construct the work in accordance with the drawings and specifications.
- .2        The prices bid for supply of materials and installation of materials shall be full compensation of supplying, hauling, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.
- .3        The method of measurement of the quantities for payment and the basis for payment will be in accordance with 'MEASUREMENT AND PAYMENT ITEMS' below.
- .4        All measurement shall be done by the Contractor using methods acceptable to the Departmental Representative and are subject to verification by the Departmental Representative.
- .5        Where the tender shows separate items for supply and installation, the unit prices or lump sum prices bid for supply shall include supplying, delivering, loading, unloading and all allowances for handling, storage, breakage and waste. Payment will be made only for materials stored in a secure manner at the site or which have been installed.
- .6        All materials on site whether existing structures, vegetation, topsoil, gravel, sand or other excavated, or piled materials are the property of the Owner or the owner of the land on which the work is located. Only those materials specifically noted in the specification or on drawings as belonging to the Contractor shall become the Contractor's property.
- .7        Where there are excess excavated materials, unsuitable materials excavated or materials of any kind that are excavated but not used in the work, such materials are not the property of the Contractor unless authorized in writing by the Departmental Representative or specified to be disposed of by the Contractor.
- .8        Each unit price shall be the full and only amount payable for the unit and all things directly or indirectly required to complete it in accordance with the contract, such as, but not limited to delivering, erecting, handling, re-handling, storing, consumable items, temporary facilities, scaffolding, protecting, painting, dewatering, setting out, disposing, dust control, clean up, measuring, calculating, scheduling, administration, supervising, inspection, testing, overhead and profit.
- .9        Each item will be measured for payment in the unit stated in the Schedule of Prices. The unit prices in the Schedule shall remain unchanged notwithstanding differences between the actual quantities and quantities shown therein.
- .10      The items listed in the Schedule of Prices shall together cover the entire Scope of the Work required by the Tender Documents at the time of tendering. The scope of each item shall be interpreted accordingly.

- .11 Provisional items as identified in the Schedule of Prices are discretionary and will be determined by the Owner if they are to be constructed as part of the work following the award of this Contract.

## **1.2 LUMP SUM ITEMS**

- .1 Following tender award, provide a detailed breakdown for each of the Lump Sum prices included in the tender, with the price for each line item fairly and accurately representing the work to be completed.
- .2 Submit breakdowns to the Departmental Representative for review within 10 days after contract award.
- .3 Make adjustments to the breakdowns as required.
- .4 Detailed breakdowns will replace the original Lump Sum prices with a series of smaller lump sum items for use in Progress Claims.

## **1.3 PRIME COST SUM**

- .1 A Prime Cost Sum shall be included as provided in the Bid Table.
- .2 Prime Cost Sum is not a sum due to the Contractor. If and when the Departmental Representative identifies and requests additional work outside the original scope, payment for that work may, at the discretion of the Departmental Representative, be made from the Prime Cost Sum.
- .3 Pricing for each individual instance of additional work ('Prime Cost Sum Items') will be negotiated between the Departmental Representative and the Contractor. Depending on the nature of the work, a Prime Cost Sum Item may be priced as a lump sum price or as a unit price.
- .4 Once a Prime Cost Sum Item has been agreed upon with the Departmental Representative, the associated work shall be added to the Contract and the agreed price shall be included as an item for payment.
- .5 As Prime Cost Sum Items are added to the project, a corresponding reduction will be made to the remaining Prime Cost Sum.
- .6 The use of the Prime Cost Sum will be at the sole discretion of the Departmental Representative. Contractor cannot make any claim in the event that some or all of Prime Cost Sum is deemed unnecessary and left unspent.
- .7 Items to be completed under the Prime Cost Sum may include but may not be limited to the following items:
  - .1 Additional granular material placement for picnic areas and/or trail improvements;
  - .2 Additional stabilization works;
  - .3 Additional stone or timber features;
  - .4 Additional landscape features (benches, picnic tables, garbage bins, bicycle racks, concrete curbs and signage);
  - .5 Additional railing cost due to fabrication and/or installation;
  - .6 Additional cost incurred for new or rehabilitated bridge structures fabrication and/or installation;



- .7 Other Miscellaneous work as directed by the Departmental Representative.

#### **1.4 PROGRESS CLAIMS**

- .1 Contractor's Responsibilities:
  - .1 Submit draft Progress Claim to Departmental Representative, including proposed quantities for unit price items and proposed percent complete for lump sum items.
  - .2 Departmental Representative will review the draft Progress Claim and return requested modifications within three (3) working days.
  - .3 Based on the Departmental Representative's proposed modifications, prepare and submit the Progress Claim in the specified format ("Request for Progress Payment", Form PWGSC-TPSGC 1792).
  - .4 Submit a maximum of one (1) progress claim per month.
  - .5 Supply documentation to support claim for materials on site in the form of itemized lists or purchase orders showing quantities.
  - .6 Supply other evidence as may be required by Departmental Representative in support of progress claims.
- .2 Departmental Representative Responsibilities:
  - .1 Review Contractor's draft Progress Claim and return requested modifications to the Contractor within three (3) working days.
  - .2 Review Contractor's modified Progress Claim / Request for Progress Payment and issue for payment processing within ten (10) working days.

#### **1.5 CHANGE ORDERS**

- .1 Complete and promptly return all Contemplated Change Notices (CCN's) issued by Departmental Representative, quoting unit and/or lump sum prices as requested. Include appropriate supporting documentation to verify prices.
- .2 Do not proceed with work affected by CCN until authorised to do so by Change Order (CO).
- .3 Make no changes in Work unless Change Order issued. Change Order is only valid when signed by Departmental Representative and Contractor.

#### **1.6 MEASUREMENT AND PAYMENT**

- .1 Method of measurement for payment to be used for each item contained in the Schedule of Prices is detailed below.
- .2 Where a method of measurement for payment for a work item is not specified, payment for that item will be deemed to be incidental to another pay item or other pay items; no separate or additional payment will be made.

#### **1.7 MEASUREMENT AND PAYMENT ITEMS**

- .1 Mobilization and Demobilization
  - .1 The Lump Sum price for Mobilization and Demobilization shall include the following:

- .1 All preparatory work and operations.
- .2 Transportation of equipment, tools, materials and personnel to and from site and within the site.
- .3 Leveling of laydown area for Contractor's use.
- .4 Preparing all required submissions.
- .5 Obtaining all necessary permits and approvals.
- .6 Traffic accommodation including all signage and barricades as per the accepted Traffic Accommodation Strategy (TAS).
- .7 Tree protection.
- .8 Erosion and sediment control, including ESCP.
- .9 Environmental protection, including EPP.
- .10 Implementation of mitigation measures required under the BMP's.
- .11 Survey.
- .12 All submissions, permits and approvals.
- .13 Cleaning of equipment prior to entering or leaving site.
- .14 Waste management.
- .15 Site clean-up, including remediation and restoration of disturbed areas – either inside or outside of the identified work zones – to condition existing at start of construction.
- .16 All other activities required to complete the Work as detailed in the Contract Documents but not otherwise listed for payment.
- .2 Mobilization and Demobilization will be measured and paid as a Lump Sum.
- .3 Payment will be made as follows:
  - .1 20% of item price may be claimed on the first Progress Claim after Contractor has established their operations and facilities and provided any required submissions.
  - .2 A further 40% of item price may be claimed paid on the first Progress Claim on which the combined billing for the remaining items exceeds 10% of the total for those items.
  - .3 The remaining 40% of item price may be claimed on the final Progress Claim.
- .2 Prime Cost Sum
  - .1 The Prime Cost Sum is an allowance for potential additions to the Scope of Work that may be made throughout the course of the Work.
  - .2 The Prime Cost Sum will not be measured or paid as a separate item.
  - .3 Any additions to the Scope of Work will be made through one or more Prime Cost Sum Items, each of which will specify the measurement and payment terms for the additional work.
- .3 Removal and Relocation of Existing Site Features
  - .1 This lump sum item is to include all costs associated with existing site features, including, but not necessarily limited to:
    - .1 Removal

- .2 Temporary storage
- .3 Disposal
- .4 Installation
- .2 Features present at some or all sites include, but may not be limited to, the following:
  - .1 Picnic tables
  - .2 Garbage bins
  - .3 Bicycle racks
  - .4 Stone features
  - .5 Timber features
  - .6 Firepits
- .4 Remove Unsuitable Base Material
  - .1 This unit price item is to include all costs associated with removal and proper disposal of soil materials currently in place which are required to be removed as part of the Work.
  - .2 Measurement for this unit price item will be based on the volume of material removed, measured in cubic meters.
  - .3 Payment will be made at the unit price bid.
  - .4 After the trail surface has been removed, the Departmental Representative will determine, in coordination with Consultant and Contractor, those areas where the material in place below the trail is not suitable for reuse under the new trail. The Contractor shall remove the material in these areas to minimum of the following depths:
    - .1 To sound rock.
    - .2 To suitable granular material.
    - .3 To the depth necessary to install a completely new granular base layer as shown on the Drawings.
- .5 Remove ACP Trail Surface (Typical)
  - .1 This unit price item is to include all costs associated with removal and proper disposal of asphaltic concrete pavement (ACP) currently in place, which is required to be removed as part of the Work, and which is not covered by another pay item.
  - .2 Measurement for this unit price item will be by linear meter.
  - .3 Payment will be made at the unit price bid.
  - .4 Where there is a railing adjacent to the trail, the measurement will be taken between railing posts, including at widening locations.
  - .5 Where there is no railing, measurement will be taken along the edge of pavement.
  - .6 The width of pavement varies along the trail. Contractor shall include the effect of this variation in the unit price bid.
  - .7 The thickness of the pavement is not known. For bidding purposes, an average thickness of 75mm shall be assumed.

- .8 An adjustment to the contract will be negotiated in the event that the average thickness of the removed material exceeds 75mm.
  - .9 The Contractor is responsible for record keeping required to facilitate the potential adjustment. Records shall be kept on a daily basis, and shall include measured ACP thickness and estimated area. Such records shall be signed off by the Consultant at the time they are prepared.
  - .10 No adjustment will be considered if the records described above are not available.
- .6 Remove ACP Trail Surface (Special Areas)
- .1 This unit price item is to include all costs associated with removal and proper disposal of asphaltic concrete pavement (ACP) currently in place, which is required to be removed as part of the Work, and is located in areas where the ACP has been placed around a series of rock outcrops.
  - .2 Measurement for this unit price item will be by linear meter.
  - .3 Payment will be made at the unit price bid.
  - .4 Where there is a railing adjacent to the pathway, the measurement will be taken between railing posts, including at widening locations.
  - .5 Where there is no railing, measurement will be taken along the edge of pavement.
  - .6 The width of pavement varies along the pathway. Contractor shall include the effect of this variation in the unit price bid.
  - .7 The thickness of the pavement is not known. For bidding purposes, an average thickness of 75mm shall be assumed.
  - .8 An adjustment to the contract will be negotiated in the event that the average thickness of the removed material exceeds 75mm.
  - .9 The Contractor is responsible for record keeping required to facilitate the potential adjustment. Records shall be kept on a daily basis, and shall include measured ACP thickness and estimated area. Such records shall be signed off by the Departmental Representative or the Consultant at the time they are prepared.
  - .10 No adjustment will be considered if the records described above are not available.
- .7 Partial Removal - Upper Loop Steel Railing
- .1 This unit price item is to include all costs associated with partial removal and proper disposal of the existing steel railing along the Upper Loop trail.
  - .2 Measurement for this unit price item will be by the linear meter, measured between posts along the line of the existing railing.
  - .3 Payment will be made at the unit price bid.
  - .4 Removal of the following elements is required:
    - .1 Top rail
    - .2 Fencing fabric
    - .3 Top section of posts (cut height to be determined).

- .5 Complete removal of the entire railing, including foundations, is required for a short distance (< 5m) adjacent to the new ramp at the north end of the Upper Bridge.
  - .1 This complete removal will be paid at a rate of two (2) times the unit price bid in order to account for the additional effort required.
- .8 Remove Upper Loop Timber Guardrail
  - .1 This unit price item is to include all costs associated with complete removal and proper disposal of the existing low-height timber guardrail located along the lower west side of the Upper Loop trail.
  - .2 Measurement for this unit price item will be by the linear meter, measured between posts along the line of the existing railing.
  - .3 Payment will be made at the unit price bid.
  - .4 Complete removal of the railing is required, including foundation elements to a minimum depth of 600 mm below grade.
- .9 Rebuild Trail Subbase
  - .1 This unit price item is to include all costs associated with supply and placement of new granular base material below trails.
  - .2 Measurement for this unit price item will be by cubic meter.
  - .3 Payment will be made at the unit price bid.
  - .4 This material is required in areas where the Departmental Representative determines that removal of unsuitable material is required, after the existing ACP surface has been removed.
  - .5 The volume for payment will be determined based on measurements of the material in place, including area and thickness.
  - .6 The Contractor is responsible for record keeping required to facilitate payment. Records shall be kept on a daily basis, and shall include measured thickness and placement area. Such records shall be signed off by the Departmental Representative or the Consultant at the time they are prepared.
- .10 Place ACP Trail Surface (Typical)
  - .1 This unit price item is to include all costs associated with placement of a new ACP wearing surface, excluding locations covered by another pay item.
  - .2 Measurement for this unit price item will be by linear meter.
  - .3 Payment will be made at the unit price bid.
  - .4 Where there is a railing adjacent to the trail, the measurement will be taken between railing posts, including at widening locations.
  - .5 Where there is no railing, measurement will be taken along the edge of pavement.
  - .6 The width of pavement varies along the trail. Contractor shall include the effect of this variation in the unit price bid.
  - .7 The minimum thickness of the pavement at any point shall be 50mm.
  - .8 No payment adjustments will be considered in the event that the average ACP thickness in place is greater than the specified minimum of 50mm.

- .11 Place ACP Trail Surface (Special Areas)
  - .1 This unit price item is to include all costs associated with placement of a new ACP wearing surface on the Upper Loop trail, in areas where the ACP is placed around a series of rock outcrops.
  - .2 Measurement for this unit price item will be by linear meter.
  - .3 Payment will be made at the unit price bid.
  - .4 Where there is a railing adjacent to the trail, the measurement will be taken between railing posts, including at widening locations.
  - .5 Where there is no railing, measurement will be taken along the edge of pavement.
  - .6 The width of pavement varies along the trail. Contractor shall include the effect of this variation in the unit price bid.
  - .7 The minimum thickness of the pavement at any point shall be 50mm.
  - .8 No payment adjustments will be considered in the event that the average ACP thickness in place is greater than the specified minimum of 50mm.
- .12 Upper Loop Steel Railing
  - .1 This unit price item is to include all costs associated with detailing, fabricating and installing a new steel railing system (with timber top rail) around the Upper Loop.
  - .2 Measurement for this unit price item will be by linear meter.
  - .3 Payment will be made at the unit price bid.
  - .4 Length will be measured between posts.
  - .5 The complexity of the railing will vary along the length of the trail. Some panels will be very simple while other panels will require custom design and detailing which may significantly affect the fabrication cost for these panels. Contractor shall include the effect of this variation in the unit price bid.
- .13 Construct Picnic Area
  - .1 This lump sum price item is to include all costs associated with construction of the Middle Bridge Picnic Area, for which separate payment is not otherwise included.
  - .2 This includes, but may not be limited to:
    - .1 Removals.
    - .2 Trail improvements.
    - .3 Surface improvements.
    - .4 Reclamation of abandoned trails.
    - .5 Log edging.
    - .6 New concrete slab and bike rack.
  - .3 Payment will be made at the lump sum price bid.
  - .4 Work in this area covered by other pay items includes, but may not be limited to:
    - .1 Removal, storage and re-installation of existing site features such as picnic tables and garbage bins is covered under the lump sum price for Removal and Relocation of Existing Site Features.

- .2 New picnic tables, new benches and concrete pads for picnic tables (either new tables or relocated tables) are covered under the appropriate unit price items.
- .14 Construct Middle Bridge East Plaza
  - .1 This lump sum price item is to include all costs associated with construction of the Middle Bridge East Plaza area, for which separate payment is not otherwise included.
  - .2 This includes, but may not be limited to:
    - .1 Removals.
    - .2 Concrete slabs and pedestals.
    - .3 Relocation of signage.
  - .3 Payment will be made at the lump sum price bid.
  - .4 Work in this area covered by other pay items includes, but may not be limited to:
    - .1 Removal, storage and re-installation of existing site features such as picnic tables and garbage bins is covered under the lump sum price for Removal and Relocation of Existing Site Features.
    - .2 The following elements within the plaza area are covered under other pay items:
      - .1 Gabion walls.
      - .2 Stone stairs.
      - .3 Benches Type 1 and Type 2.
      - .4 Relocated stone features.
- .15 Construct Middle Bridge West Plaza
  - .1 This lump sum price item is to include all costs associated with construction of the Middle Bridge West Plaza area, for which separate payment is not otherwise included.
  - .2 This includes, but may not be limited to:
    - .1 Removals.
    - .2 Concrete slabs and pedestals.
    - .3 Relocation of signage.
  - .3 Payment will be made at the lump sum price bid.
  - .4 Work in this area covered by other pay items includes, but may not be limited to:
    - .1 Removal, storage and re-installation of existing site features such as picnic tables and garbage bins is covered under the lump sum price for Removal and Relocation of Existing Site Features.
    - .2 The following elements within the plaza area are covered under other pay items:
      - .1 Benches Type 1 and Type 2.
      - .2 New stone features.
- .16 Reconstruct Stone Stair At Middle Bridge

- .1 This lump sum price item is to include all costs associated with demolition, removal and reconstruction of the stone stair as shown on the Drawings.
- .2 Payment will be made at the lump sum price bid.
- .17 Install Stone Features
  - .1 This unit price item is to include all costs associated with the supply and installation of stone features as shown on the Drawings.
  - .2 Quantities for payment will be determined by measuring each feature in three orthogonal directions (Length, Width and Depth), calculating the volume assuming a prismatic shape (i.e. L x W x D – no reduction or other adjustment for rounded shapes) and an assumed unit weight of 2.5 tonnes/m3.
  - .3 Quantities shall be measured, calculated and recorded by the Contractor prior to placement. Quantities shall be provided to the Departmental Representative in sufficient time to allow confirmation / verification of the calculated quantities before the features are placed in final position.
  - .4 Suitable stone will be made available by PCA at no charge to the Contractor.
  - .5 Unit price shall include, but may not be limited to, the following:
    - .1 Loading and transport of stones from PCA storage area.
    - .2 Transport and placement in final position.
  - .6 Note that the relocation and reuse of existing stone features is covered under 'Removal and Relocation of Existing Site Features' and will not be paid under this item.
- .18 Modify Upper Bridge Seating Area
  - .1 This lump sum price item is to include all costs associated with modifications to the Upper Bridge Seating Area for which separate payment is not otherwise included.
  - .2 This includes, but may not be limited to:
    - .1 Removals.
    - .2 Surface grading.
    - .3 Surface improvements.
  - .3 Payment will be made at the lump sum price bid.
  - .4 Work in this area covered by other pay items includes, but may not be limited to:
    - .1 The following elements within the seating area are covered under other pay items:
      - .1 Benches.
      - .2 Stone features.
  - .5 New stone features.
- .19 Construct Gabion Walls
  - .1 This unit price item is to include all costs associated with construction of gabion walls at the locations shown on the Drawings.
  - .2 Measurement for this unit price item will be by cubic meter of gabion basket.
  - .3 Payment will be made at the unit price bid.



- .20 Construct Timber Edge
  - .1 This lump sum price item is to include all costs associated with construction of timber edges as shown on the Drawing.
  - .2 Payment will be made at the unit price bid.
- .21 Rock Culvert
  - .1 This unit price item is to include all costs associated with construction of new rock culverts at locations identified on the Drawings.
  - .2 Payment will be made at the unit price bid.
- .22 Construct Stone Curb Walls
  - .1 This unit price item is to include all costs associated with construction of new stone curb walls at locations identified on the Drawings.
  - .2 Payment will be made at the unit price bid.
- .23 Accessible Picnic Table
  - .1 This unit price item is to include all costs associated with supply and installation of a new accessible picnic table as defined in the Specifications.
  - .2 This price is for the table alone; the concrete pad required below the table is covered under a separate pay item.
  - .3 Note that the relocation and reuse of existing accessible picnic tables at a given site is covered under 'Removal and Relocation of Existing Site Features' and will not be paid under this item.
- .24 Concrete Pad – Standard Picnic Tables
  - .1 This unit price item is to include all costs associated with the construction of a standard picnic table concrete base pad as shown on the Drawings.
  - .2 This price applies whether the table installed on the pad is new or salvaged.
- .25 Concrete Pad – Accessible Picnic Tables
  - .1 This unit price item is to include all costs associated with the construction of an accessible picnic table concrete base pad as shown on the Drawings.
  - .2 This price applies whether the table installed on the pad is new or salvaged.
- .26 Type 1 New Bench
  - .1 This unit price item is to include all costs associated with the supply and installation of a new Type 1 Bench as defined in the Specifications.
- .27 Type 2 New Bench
  - .1 This unit price item is to include all costs associated with the supply and installation of a new Type 2 Bench as defined in the Specifications.
- .28 "Keep Out" Sign Supports
  - .1 This unit price item is to include all costs associated with construction of supports for "Keep Out" signs to be provided by PCA.
  - .2 The work includes, but may not be limited to, the following activities:
    - .1 Construction of timber frame, including foundations.

- .2 Transport and handling of sign panel within WLNP.
  - .3 Provision of appropriate stainless steel hardware for mounting of sign panel.
  - .4 Installation of sign panel.
- .3 Sign panel will be provided by PCA at no cost to the Contractor.
- .29 Remove and Replace Upper Bridge
  - .1 This lump sum price item is to include all costs associated with removal and replacement of the Upper Bridge, including the associated ramp structure. This includes, but may not be limited to:
    - .1 Removal of the existing bridge superstructure.
    - .2 Disposal of the existing bridge superstructure.
    - .3 Selective demolition of the existing bridge substructure as required to allow construction of the new bridge.
    - .4 Substructure construction, including micro-piles and cast-in-place concrete.
    - .5 Fabrication and installation of new steel superstructure.
    - .6 Fabrication and installation of new steel / timber railing.
  - .2 Payment will be made at the lump sum price bid.
- .30 Modify Middle Bridge
  - .1 This lump sum price item is to include all costs associated with modifications to the Middle Bridge. This includes, but may not be limited to:
    - .1 Removal of the existing timber railings and deck.
    - .2 Disposal of the existing timber railings and deck.
    - .3 Supply, fabricate and install steel top flange bracing.
    - .4 Supply, fabricate and install new steel / timber railing, including decorative steel panels.
    - .5 Install new timber deck.
  - .2 Payment will be made at the lump sum price bid.
- .31 Modify Lower Bridge
  - .1 This lump sum price item is to include all costs associated with modifications to the Lower Bridge. This includes, but may not be limited to:
    - .1 Removal of the existing timber railings and deck.
    - .2 Disposal of the existing timber railings and deck.
    - .3 Supply, fabricate and install new steel / timber railing, including decorative steel panels.
    - .4 Install new timber deck.
  - .2 Payment will be made at the lump sum price bid.
- .32 Modify Bauerman Creek Bridge
  - .1 This lump sum price item is to include all costs associated with modifications to the Lower Bridge. This includes, but may not be limited to:

- .1 Removal of the existing timber railings and deck.
  - .2 Disposal of the existing timber railings and deck.
  - .3 Supply, fabricate and install steel top flange bracing.
  - .4 Supply, fabricate and install new steel / timber railing, including decorative steel panels.
  - .5 Install new timber deck.
- .2 Payment will be made at the lump sum price bid.
- .33 Modify Bauerman Creek / Lower Bridge Approaches
  - .1 This lump sum price item is to include all costs associated with modifications to the approach area between the Bauerman Creek Bridge and the Lower Bridge. This includes, but may not be limited to:
    - .1 Remove and dispose of existing railings.
    - .2 Supply, fabricate and install new railings.
    - .3 Timber curbs.
    - .4 Regrading.
  - .2 Payment will be made at the lump sum price bid.

**END OF SECTION**

## **Part 1            General**

### **1.1                WORK STAGING**

- .1        Maintain access to the RRC parking area at all times.
- .2        Maintain pedestrian traffic to at least one side of the canyon between the Middle Bridge and the Upper Bridge at all times. As a minimum, this requires the following:
  - .1        At all times, either the Lower Bridge or the Middle Bridge shall be open.
  - .2        If the Middle Bridge is closed, and the east side of the Upper Loop trails is closed, then both sides of the Lower Loop trail shall be open.

### **1.2                RARE PLANT MITIGATIONS**

- .1        Several species of rare plants have been identified alongside the current Red Rock Canyon trail. General mitigations to protect rare plants are as follows:
  - .1        North of Middle Bridge (Upper Loop) – Ensure disturbance extends no further than 300mm on either side of the trail (including seating areas).
  - .2        South of Middle Bridge (Lower Loop) – Ensure disturbance extends no further than 500mm on either side of the trail (including seating areas).
  - .3        All locations – refer to see partial sod salvage / disturbed areas reclamation mitigations below.
  - .4        Identify and avoid high-priority rare plant sites. Contact Departmental Representative at start-up to identify these locations in advance. If avoidance is not possible, Departmental Representative will identify suitable mitigations to follow.

### **1.3                PARTIAL SOD SALVAGE / DISTURBED AREA RECLAMATION**

- .1        Partial sod salvage is defined as “removal of the native sod and associated shrub layer, retaining the sod and the native seed bank contained in the upper 100mm of soil as intact as possible to be used in top-dressing areas to be reclaimed.”
- .2        Where approved by the Departmental Representative the Contractor shall select stumps, logs, branches and rocks to stockpile and use to create microsites for re-vegetation of non-required trails and areas disturbed by construction activities.
- .3        Salvage all sod to be disturbed and stockpile vegetation side up in a sheltered location to be used to reclaim disturbed areas.
- .4        Stockpile all salvaged sod on pallets lined with geotextile and ensure root mass is kept moist.
- .5        Limit time sods are stockpiled to improve success of vegetation re-establishment upon project completion. This can be done by scheduling work to reduce the amount of time soils are left exposed. 1 week is the maximum recommended time sods should be left exposed.

- .6 To re-instate the salvaged sod and soils, first scarify the top 50mm of the receiving layer, then roughly place any loose soils directly on disturbed areas followed by placing sods vegetation side up and compact very lightly in place to remove any air pockets. Water as needed once in place. Ideally this work will not take place during the dry summer months.
- .7 Dispose of any excess stockpiled vegetation as directed by Departmental Representative.

**1.4 BREEDING BIRDS AND ROOSTING BATS**

- .1 Contact Departmental Representative in advance of bridge works, upper bridge removal and vegetation removal to survey the area for breeding birds or roosting bats.
- .2 If either are discovered, mitigations will be developed to protect both of these species.

**END OF SECTION**

**Part 1 General**

**1.1 LIMIT OF WORK**

- .1 The Drawings identify a 'Limit of Work' at all sites.
- .2 All activities shall be restricted to the area identified by the Limit of Work.
- .3 Repair any damage caused by the Work, including areas outside the Limit of Work.

**1.2 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary access to and egress from work areas in accordance with relevant municipal, provincial and other regulations.
- .2 Access using existing trails and pathways only.
- .3 Protect existing features (including vegetation) from damage.
- .4 Maintain access to adjacent properties.
- .5 Contractor's attention is drawn to the fact that some locations and activities required as part of the Work may not be possible using conventional access methods.
- .6 Bid pricing shall include all costs associated with access, including helicopter or other specialized means where necessary. No separate or additional payment will be made with respect to site access.

**1.3 CLIMATIC CONDITIONS**

- .1 Contractor's attention is drawn to the fact that strong winds are frequent within WLNP, with wind speeds often reaching 100 km/h or more.
- .2 Remove snow as required to gain access to site and as required for completion of the Work.

**1.4 ENVIRONMENTAL TIMING WINDOWS**

- .1 Critical environmental timing windows are as follows:
  - .1 April 8 to August 24: Migratory Bird Protection Period
  - .2 April 1 to September 30: Bat Activity Period
- .2 See Section 01 35 43 Environmental Procedures for additional information relating to these windows.

**1.5 USE OF SITE AND FACILITIES**

- .1 Keep the site clean and free from accumulation of waste materials and rubbish, regardless of source.
- .2 Do not allow pets to be brought to or kept on Site.
- .3 Public access to the work area may be closed to the minimum extent necessary to facilitate the work and ensure public safety. Areas not currently under construction shall be kept open to the public.

- .4 Prepare and submit to the Departmental Representative for review an Access Control Plan showing the proposed timing, extent and signage for all closures of public access.

#### **1.6 HOURS OF WORK**

- .1 Work is permitted during daylight hours, seven (7) days per week unless indicated otherwise.
- .2 Work is not permitted during the period of any Alberta statutory holiday long weekend, without written permission from the Departmental Representative.
  - .1 Where the holiday is on a Monday, work shall be stopped no later than 4:00 PM on Friday and shall not restart until 6:00 AM on Tuesday.
  - .2 Where the holiday is on a Friday, work shall be stopped no later than 4:00 PM on Thursday and shall not restart until 6:00 AM on Monday.
- .3 Any variance that may be approved by the Departmental Representative under this Section may be revoked at any time for any reason and is provided on the presumption that no additional cost or delay will result from the variance.
- .4 No claims for additional cost will be entertained relating to work over statutory holiday long weekends.

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

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan (EPP) prepared by the Contractor.
- .2 All components of the Work shall be conducted without equipment or debris of any kind entering into wetlands, water bodies, or streams.
- .3 All waste materials and sediment from the Work shall be contained and collected in a manner to prevent any contact with water bodies.

#### **1.8 UTILITIES**

- .1 Become familiar with all utilities and services adjacent to the Work and be responsible for cost of repair of any damage resulting from the Work.
- .2 Establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. Cooperate with them at all times and in all places of Work.
- .3 Keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .4 Notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.
- .5 Whenever working in the vicinity of Utilities, locate such Utilities and expose those that may be affected by the Work, using hand labour or other special means as required.
- .6 Assess the possible impact of the Work on all Utilities that may be affected by the Work and in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.

- .7 Immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected and promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

## **1.9 PROTECTION OF PERSONS AND PROPERTY**

- .1 Comply with all applicable safety regulations, including but not limited to the Workers Compensation Act, Occupational Health and Safety Regulations and General Safety Regulations.
- .2 Comply with Canada Labour Code and Canada Occupational Safety and Health Regulations.
- .3 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”.
- .4 Take all reasonable and necessary precautions and measures to prevent injury or damage to persons and property on or near the Site.
- .5 Promptly take such measures as are required to repair, replace or compensate for any loss or damage caused.
  - .1 Alternatively, and if Departmental Representative so directs, promptly reimburse to Departmental Representative the costs incurred by them as a result of such loss or damage.

## **1.10 USE OF PUBLIC AREAS**

- .1 Materials and equipment may be hauled on roads within WLNP using standard highway trucks only, not exceeding legal highway load limits.
- .2 Ensure that vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .3 Load and unload vehicles arriving at or leaving the Site in a manner that will prevent dropping of materials or debris on the roadways. Where contents may otherwise be blown off during transit, cover such loads using tarpaulins or other suitable covers.
- .4 Immediately remove or clean spills of materials.

## **1.11 PROJECT IMPACTS ON VISITORS OR PUBLIC**

- .1 In addition to all required traffic control requirements, all project sites shall be clearly delineated with informative signage, identification of personal protective equipment requirements, as well as fencing as required to eliminate project related risk to visitors or the public.
- .2 All sites are to maintain safe passage, including clear direction, for pedestrians and cyclists throughout project construction.



**1.12 SUPERVISORY PERSONNEL**

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 19 – Project Meetings, submit to the Departmental Representative confirmation of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 At a minimum, the following personnel shall be included:
  - .1 Project Manager
  - .2 Project Superintendent
  - .3 Safety Representative
  - .4 Environmental Representative
- .3 Where appropriate, one individual can be assigned to multiple roles.
- .4 The above personnel shall perform the following duties:
  - .1 Project Manager shall have 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.
  - .2 The Project Superintendent shall be employed full time with full authority to supervise the Work and shall be directly available to the Consultant during all active periods of Work. Either they or their designated deputy shall be present on Site each and every day that Work is being performed, from the commencement of Work to Total Performance of the Work.
  - .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
  - .4 The Safety Representative shall possess construction safety supervisory experience. Their duties shall encompass all matters of safety from commencement of Work until the Total Performance of the Work.
  - .5 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.

**1.13 WASTE MANAGEMENT AND DISPOSAL**

- .1 All surplus, unsuitable and waste materials shall be removed from the Site to approved sites outside the National Parks. Refer to Section 01 35 43 – Environmental Procedures and Section 01 74 19 – Waste Management and Disposal.
- .2 Deposit of any construction debris or sediment into any water body is strictly forbidden.
- .3 Burning of any waste is strictly prohibited.
- .4 Cost for Waste Management and Disposal is considered incidental to the Work and no separate or additional payment will be made.

**1.14 WORK STOPPAGE**

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

**1.15            EQUIPMENT**

- .1        Do not leave machinery running while not in use, except where extreme temperatures prohibit shutting machinery down.

**END OF SECTION**

**Part 1 General**

**1.1 EQUIVALENT PRODUCTS**

- .1 The Contract Documents may indicate specific proprietary products, procedures or materials followed by the notation 'or approved equivalent only' (or similar wording). These products, procedures or materials have been carefully selected for use based on a variety of criteria.
- .2 This Section defines the process to be followed in order to receive approval for use of an equivalent product.

**1.2 TENDERING**

- .1 Tenders shall be submitted and will be awarded on the basis of the specific products or materials identified in the Contract Documents.
- .2 No requests for approval of alternatives will be considered until after the Contract has been awarded.
- .3 After the Contract has been awarded, the Contractor may apply for approval of equivalent products, procedures or materials.

**1.3 APPROVAL PROCESS**

- .1 Submit details of the proposed equivalent product, procedure or material including any test results, standards approvals or other information supporting the contention that the proposed product or material is equivalent to the one identified in the Contract Documents.
- .2 Clearly indicate any proposed change to the Contract Price or any other provision of the Contract that would be affected by approval of the proposed alternative.
- .3 The Departmental Representative will review the information submitted and may request additional information, testing results, standards approvals or other information required to assess the equivalence of the proposed alternative.
- .4 After reviewing the information submitted, the Departmental Representative will indicate in writing whether the proposed alternative has been deemed to be equivalent and will be accepted as an alternative.
- .5 If the proposed alternative is accepted, respond in writing confirming whether or not the proposed alternative will be used for the Work. Once this confirmation has been submitted, the proposed alternative (along with any proposed and accepted adjustments to the provisions of the Contract) will become a part of the Contract.
- .6 Approval of any proposed alternative is entirely at the discretion of the Departmental Representative and no dialog or negotiation will be entered into with respect to the approval process. Reasons for the rejection of any proposed alternative do not have to be provided and no appeal of the decision is permitted.

**END OF SECTION**

**Part 1            General**

**1.1                PRECONSTRUCTION MEETING**

- .1      Departmental Representative will schedule a pre-construction meeting of parties in contract within ten (10) days after contract is award to discuss and resolve administrative procedures and responsibilities.
- .2      As a minimum, the following participants shall be present at all meetings:
  - .1          Contractor's project manager.
  - .2          Contractor's superintendent.
  - .3          Senior representatives of major subcontractors.
  - .4          Consultant.
  - .5          Departmental Representative.
- .3      Distribute written notice of meeting to all attendees at least seven (7) days in advance of meeting date.
- .4      Consultant will record discussion and decisions, and circulate the minutes to all relevant parties.
- .5      Agenda to include:
  - .1          Introductions
  - .2          Notice of award
  - .3          Agreement status
  - .4          Project work overview
  - .5          Project schedule
  - .6          Temporary facilities
  - .7          Permits
  - .8          Access and easement
  - .9          Environmental issues and requirements
  - .10        Waste management
  - .11        Health and safety
  - .12        Emergency services
  - .13        Hours of work
  - .14        Work restrictions
  - .15        Progress claims
  - .16        Change process
  - .17        Submissions
  - .18        Insurance
  - .19        Other business

## **1.2 PROJECT COORDINATION**

- .1 Co-ordinate progress of the work, construction schedules, submittals, use of the site, temporary utilities, construction facilities and controls.
- .2 Ensure work is co-ordinated and scheduled to minimize conflicts between trades and to avoid delays.
- .3 Notify trades of readiness for their Work and to allow adequate time for preparation and installation.
- .4 Examine drawings, specifications, existing conditions and report to the Departmental Representative, in writing, any omissions or irregularities that may affect the performance of the work. In the absence of any such report, the Contractor and all trades will be held to have waived all claims to extra costs for performance of the work.
- .5 Supply all items to be built-in, including anchors, ties, nailing strips, blocks, bolts, sleeves and any other miscellaneous items, together with any templates, measurements and shop drawings.
- .6 Establish correct locations of sleeves, inserts, hangers, holes and chases.

## **1.3 DIMENSIONS / LOCATIONS**

- .1 Check and verify all dimensions as work proceeds.
- .2 Un-dimensioned locations of equipment indicated or specified are to be considered as approximate. Confirm all un-dimensioned locations prior to beginning any installation.
- .3 Where locations or holes in structural elements may possibly affect the nature or strength, inform the Departmental Representative prior to beginning any work.
- .4 Inform Departmental Representative of impending installation of items of work that are diagrammatically indicated on the drawings, and obtain acceptance of actual locations.
- .5 Record actual dimensions and locations on Project Record Documents.

## **1.4 PROGRESS MEETINGS**

- .1 Hold regular weekly progress meetings at site, by conference call or at an office location to be provided by PCA.
- .2 Frequency of meetings may be reduced if approved by the Departmental Representative.
- .3 Additional meetings may be requested by Departmental Representative at any time.
- .4 For any weeks during which a progress meeting is not held, provide a written update to the Departmental Representative.
- .5 As a minimum, the following participants shall be present at all meetings:
  - .1 Contractor's superintendent.
  - .2 Representatives of major subcontractors.
  - .3 Consultant.
  - .4 Departmental Representative.
- .6 All participants shall be qualified and authorized to act on behalf of party each represents.

- .7 Distribute written notice of each meeting to all attendees at least seven (7) days in advance of meeting date.
- .8 Consultant will produce and distribute minutes of meetings within five (5) working days after meetings and transmit to all meeting participants.

**END OF SECTION**

## **Part 1 General**

### **1.1 DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): 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: to be determined by the Contractor subject to restrictions defined in the Contract Documents. Defines the days to be considered as “working days” when schedule is being prepared.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as work days or work weeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Detailed Schedule: detail-level schedule that includes applicable activities and tasks. The Master Plan may summarize and coordinate a number of different Detailed Schedules.
- .8 Milestone: significant event in project, usually completion of major deliverable.
- .9 Project Schedule: The Master Plan and Detailed Schedule(s) together constitute the Project Schedule. The Project Schedule shall show planned dates for performing activities and tasks and the planned dates for meeting milestones. The Project Schedule is a dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives.

### **1.2 REQUIREMENTS**

- .1 Ensure Master Plan and Detailed Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Break activities into tasks of maximum 10 working days duration to allow for progress reporting.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Master Plan to the Departmental Representative at least five (5) working days in advance of the Pre-Construction Meeting.

- .3 Submit Detailed Schedule(s) to Departmental Representative within five (5) working days following acceptance of Master Plan by the Departmental Representative.

#### **1.4 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 Master Plan with comments within five (5) working days.
- .3 Revise and resubmit within five (5) working days.
- .4 Accepted Master Plan will be used as baseline for updates.

#### **1.5 DETAILED SCHEDULE(S)**

- .1 Develop project Detailed Schedule(s) derived from Master Plan.
- .2 Ensure Detailed Schedule(s) include as minimum milestone and activity types as follows:
  - .1 Award
  - .2 Submission of shop drawings and samples
  - .3 Review period for shop drawings and samples
  - .4 Application for permits
  - .5 Receipt of permits
  - .6 Mobilization
  - .7 Dates and details of work at each location
  - .8 Environmental timing windows
  - .9 Product deliveries
  - .10 Demobilization

#### **1.6 SCHEDULE REPORTING**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Provide updates a minimum of one (1) working day prior to regular weekly progress meetings.
- .3 Updates to the Project Schedule shall be accompanied by a brief narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

#### **1.7 PROJECT MEETINGS**

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



**END OF SECTION**

**Part 1 General**

**1.1 REQUIRED SUBMITTALS**

- .1 The following list of required submittals may not be complete. Provide submittals requested elsewhere in the Contract Documents regardless of whether or not they are listed below.
- .2 Where appropriate, some of the submittals listed below may be included as subsections of the Environmental Protection Plan; separate standalone submissions are not required.
- .3 Do not mobilize to site until required submittals have been provided to the Departmental Representative and review comments have been received and incorporated appropriately.
- .4 List of required submittals:
  - .1 Breakdown of Lump Sum tender prices
  - .2 Proof of insurance
  - .3 Proof of WCB status
  - .4 Project schedule
  - .5 Laydown area layouts
  - .6 Site-specific signage plans
  - .7 List of subcontractors and suppliers
  - .8 Narrative work plans for unique or complicated tasks
  - .9 Waste Management Plan (WMP)
  - .10 Environmental Protection Plan (EPP)
  - .11 Erosion and Sediment Control Plan (ESCP)
  - .12 Tree Protection Plan (TPP)
  - .13 Traffic Accommodation Strategy (TAS)
  - .14 Access Control Plan
  - .15 Acknowledgement of PCA Best Management Practices (BMP's)
  - .16 Health and Safety Plan (HSP)
  - .17 Emergency Response Plan (ERP)
  - .18 Hazardous spill plan
  - .19 Shop drawings

**1.2 ADMINISTRATIVE**

- .1 Submit to Departmental Representative submittals listed or identified for review. Submit with reasonable promptness 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 The Departmental Representative will review submittals and return review copy within seven (7) working days of receipt.
- .3 Do not proceed with Work affected by submittal until review is complete.

- .4 Review submittals prior to submission to Departmental Representative.
  - .1 This review is to confirm that:
    - .1 Field measurements have been verified.
    - .2 Requirements have been determined and verified.
    - .3 Submittal has been checked and coordinated with requirements of Contract Documents.
    - .4 The effect of this submittal on other aspects of the Work has been properly accounted for.
  - .2 Stamp, sign and date each submission to indicate this review has been carried out. Identify the individual responsible for the review.
  - .3 Submittals not stamped, signed, dated and identified will be returned without being examined and considered rejected.
- .5 If a submittal contains deviations from the requirements of the Contract Documents, notify Departmental Representative of such deviations in writing at time of submission. Include reasons why the deviation is requested or required.
- .6 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .8 Keep one reviewed copy of each submission on site.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Alberta, Occupational Health and Safety Act (SA 2017 cO-2.1).

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan (HSP) within seven (7) working days after date of Notice to Proceed and prior to commencement of Work.
- .3 Submit Emergency Response Plan (ERP) to identify standard operating procedures to be implemented during emergency situations within seven (7) working days after date of Notice to Proceed and prior to commencement of Work.
- .4 Submit copies of reports or directions issued by Federal or Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 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.

**1.3 SAFETY ASSESSMENT**

- .1 Perform site-specific safety hazard assessment related to project.
- .2 Submit hazard assessments to Departmental Representative on a weekly basis.

**1.4 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. (This can be combined with the Pre-Construction Meeting).
- .2 Arrange for "Tool Box" safety meetings and submit reports to Departmental Representative on a weekly basis.

**1.5 REGULATORY REQUIREMENTS**

- .1 Do Work in accordance with Section 01 41 00- Regulatory Requirements.
- .2 Ensure safe operations on site within the specified standards and regulations.

**1.6 HEALTH AND SAFETY PLAN**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site.
- .2 As a minimum, the 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 operations.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) working days. Revise plan as appropriate and resubmit to Departmental Representative with five (5) working days after receipt of comments from Departmental Representative.
- .4 Departmental Representative may request re-submission with correction of deficiencies or concerns noted during the review.
- .5 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 Health and Safety.

#### **1.7 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.

#### **1.8 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg. 62/2003.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

#### **1.9 UNFORESEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related issues occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with relevant Alberta Acts and Regulations.
- .2 Advise Departmental Representative verbally and in writing of the issues experienced and the actions taken in response.

#### **1.10 HEALTH AND SAFETY COORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Coordinator must:
  - .1 Have site-related working experience.
  - .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, monitoring and enforcing the Health and Safety Plan on a daily basis.
  - .5 Be on site during execution of Work.

**1.11 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 Alberta, and in consultation with Departmental Representative.

**1.12 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or 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.

**1.13 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.

**END OF SECTION**

**Part 1 General**

**1.1 PURPOSE**

- .1 This section covers the required environmental procedures to be implemented on site to mitigate potential impacts to the environment from the Work.

**1.2 DEFINITIONS**

- .1 Environmental 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.
- .3 Qualified Environmental Professional (QEP): A person who has sufficient training, expertise, and experience in a discipline relevant to the field of practice required and who is registered with an appropriate professional organization and acting under that organization's code of ethics and subject to related disciplinary action as a result of a violation.
- .4 Sediment: Soil particles detached and mobilized by erosion.
- .5 Erosion: The physical removal or detachment of soil particles, followed by the transport of these detached particles to another location by the action of a mobile agent such as water, wind, etc.

**1.3 PARKS CANADA ENVIRONMENTAL INFORMATION AND MITIGATION MEASURES**

- .1 Parks Canada Agency (PCA) has provided the following documentation to be reviewed and followed in preparation of an Environmental Protection Plan (EPP):
  - .1 Best Management Practices (BMPs) for Waterton Lakes National Park (General Project).
- .2 If there is conflict between the BMPs and any information given elsewhere in the Contract Documents, immediately notify the Departmental Representative and request clarification. Unless otherwise directed in writing by the Departmental Representative, the BMPs shall govern.
- .3 Environmental Protection Plan
  - .1 Prior to any construction or on-site work activities, the contractor shall provide PCA with an EPP which has been written and certified by a QEP for PCA approval.
  - .2 Allow seven (7) calendar days for PCA to review EPP.
  - .3 PCA may request that subsequent revisions are made to the EPP in the event the document does not sufficiently address all required environmental concerns or mitigations.

- .4 Start-up and Environmental Briefing
  - .1 Prior to any on-site work, all contractors and subcontractors, as well as any of their employees who may be involved with on-site activities, shall attend a briefing conducted by the PCA Environmental Surveillance Officer (ESO) relating to their individual and collective responsibilities upon project start-up.
  - .2 Employees of other service or material providers who may visit the site must be apprised of their duty not to cause adverse environmental impacts.
  - .3 The PCA ESO will regularly visit the site to monitor construction activity for conformance with the EPP. Although the ESO has the authority to enforce violations, routine direction to the Contractor will be the duty of the Departmental Representative.
  - .4 In the event that the Contractor has not implemented the EPP measures resulting in environmental harm, the ESO has the authority to issue a stop work order on site.

#### **1.4 ADDITIONAL ENVIRONMENTAL MITIGATION MEASURES**

- .1 All work and associated costs related to required environmental mitigation measures are incidental to the contract scope of work, and are the responsibility of the Contractor.
- .2 Execution of any work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2012 and subsequent revisions.
- .3 Execution of any work is subject to the provisions within “Measures to Protect Fish and Fish Habitat” from Fisheries and Oceans Canada (DFO) available online: <https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html>
- .4 Note that various species designated as a “Species At Risk” are present within WLNP.
- .5 Work shall be scheduled so that no site is left in a state of partial completion for an extended period of time or during any shutdown period such as during winter months.
- .6 All mitigations must be included in the EPP for approval by PCA.
- .7 Mitigations that require the presence of the ESO will be identified by PCA as part of the EPP review process.
- .8 Provide notice of all mitigation activities that require surveillance by the ESO. Provide written notice a minimum of forty-eight (48) hours in advance.
- .9 Mitigations to minimise project impact on resident and migratory nesting birds:
  - .1 An inspection of each work area must be completed by an ESO prior to any work to ensure there are no active bird nests. If any active bird nest is found on site, the nest must be left undisturbed within the nesting and fledgling season (April 8 through August 24).
  - .2 Outside the nesting / fledgling season (i.e. before April 8 or after August 24) the Contractor may elect to actively discourage or prevent bird nesting at all sites by either knocking down old abandoned nests or by installing approved effective barriers, such as installation of approved netting or plastic sheeting.
  - .3 The destruction of any active bird nest is prohibited.
  - .4 The Contractor is responsible for the removal and cleanup of any implemented mitigations upon project completion.



- .10 Disturbance and/or removal of trees and vegetation shall be minimised. Any removal of trees or vegetation will require consultation with PCA ESO including written approval to proceed.
- .11 All disturbed areas from construction activities require rehabilitation as part of the contract.
- .12 Erosion of steep banks shall be minimised by limiting foot, vehicle, and equipment traffic.
- .13 Mitigations related to any watercourse
  - .1 No instream work will be permitted. Contractor shall ensure project activities do not affect any water body, either directly or indirectly.
  - .2 No construction-related debris, sediment, or any other foreign materials shall be permitted to enter any watercourse.
- .14 Sensitive and No-Go Zones
  - .1 The ESO may identify sensitive areas and no-go zones in proximity to the worksite. These areas will lie outside the construction limit and must not be disturbed by any construction activity. The EPP shall describe measures to be employed in order to prevent disturbance.
- .15 Accidental Finds Protocol
  - .1 In the event that unanticipated significant artifacts/features are uncovered during project activities, work shall stop in the immediate area in order to remain undisturbed.
  - .2 The Contractor shall immediately notify the Departmental Representative of any unanticipated artifacts/features found to ensure proper action is followed. PCA will ensure an immediate response and investigation so as to not delay work. PCA will advise the Contractor of required protective measures as well as steps moving forward.
  - .3 Examples of significant artifacts/features include but are not limited to: Human remains, archaeological sites (buried artifacts and other evidence that tell us about human life in the past), palaeontological sites (fossilized remains of plants and animals), historic buildings and other structures, and Aboriginal traditional use sites.
- .16 Archeological Monitoring
  - .1 The Contractor may be required to provide archeological monitoring at certain sites.
  - .2 Sites where archeological monitoring is required will be identified in Section 01 11 00 Summary of Work.
  - .3 Archeological services will be considered incidental to the project and no separate or additional payment will be made.

## **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 A minimum of two (2) weeks prior to start of work at any site identified as requiring archeological monitoring, submit the following information for review by the Departmental Representative.
  - .1 Proposed schedule at the affected site.
  - .2 Resume of the proposed archeological monitor.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Consultant and Departmental Representative.
- .4 Environmental Protection Plan shall include comprehensive overview of known or potential environmental issues to be addressed during construction, including identification of potential impacts on existing aquatic and terrestrial habitats.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Environmental Protection Plan shall include but may not be limited to:
  - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
  - .3 Name[s] and qualifications of person[s] responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Erosion and sediment control plan (ESCP) identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
  - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .7 Measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
    - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
  - .9 Spill control plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .10 Non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal.
  - .11 Air pollution control plan detailing provisions to assure that dust and other airborne debris is contained on project site.
  - .12 Sod salvage and site reclamation plan, including partial sod salvage, reapplication and restoration of disturbed areas.

- .13 Contaminant prevention plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .14 Waste water management plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .15 Plan that defines the procedures for identifying and protecting historical, archaeological and cultural resources known to occur on the project site, including procedures to be followed if historical, archaeological or cultural resources, not previously known to be in the area, are discovered during construction.
  - .1 Include methods to assure protection of known or discovered resources and clearly identify lines of communication between Contractor personnel and PCA.
- .16 Proposed schedule for monitoring and repairing (if required) all temporary environmental measures. The frequency of such monitoring shall be at least daily.

## **1.6 FIRE PREVENTION AND CONTROL**

- .1 A fire extinguisher shall be carried and available for use on each machine or vehicle in the event of any fire to prevent the fire from burning the unit or spreading to other fuels in the immediate area.
- .2 Basic firefighting equipment including a variety of hand tools as well as two 20L backpack water pumps shall be kept at the site in a known location easily accessible to all staff present.
- .3 Machinery and equipment shall be operated with all original safety devices in place to prevent ignition of flammable materials in the area.
- .4 Care shall be taken when extinguishing or disposing of any potential fire ignition source.
- .5 In case of fire, the Contractor (or any staff present) shall take immediate action to extinguish the fire provided it is safe to do so and immediately call 911. Immediately following the 911 call, notify Banff dispatch at 1-888-927-3367, RCMP Waterton Dispatch at 403-859-2244, the ESO, and the Departmental Representative.
- .6 Any fire or burning of waste materials is not permitted.

## **1.7 WILDLIFE**

- .1 During Environmental briefing all personnel will be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- .2 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behavior or persistent intrusion. Extra care to control materials that might

attract wildlife (e.g. food, food scraps, petroleum products, etc.) must be exercised at all times.

- .3 Notify the ESO and Departmental Representative immediately about dens, litters, nest, and carcasses (road kill), bear activity or encounters on or around the site. Other wildlife related encounters are to be reported within 24 hours.

## **1.8 DRAINAGE**

- .1 Develop and submit erosion and Erosion and Sediment Control Plan (ESC Plan) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with ESC Plan and with all Federal, Provincial, and Municipal laws and regulations.
- .2 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .3 Do not discharge pumped water into waterways.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with regulatory requirements.

## **1.9 GROUND DISTURBANCE**

- .1 Ground disturbance shall be keep to a minimum and within the limit of work.
- .2 If ground disturbance is to occur outside of designated locations immediately contact the Departmental Representative as an Archeologist may be required to continue work. Do not proceed without approval by the Departmental Representative.
- .3 For installation of posts and other below-ground elements of the Work:
  - .1 All foundation holes shall be made by auguring.
  - .2 No hydrovac use will be permitted without prior written approval from the Departmental Representative.

## **1.10 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and immediately adjacent to site.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective framework from grade level to a minimum height of 2 m.
- .3 Protect trees immediately adjacent to trails through the use of HDPE pipe, cut lengthwise and strapped around the trunk to a minimum height of 2 m.
- .4 Protect roots of trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .5 If roots are encountered during excavation, immediately stop work and notify the Departmental Representative. Do not resume work at these locations until instructed by the Departmental Representative to proceed.
- .6 Minimize stripping of topsoil and native vegetation. All stripped topsoil and native vegetation shall remain intact and stockpiled on site and shall be used to reinstate disturbed areas after completion of Work.

- .7 Restrict vegetation removal to areas designated by Departmental Representative.

#### **1.11 WORK ADJACENT TO WATERWAYS**

- .1 Construction equipment to be operated on land only.
- .2 Waterways to be kept free of excavated fill, waste material, debris and hazardous materials.
- .3 No materials and/or equipment are permitted to enter any waterways.

#### **1.12 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Ensure that machinery arrives free of dirt and vegetative debris and is maintained free of leaks.

#### **1.13 EQUIPMENT MAINTENANCE, FUELING AND OPERATION**

- .1 All construction equipment to be used for this Work shall be cleaned outside of WLNP prior to delivery to work site and is subject to a mandatory inspection by Departmental Representative prior to being unloaded at work site.
- .2 Equipment fuelling sites shall be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chainsaws, any fuelling closer than 100 metres from any stream, wetland, or other water body shall require authorization of the Departmental Representative.
- .3 Ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .4 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially delirious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals or accessed by wildlife when left overnight in WLNP.

#### **1.14 OPERATION OF EQUIPMENT**

- .1 Equipment movements shall be restricted to the approved limit of work. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery shall enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitats. Some construction work may require working close to watercourse 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 watercourse, to the satisfaction of the Departmental Representative and ESO.

- .2 Equipment shall be sized appropriately for the work (i.e. shall not be oversized) and shall be of a type selected to minimize ground disturbance (e.g. rubber tracked where appropriate, etc.).
- .3 Contractor shall take all necessary steps to prevent pushing, placement, raveling, storage or stockpiling of any materials 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 limit of work, the Contractor shall be responsible for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc., to the satisfaction of the Departmental Representative and ESO and at no cost to PCA.
- .5 Restrict vehicle movements to work limits.
- .6 Workers private vehicles are to remain within the construction footprint.

#### **1.15 NOTIFICATION**

- .1 Consultant and/or Departmental Representative will notify the Contractor in writing of any observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection Plan.
- .2 Contractor is responsible for monitoring and ensuring compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection Plan. Notification by the Consultant and/or Departmental Representative is a courtesy only and shall not be relied upon.
- .3 After notification or observation of any noncompliance, inform Departmental Representative of proposed corrective action.
- .4 Take action only after receipt of written approval by Departmental Representative, unless immediate action is necessary to prevent further noncompliance.
- .5 Departmental Representative may issue stop work order until satisfactory corrective action has been taken.
- .6 No time extensions or payment adjustments will be allowed to Contractor for such suspensions.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES TO REGULATORY REQUIREMENTS**

- .1        Comply with all laws, by-laws, ordinances, rules, regulations, codes, and other legally enforceable requirements from any relevant Authority Having Jurisdiction that are applicable to Work and in force during performance of Work.
- .2        Specific design and performance requirements listed in specifications or indicated on Drawings may exceed minimum requirements established by referenced regulatory requirements. Such requirements in the Contract Documents will govern over the minimum mandated requirements.

**1.4                CANADA NATIONAL PARKS ACT AND REGULATIONS**

- .1        The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules, and regulations set out in the National Parks Act and Regulations.
- .2        The Contractor and any sub-Contractors shall each obtain a business licence from the appropriate Parks Canada Administration Office.
- .3        All Contractor and sub-Contractor vehicles shall display a vehicle work pass from Parks Canada, available free of charge from the Parks Canada Administration Office with a valid business licence.
- .4        Contractor and all sub-Contractors shall obtain Restricted Activity Permits (RAP's) for work within WLNP.

**END OF SECTION**

**Part 1            General**

**1.1                RESPONSIBILITY**

- .1 Contractor is responsible for all Quality Control required to verify that the Work has been completed in accordance with the Contract Documents.
- .2 Submit copies of all Quality Control documentation to the Departmental Representative as it becomes available.
- .3 Quality Control is considered incidental to the Work. No separate or additional payment will be made.

**1.2                INSPECTION ACCESS**

- .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.
- .3 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. If such Work is found in accordance with Contract Documents, Departmental Representative will pay cost of examination and restoration (if applicable).

**1.3                SCHEDULE**

- .1 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .2 Submit Quality Control results to the Departmental Representative before proceeding with work that depends on such results. For example, submit compaction testing results before proceeding with placement of concrete slabs or other supported elements.

**1.4                INDEPENDENT INSPECTION / TESTING AGENCIES**

- .1 One or more Independent Inspection/Testing Agencies ("Testing Agency") may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by PCA.
- .2 Employment of Testing Agency does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed Testing Agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to PCA. Pay costs for retesting and re-inspection.



**1.5 ACCESS TO WORK**

- .1 Allow Testing Agencies access to Work, whether at site or at off-site facilities such as manufacturing and fabrication plants.
- .2 Cooperate with Testing Agencies and provide facilities required for access.

**1.6 PROCEDURES**

- .1 Notify 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, as specifically requested in specifications. 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.

**1.7 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, PCA 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.

**1.8 REPORTS**

- .1 Provide copies to manufacturer or fabricator of material being inspected or tested and to subcontractor responsible for work being inspected or tested.

**1.9 SAMPLES / MOCK-UPS**

- .1 Prepare sample and mock-ups for Work specifically requested in specifications.
- .2 Construct in locations acceptable to Departmental Representative.
- .3 Prepare samples and mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence so as to not cause delays in Work.
- .4 Failure to prepare samples and mock-ups 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.
- .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.

- .6 Remove samples and mock-ups at conclusion of Work or when acceptable to Departmental Representative.
- .7 Sample and mock-ups may remain as part of Work where accepted by the Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1            INSTALLATION AND REMOVAL**

- .1    Provide construction facilities as required to facilitate the Work.
- .2    Remove from site all such facilities after Work is complete.

**1.2            LAYDOWN AREAS**

- .1    Construction laydown space will be identified at the construction start-up meeting.
- .2    Specific proposed laydown areas are subject to the approval of the Departmental Representative.
- .3    Prepare site plan showing proposed laydown areas indicating all relevant information, including but not necessarily limited to:
  - .1    Fencing
  - .2    Trailers
  - .3    Access routes
  - .4    Equipment refueling areas
  - .5    Surface treatment (e.g. gravel, ACP, etc.)

**1.3            CONSTRUCTION PARKING**

- .1    Parking shall be limited to identified laydown areas or to existing paved surfaces within the work site.

**1.4            EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1    Provide and maintain lockable weatherproof sheds in clean and orderly condition 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.

**1.5            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.
- .3    Locate sanitary facilities a minimum of 100 meters from any water body.
- .4    Secure temporary sanitary facilities against dislocation by wind.

**1.6            TEMPORARY BARRIERS**

- .1    Temporary barriers shall not restrict wildlife movement through site, or if required to keep wildlife from accessing an area, must be placed in a manner that will not entrap wildlife.

**1.7 CONSTRUCTION SIGNAGE**

- .1 No signs other than safety-related warning signs are permitted on site.
- .2 Signs and notices for public safety and instructions shall be in both official languages and shall conform to CSA Standard Z321.
- .3 Prepare and submit site-specific signage plans to the Departmental Representative for review in accordance with Section 01 33 00 Submittals.
- .4 Submit signage plans a minimum of fourteen (14) working days prior to schedule mobilization to site.
- .5 Provide and install required signage.
- .6 Maintain approved signage and notices in good condition for the duration of the Work.
- .7 Remove when Work is complete, or earlier as directed by the Departmental Representative.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 Alberta Infrastructure and Transportation, 2018 Traffic Accommodation in Work Zones manual, 2nd Edition.

**1.2 SUBMITTALS**

- .1 Prepare one or more Traffic Accommodation Strategies (TAS) covering all locations and activities that will impact traffic on public roadways.
- .2 Prepare the TAS following the requirements given in Alberta Infrastructure and Transportation, 2018 Traffic Accommodation in Work Zones manual, 2nd Edition.
- .3 Submit the TAS to the Departmental Representative for review in accordance with Section 01 33 00 Submittal Procedures.
- .4 TAS shall be submitted under the seal of a professional engineer registered in the province of Alberta.
- .5 Submit TAS to the Departmental Representative a minimum of seven (7) working days prior to the day proposed for mobilization to any locations affected by the TAS.
- .6 Update, revise and resubmit TAS for any locations where a significant change in traffic conditions occurs over the course of the Work.

**1.3 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 Protect travelling public from damage to person and property.
- .3 The site will remain open to public traffic throughout the Work, unless specifically noted elsewhere in the Contract Documents.
- .4 When working on travelled way:
  - .1 Place equipment in position to minimize interference and hazard to travelling public.
  - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3 Do not leave equipment on travelled way overnight.
- .5 Provide and maintain road access and access to property fronting the Work.
- .6 Close lanes of road or access roads only after receipt of written approval from Departmental Representative.
- .7 Limit temporary delays of public traffic to a maximum of 10 minutes and no more than once per hour.
- .8 Contractor's traffic on roads selected for access to and from site shall interfere as little as possible with public traffic.

**1.4 INFORMATIONAL AND WARNING DEVICES**

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from the Work and which affects traffic on public roads.
- .2 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability and location.
  - .2 Clean, repair or replace to ensure clarity and reflectance.
  - .3 Remove or cover signs which do not apply to current conditions.

**1.5 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent flag personnel, trained in and properly equipped for Traffic Control in Work Zones for situations as follows:
  - .1 When public 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 crest 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.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 Within text of each specification section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3 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.

**1.2 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 will be rejected whenever they are identified, regardless of any 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 the Work.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.3 SUSTAINABILITY**

- .1 PCA procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition.
- .2 Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

**1.4 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.

## **1.5 STORAGE, HANDLING AND PROTECTION**

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

## **1.6 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Products supplied by Owner will be made available at locations noted elsewhere in the Contract Documents. Be responsible for all costs relating to transport of such items from existing locations.

## **1.7 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 may establish course of action.
- .3 If failure to comply with these requirements results in improper installation or erection of products, remove and reinstall such products at no increase in Contract Price or Contract Time.



**1.8 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.

**1.9 COORDINATION**

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

**1.10 REMEDIAL WORK**

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

**1.11 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested elsewhere in the Contract Documents.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Plugs made of organic material (including wood) 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.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .9 Bolts shall not project more than one diameter beyond nuts.
- .10 Use appropriate washers on all connections:
  - .1 Plain washers on equipment and sheet metal.

- .2 Soft gasket lock-type washers where vibrations occur.
- .3 Resilient washers with stainless steel.
- .4 Oversized washer with timber connections.

**END OF SECTION**

**Part 1            General**

**1.1               REFERENCE STANDARDS**

**1.2               QUALIFICATIONS OF SURVEYOR**

- .1      Qualified surveyor licensed to practise in Alberta and acceptable to Departmental Representative.

**1.3               SURVEY REFERENCE POINTS**

- .1      Identify existing base horizontal and vertical control points.
- .2      Locate, confirm and protect control points prior to starting site 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 in grades or locations.
- .5      Require surveyor to replace control points in accordance with original survey control.

**1.4               SURVEY REQUIREMENTS**

- .1      Establish two permanent bench marks on each site, referenced to established bench marks by survey control points. Record details of bench mark locations 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      Stake slopes and berms.
- .5      Verify all lines, levels, datum and dimensions shown on Drawings and report errors or inconsistencies to the Departmental Representative prior to commencing work. Failure to do so does not relieve the Contractor from responsibility for correcting same.
- .6      Lay out work to lines and levels as indicated on Drawings. In all cases, figured dimensions will overrule scaled dimensions.
- .7      Exercise every possible precaution to verify figures shown on Drawings and to obtain from Departmental Representative any additional dimensions or information as required before laying out the work. Be responsible to rectify any errors or incorrect work due to failure to exercise such precautions.

**1.5               SITE EXAMINATION**

- .1      Visit the site and compare drawings and specifications with existing conditions, including all conditions surrounding the site prior to submitting bids.
- .2      Failure to visit the site will not relieve the Contractor from supplying any materials or performing any work in accordance with drawings and specification, without additional cost to PCA.

- .3 Submission of bid will be deemed to be evidence that the Contractor has examined the site and is familiar with conditions under which work will be performed.

**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 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

**1.7 EXISTING FEATURES**

- .1 Location and dimensions of existing features indicated or specified are approximate only and shall be field confirmed prior to fabrication or other activities.

**1.8 RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.

**1.9 SUBSURFACE CONDITIONS**

- .1 Promptly notify Departmental Representative in writing if subsurface conditions differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 Departmental Representative will investigate promptly.
- .3 If the Departmental Representative determines that subsurface conditions do differ materially, appropriate instructions for changes in the Work will be issued.

**1.10 CUTTING AND PATCHING**

- .1 Do not cut, bore or sleeve any structural elements without the written acceptance of Departmental Representative.
- .2 Submit written request in advance of cutting or alteration which affects the following:
  - .1 Structural integrity of any element,
  - .2 Integrity of weather-exposed or moisture-resistant elements,
  - .3 Efficiency, maintenance, or safety of any operational elements,
  - .4 Visual qualities of exposed elements, or
  - .5 Work of Owner or separate contractor as applicable.
- .3 After uncovering, inspect conditions affecting performance of Work.
- .4 Commencement of cutting or patching means acceptance of existing conditions.
- .5 Perform cutting, fitting, and patching, including excavation and backfilling, to complete the Work.
- .6 Cut and drill with true, smooth edges and to minimum suitable tolerances. Do not oversize holes.
- .7 Perform work to avoid damage to other work.

- .8 Provide supports to assure structural integrity of surroundings devices and methods to protect other portions of project from damage.
- .9 Provide protection from elements for areas that may be exposed by uncovering work.
- .10 Prepare surfaces to receive patching and finishing.
- .11 Cut rigid materials using power saw or core drill, except as otherwise noted. Pneumatic or impact tools not allowed without approval from the Departmental Representative.
- .12 Restore work with new products in accordance with the Contract Documents.

**END OF SECTION**

**Part 1 General**

**1.1 WASTE MANAGEMENT GOALS**

- .1 Waste management goal is for waste materials to be diverted from landfill sites to the greatest degree possible while remaining cost effective.
- .2 Waste management goal shall be discussed at the Preconstruction Meeting, including proposed means and methods to be used to meet the stated goal.
- .3 Provide Departmental Representative documentation certifying that waste management, recycling, reuse or recyclable and reusable materials has been extensively practiced.

**1.2 DEFINITIONS**

- .1 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .2 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .3 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating or otherwise destroying waste.
- .4 Reuse: To reuse a construction waste material in some manner on the project site.
- .5 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .6 Waste Material: any product or material associated with the Contract that is not incorporated into the Work. This includes, but may not be limited to, the following:
  - .1 Unsuitable excavated materials.
  - .2 Organic materials such as tree trimming, grass clippings, etc.
  - .3 Existing features to be removed as part of the Work.
  - .4 Excess products or materials delivered to site.
  - .5 Packaging.
  - .6 Concrete formwork.
  - .7 Personal waste.
- .7 Trash or Rubbish: Any product or material unable to be reused, returned, recycled, or salvaged.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Prepare and submit a Waste Management Plan (WMP) for review by the Departmental Representative.
- .2 Submit the WMP a minimum of seven (7) working days prior to the Preconstruction Meeting.
- .3 Coordinate waste management requirements with all subcontractors and ensure that Waste Management Plan is followed.

- .4 Submit verification of proper disposal for all material removed by the site, in a form acceptable to the Departmental Representative. This may include such items as copies of certified weigh bills, bills of lading and receipts from authorized disposal sites and recycling facilities.
  - .1 Submit verification on a monthly basis, covering all removals completed up to the end of the preceding month.

#### **1.4 STORAGE, HANDLING AND DISPOSAL**

- .1 Unless specifically noted otherwise, removed items and materials that are not incorporated into the Work become property of the Contractor, who is responsible for proper disposal.
- .2 Separate recyclable and salvageable materials from other waste.
- .3 Transport and deliver recyclable items to recycling facilities.
- .4 Do not allow recyclable materials to enter a landfill facility without prior written approval from the Departmental Representative.
- .5 Transport and deliver all compostable organic waste generated by the Work to approved composting facilities outside WLNP. Do not allow compostable materials to enter a landfill facility without prior written approval from the Departmental Representative.
- .6 Transport and deliver salvaged items to an appropriate location outside WNLP.
- .7 Transport and deliver all other waste materials to licensed disposal facility located outside WLNP.
- .8 Remove materials from the site as Work progresses.
- .9 All odorous waste, including food waste, petroleum products or similar items, shall be removed from site daily or shall be stored in a bear-proof container acceptable to the Departmental Representative.
- .10 Sale of any materials within WLNP is not permitted.
- .11 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove combined materials to off-site processing facility for separation. Do not process waste material on site.
- .12 Do not burn or bury waste materials.
- .13 Do not dispose of any material into waterways.

**END OF SECTION**

**Part 1            General**

**1.1            ADMINISTRATIVE REQUIREMENTS**

- .1 Contractor's Inspection
  - .1 Conduct a complete inspection of the Work.
  - .2 Identify and record deficiencies and defects.
  - .3 Repair deficiencies and defects as required to conform to Contract Documents.
  - .4 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection, including specific confirmation that all identified deficiencies and defects have been repaired.
  - .5 Request Departmental Representative to schedule the Substantial Completion inspection.
- .2 Substantial Completion Inspection
  - .1 Departmental Representative and Contractor to jointly inspect the Work and identify defects and deficiencies.
  - .2 Contractor to record deficiencies and defects noted during the inspection.
  - .3 Contractor to correct defects and deficiencies as noted and as directed.
  - .4 Substantial Completion Form will be completed at this time; warranty period begins for completed work.
- .3 Contractor's Completion
  - .1 Repair all defects and deficiencies noted in the Departmental Representative Inspection.
  - .2 Notify the Departmental Representative in writing that all identified defects and deficiencies have been repaired and the Work is ready for Final Completion Inspection.
- .4 Final Completion Inspection
  - .1 Departmental Representative and Contractor to jointly inspect the Work to confirm that all identifies defects and deficiencies have been repaired.
  - .2 If any defects or deficiencies are note during the Final Inspection, whether or not they had been identified previously, the Contract shall record these defects and deficiencies and the process will return to the 'Contractor's Completion' stage above.
- .5 Final Payment
  - .1 When Departmental Representative considers all defects and deficiencies have been satisfactorily repaired and all other requirements of the Contract have been met, make application for final payment.
- .6 Payment of Holdback
  - .1 After issuance of Certificate of Substantial Performance, submit application for payment of holdback amount in accordance with the Contract.



- .7      Warranty Inspection
  - .1      Approximately one year following the Substantial Completion Inspection, the Departmental Representative will schedule a warranty inspection meeting.
  - .2      Attend the Warranty Inspection meeting and address in a timely manner all deficiencies identified during the meeting.

**END OF SECTION**

**Part 1            General**

**1.1            RECORD DOCUMENTS**

- .1 Maintain at site for Consultant 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 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .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.
- .6 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .7 Record information concurrently with construction progress.
- .8 Do not conceal Work until required information is recorded.
- .9 Record as-built information on record documents, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 Referenced Standards to related shop drawings and modifications.
  - .8 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .9 Changes made by Addenda and change orders.

- .10 Other Documents: maintain inspection certifications, manufacturer's certifications and field test records as required by individual specifications sections.

## **1.2 OPERATION AND MAINTENANCE MANUALS**

- .1 Manual:
  - .1 An organized compilation of operating and maintenance data including detailed technical information, documents, and records describing operation and maintenance of individual products or systems as specified in individual sections.
  - .2 Divide the manual into two volumes to address Record Documents and Maintenance Documents as noted in this section.
- .2 General
  - .1 Assemble, co-ordinate, bind and index required data into Operation and Maintenance Manual.
  - .2 Submit complete operation and maintenance manual to Departmental Representative two (2) weeks prior to application for Substantial Performance.
  - .3 Submit one (1) copy of each required volume in English language and one (1) pdf copy.
  - .4 Organize data into systems and not in numerical order as contract specifications.
  - .5 Label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.
  - .6 Type lists and notes.
  - .7 Drawings, diagrams and manufacturers literature must be legible.
- .3 Binders
  - .1 Binders: "D" ring type binders bound with heavy vinyl, with clear vinyl pocket on front cover and spine, sized for 215 x 280 mm paper. Binders must not exceed 75 mm thick or be more than 2/3 full. Include a slip sheet in vinyl pockets indicating the following only:
    - .1 Name of Project.
    - .2 Date of Project Completion
    - .3 Volume 1 – Record Documents, or  
Volume 2 – Maintenance Documents
  - .2 Submissions with any additional information will be rejected by the Owner.
- .4 Binder contents:
  - .1 Volume 1 - Record Documents
    - .1 Table of contents
    - .2 Shop drawings and other product submittals
    - .3 Each submittal shall include a cover sheet containing the following information:
      - .1 Date submitted.
      - .2 Project title, location and project number.
      - .3 Description of submittal.
  - .2 Volume 2 – Maintenance Documents

- .1 Table of Contents
- .2 List of all finish materials and locations used on the project.
- .3 List of suppliers, phone numbers and addresses.
- .4 Care taking and cleaning instructions for finish materials.
- .5 Operating and maintenance instructions for mechanical and electrical systems.
- .6 Names and addresses of Contractor and relevant Subcontractors.
- .7 Operation data to include:
  - .1 Control schematics for each system including environmental controls.
  - .2 Description of each system and its controls.
  - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
  - .4 Operation instructions for each system and each component.
  - .5 Description of actions to be taken in event of equipment failure.
- .8 Maintenance data shall include:
  - .1 Cleaning and maintenance of all finishes and surfaces.
  - .2 Servicing, maintenance, operation and troubleshooting instructions for each item of equipment.
  - .3 Data to include schedules of tasks, frequency, and tools required and task time.
- .9 Performance data to include:
  - .1 Equipment manufacturer's performance data sheets with point of operation as left after facility systematic testing & balancing is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified elsewhere.
- .5 Approvals
  - .1 Submit draft Operation and Maintenance Manual to Departmental Representative for approval.
  - .2 Make changes as required and resubmit as directed by Departmental Representative.

### **1.3 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan to Departmental Representative 30 days before planned pre-completion meeting.
- .3 Warranty management plan to include required actions and documents to assure that PCA receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

- .5 Submit warranty information made available during construction phase to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .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 applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items.
  - .3 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work. Written notification to follow oral notification.
- .10 Failure to respond will be cause for PCA to proceed with action against Contractor.

**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                NOT USED**

- .1        Not Used

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used

**Part 3            Execution**

**3.1                PREPARATION**

- .1        Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2        Identify, locate and protect utilities.
- .3        Preserve active utilities traversing site in operating condition.
- .4        Notify and obtain approval of affected utility companies before starting demolition.

**3.2                REMOVAL OF HAZARDOUS WASTES**

- .1        Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal.

**3.3                REMOVAL OPERATIONS**

- .1        Remove items as indicated.
- .2        Do not disturb items designated to remain in place.
- .3        Removal of pavements and concrete:
  - .1        Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
  - .2        Protect adjacent joints and load transfer devices.
  - .3        Protect underlying and adjacent granular materials.
- .4        Prevent contamination with base course aggregates when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.
- .5        Remove designated trees.
  - .1        Obtain written approval of Departmental Representative prior to removal of trees not designated.

### **3.4 BACKFILL**

- .1 Backfill holes remaining after removals as follows:
  - .1 More than 150 mm below grade: granular material, compacted to 95%.
  - .2 Upper 150 mm: top soil. Top soil to be native to the area and should be surplus from work within the area. No topsoil is to be brought to the site for this activity.

### **3.5 PARTIAL SOD SALVAGE**

- .1 Partial sod salvage is defined as: “removal of the native grassland sod and associated shrub layer, retaining the sod and the native seed bank as intact as possible to be used in top-dressing areas to be reclaimed”.
- .2 The plant materials and soils shall be stripped in a single lift to a minimum thickness of 20cm, or at a depth of the rooting zone and distinct color/textural change.
- .3 Place salvaged sod “vegetation side up” adjacent to the location it was stripped from.
- .4 Ensure that sod doesn’t dry out due to wind or heat.
- .5 Apply water as required to ensure organic sod material remains viable and can be reused.
- .6 Transport and place material at new location within 2 days.
- .7 Transport salvaged sod to new location in a fashion that minimizes handling and loss of the native seed bank and soil composition.
- .8 Underlying topsoil and subsoils not appropriate for use in trail areas shall be salvaged and used as fill in areas to be reclaimed.

### **3.6 SALVAGE**

- .1 Salvage stone features such as stair treads, foundation blocks and similar items.
  - .1 Transport these elements to the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
  - .2 Unload and stack the materials in the location designated by the Departmental Representative.
- .2 Salvage site furnishings and other features to be reused.
  - .1 Move these elements from their existing location to temporary storage locations on site as approved by the Departmental Representative.
  - .2 Relocate and reinstall in final position at the appropriate stage of the work.
  - .3 Dispose of excess salvaged elements as instructed by the Departmental Representative.

### **3.7 DISPOSAL**

- .1 Remove materials not designated for salvage to an approved disposal facility outside of WLNP.
- .2 All excess subgrade materials shall become waste material and shall be properly disposed of outside of WLNP.

### **3.8 STOCKPILING**

- .1 Obtain written approval for stockpile locations from Departmental Representative.
- .2 Label stockpiles, indicating material type and quantity.
- .3 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .4 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .5 If salvaged sod materials must be stockpiled, place on pallets lined with high tensile strength woven geotextile. Locate pallets in shaded areas. Protect exposed roots from dessication.
- .6 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

### **3.9 RESTORATION**

- .1 Retain all excess mineral soil and transport to locations where trails are being eliminated, to be installed before salvaged plant material is placed on top.
- .2 Retain the salvaged plant material and soils in clumps that can be transported to the trails being eliminated and applied as a top dressing and growth medium.
- .3 Following trail construction, broadcast seed all disturbed areas and lightly work the surface to incorporate seed into soils. Seeding rate shall be 10 kg/ha. Seed will be supplied by PCA
- .4 Restore all areas where disturbance has occurred or materials have been stored. Sod and soil to be spread over disturbance, followed by broadcast seeding.
- .5 Repair damage to adjacent materials or property to the satisfaction of the Departmental Representative.
- .6 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
- .7 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water. All treatments must be approved before use by Departmental Representative.

**END OF SECTION**



**Part 1            General**

**1.1                SUMMARY**

- .1        Section includes specifications for demolishing, salvaging, recycling and removing of asphalt paving identified for removal.

**1.2                ACTIONS**

- .1        Review and follow all environmental procedures outlined in BMP related to asphalt handling.

**1.3                SITE CONDITIONS**

- .1        Protect existing site features (structures, trees, plants, foliage, etc.) to remain or identified for salvage or re-use, both on site and on adjacent properties.
- .2        Repair or replace existing site features where damage to these items occurs and at no cost to PCA.
- .3        Repair shall restore the feature to the same or better condition that was existing before the damage occurred and to the approval of the Departmental Representative.
- .4        Replace features where repair to the approval of the Departmental Representative is not possible.
- .5        Remove and store salvaged materials to prevent contamination.
- .6        Store and protect salvaged materials as required for maximum preservation of material.
- .7        Handle salvaged materials using the same methods that would be used for new materials.

**Part 2            Products**

**2.1                EQUIPMENT**

- .1        Where partial depth removal is required, use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing pavement surface to required depths and/or grades.

**Part 3            Execution**

**3.1                PREPARATION**

- .1        Verify extent and location of asphalt identified for removal.
- .2        Identify, locate and protect utilities.
- .3        Preserve active utilities traversing site in operating condition.
- .4        Provide appropriate temporary erosion and sedimentation control as identified in the project Erosion and Sedimentation Control Plan (ESCP).
- .5        Joint Inspection

- .1 Prior to beginning removal operation, conduct a Joint Inspection with the Departmental Representative to verify areas, depths and lines of asphalt pavement to be removed.

### **3.2 REMOVAL**

- .1 Perform pavement removal work in a manner that avoids adverse effects to adjacent watercourses, groundwater and wildlife, and which does not produce excessive air and noise pollution.
- .2 Remove existing asphalt pavement to lines and grades as indicated and as accepted by the Departmental Representative during the Joint Inspection.
- .3 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Departmental Representative.
- .4 Protect adjacent joints and load transfer devices.
- .5 Protect underlying and adjacent granular materials where they are exposed and identified to remain.
- .6 Prevent contamination with base course aggregates when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.
- .7 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .8 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .9 Suppress dust generated by removal process.

### **3.3 FINISH TOLERANCES**

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

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA O86, Engineering Design in Wood.
  - .3 CSA O121, Douglas Fir Plywood.
  - .4 CSA O151, Canadian Softwood Plywood.
  - .5 CSA O153, Poplar Plywood.
  - .6 CSA O325.0, Construction Sheathing.
  - .7 CSA O437 Series, Standards for OSB and Waferboard.
  - .8 CSA S269.1, Falsework and Formwork.
- .2 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-[11], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Review and follow all environmental procedures outlined in BMP related to concrete handling.
- .2 Provide submittals in accordance with Section 01 33 00 Submittal Procedures.
- .3 Submit shop drawings for formwork and falsework, prepared in accordance with CSA S269.1.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 Common Product Requirements and with Manufacturer's written instructions.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Formwork materials:
  - .1 Use wood and wood product formwork materials to CSA O86, CSA O121, CSA O437 Series and/or CSA O153.
- .2 Form ties:
  - .1 Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes exceeding 25 mm diameter in concrete surface.
- .3 Form release agent:

- .1 Proprietary, non-volatile material that will not stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non-toxic, low VOC, biodegradable.
- .4 Falsework materials: to CSA S269.1.

### **Part 3 Execution**

#### **3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Fabricate and erect formwork in accordance with CAN/CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.
- .4 Align form joints and make watertight.
- .5 Keep form joints to minimum.
- .6 Use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners and joints.
- .7 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .8 Build in anchors, sleeves, and other inserts as required.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .9 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

#### **3.2 FORM REMOVAL**

- .1 Leave formwork in place for a minimum of 48 hours after placing concrete.
- .2 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 CSA Group
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
- .2 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC Reinforcing Steel Manual of Standard Practice.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .1 Review and follow all environmental procedures outlined in BMP related to concrete handling.
- .2 Shop Drawings:
  - .1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
  - .2 Indicate the following:
    - .1 Bar bending details.
    - .2 Bar lists.
    - .3 Quantities of reinforcement.
    - .4 Size, spacing and locations of reinforcement with identifying marks to permit correct placement without reference to structural drawings.
    - .5 Size, spacing and location of chairs, spacers and hangers.
    - .6 Detail lap lengths and bar development lengths to CSA A23.3.
- .3 Quality Assurance Submittals:
  - .1 Submit to Departmental Representative a certified copy of mill test report pertaining to reinforcing steel supplied.
  - .2 Submit to Departmental Representative proposed source of reinforcement material.

**1.3 DELIVERY, STORAGE AND HANDLING**

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

**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 400R, deformed bars to CSA G30.18.
- .3 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
- .4 Tie wire: 1.5 mm diameter annealed wire.

## **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with Reinforcing Steel Institute of Canada “Reinforcing Steel Manual of Standard Practice” and CSA A23.1/A23.2.
- .2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

## **Part 3 Execution**

### **3.1 FIELD BENDING**

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

### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on shop drawings in accordance with CSA A23.1/A23.2.
- .2 Ensure that reinforcement is in place a minimum of twenty-four (24) hours in advance of the planned time for concrete placement.
- .3 Notify the Departmental Representative a minimum of twenty-four (24) hours in advance of the planned time for concrete placement, that the reinforcement is in place and ready for review.
- .4 Do not place concrete until the Departmental Representative provides written approval of reinforcing material and placement.
- .5 Maintain specified cover to reinforcement during concrete pour.

**END OF SECTION**

**Part 1 General**

**1.1 ACTIONS**

- .1 Review and follow all environmental procedures outlined in BMP related to concrete handling.

**1.2 QUALITY ASSURANCE**

- .1 A minimum of two (2) weeks prior to the planned start of concrete placement, provide the following to Departmental Representative:
  - .1 Details of the concrete source, including mix design, relevant plant certifications and other qualifications.
  - .2 Quality control plan, including relevant certifications and other qualifications relating to the testing agency.
- .2 Produce a sample of exposed aggregate concrete, minimum 1m x 1m in size, to allow the Departmental Representative to assess the appearance of the proposed aggregate and the effectiveness of the methods proposed to expose those aggregates.
  - .1 Produce additional samples as required by the Departmental Representative.
  - .2 Once approved, the sample panel will be the basis for acceptance of the Work.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Concrete shall be delivered to site and discharged within 120 minutes after batching.
- .2 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
- .3 Proposed deviations to be submitted for review by the Departmental Representative.

**1.4 SITE CONDITIONS**

- .1 Do not place concrete during rain or weather events that could damage concrete.
- .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 at site.
  - .2 Use such equipment when ambient temperature is below 5°C, or when temperature may fall below 5°C before concrete is cured.
  - .3 Do not place concrete on or against surfaces at a temperature below 5°C.
- .4 Hot weather protection:
  - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
  - .2 Prevent forms from getting too hot before concrete is placed. Apply accepted methods of cooling with no adverse effects on concrete.
- .5 Protect from drying.

## **1.5 SHOP DRAWINGS AND SUBMITTALS**

- .1 Provide shop drawings of all architectural concrete (seating areas, slabs, etc.) including elevations, reinforcing, construction and control joint locations, joint types and locations, penetrations, embedded items, form tie locations and finishes.
- .2 Material shall not be purchased or delivered to site, nor shall work commence, prior to approval of Shop Drawings by the Departmental Representative
- .3 Provide certification that mix proportions proposed will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA A23.1.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Cement: to CSA A3001, Type HSb.
- .2 Water: to CSA A23.1/A23.2.
- .3 Aggregates: to CSA A23.1/A23.2.
- .4 Admixtures:
  - .1 Air entraining admixture: to ASTM C260.
  - .2 Chemical admixture: to ASTM C494 and ASTM C1017. Departmental Representative to approve accelerating or set retarding admixtures during cold or hot weather placing.
- .5 Other concrete materials: to CSA A23.1/A23.2.

### **2.2 MIXES**

- .1 Proportion concrete in accordance with CSA A23.1.
- .2 Minimum 28 day compressive strengths and exposure classifications:
  - .1 All concrete: 32 MPa; C-1.
- .3 Nominal size of coarse aggregate: Clause 14 of CSA A23.1.
- .4 Slump: to Table 6 of CSA A23.1.
- .5 Air content: all concrete to contain purposely entrained air in accordance with Table 10 of CSA A23.1.
- .6 Admixtures: to Clause 6 of CSA A23.1.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Cast in sleeves, ties, slots, anchors, inserts, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other items required to be built-in.
- .2 Set anchor bolts in position using templates prior to placing concrete.



- .3 Prior to placing of concrete obtain Departmental Representative's approval of proposed methods for protection of concrete during placing and curing in adverse weather.
- .4 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.

### **3.2 PLACEMENT**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Do not allow the development of cold joints.
- .3 Ensure concrete delivery and handling procedures allow placing with minimum of rehandling and without damage to existing features.
- .4 Do not disturb reinforcement and other embedded items.

### **3.3 FINISHES**

- .1 Pavements, walks, site furniture concrete pads, curbs and other exposed unformed concrete not otherwise specified for a different finish:
  - .1 Screed to plane surfaces and use wood floats.
  - .2 Provide round edges and joint spacings using standard tools.
  - .3 Trowel smooth.
  - .4 Provide lightly brushed non-slip finish.
  - .5 Any finished areas with cracks and/or spalls, areas that do not meet grades or provide flush transitions, or areas that pond water will require replacement.
- .2 Formed concrete:
  - .1 Ensure that exposed surfaces are dense, even, uniform in color and texture.
  - .2 Ensure that exposed surfaces are free from defects such as honeycombing, voids, loss of fines, visible flow lines, cold joints, excessive bug holes, inadequate cover to reinforcement and incorrect tie holes, spacers, reglets, formwork joints or construction joints.
  - .3 Ensure that concrete members have sharp accurate definitions of corners, reglets, etc. and are free from chips and spalls.
  - .4 Failure to meet any of these requirements shall be cause for rejection at the discretion of the Departmental Representative.
  - .5 Finish concrete with a smooth form finish in accordance with CSA A23.1.
  - .6 Final appearance of exposed concrete is as important a factor as the engineering properties of the concrete and failure of the as cast concrete to meet the required standard of appearance shall be cause for rejection at the discretion of the Departmental Representative.
  - .7 Any finished areas with cracks and/or spalls will require replacement. The final concrete product shall be a high quality finish.
- .3 Exposed aggregate finish
  - .1 Provide exposed aggregate finish to surfaces identified on the Drawings.
  - .2 Exposed aggregate surface shall be produced through the following process, or approved equivalent only:

- .1 Within one hour after the concrete has been placed, screeded and troweled, spray a retarding agent on the concrete surface according to the Manufacturer's recommendation.
- .2 Wet cure the surface for 12 to 16 hours.
- .3 Expose the aggregate by washing away the cement paste using high pressure water.
- .4 Following removal of the cement paste, the surface shall be wet cured for a minimum of 72 hours.
- .5 The finished surface shall be completely covered with aggregate with a uniform appearance, as determined by the Departmental Representative.
- .6 The aggregate exposed shall have a nominal 5 mm depth of exposure.
- .7 The depth of exposure shall be measured by laying a straight edge across the plane of the surface and measuring down to the concrete matrix between the exposed aggregate.
- .3 One sample segment of exposed aggregate concrete at least 1.5 m x 1.5 m in size shall be constructed to determine the suitability of the appearance.
- .4 If the sample segment is suitable to the Departmental Representative, the sample may remain in place as part of the finished construction
- .5 If the initial sample section is unsatisfactory, it shall be removed and a new sample segment shall be constructed.
- .6 There will be no limitation of the number of sample segments required before approval is given.
- .7 Subsequent segments shall be accepted based on conformance to the approved sample segment.

### **3.4 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled contraction joints after floating, when concrete is stiff, but still plastic, at intervals shown on the Drawings or as directed by the Departmental Representative.
- .2 Expansion Joints:
  - .1 Locate expansion joints in accordance with the Drawings. Location of expansion joints to be confirmed in a layout shop drawing and approved by the Departmental Representative prior to installation of concrete. Place joints against any existing adjacent sidewalk or foundations. Place joints at each interface between cast-in-place concrete paving and concrete bases for site furniture and site features.
- .3 Control Joints:
  - .1 Control joints shall be applied between expansion joints on exposed surfaces at specified intervals. Location of control joints to be confirmed in a layout shop drawing and approved by the Departmental Representative prior to installation.
- .4 Joint locations shall be coordinated between adjacent concrete elements.

### **3.5 CURING**

- .1 Provide wet curing to unformed surfaces for a minimum of seven (7) days after placement.

- .2 Provide wet curing to formed surfaces after forms are removed, to a minimum of seven (7) days after placement.

**3.6 TOLERANCES**

- .1 Concrete finishing tolerance to CSA A23.1/A23.2.

**3.7 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by qualified independent testing agency.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A588, Standard Specification for High-Strength Low-Alloy Structural Steel, up to 345 MPa Minimum Yield Point, with Atmospheric Corrosion Resistance.
  - .2 ASTM A606, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - .3 ASTM F3125, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- .2 CSA Group (CSA)
  - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA S6, Canadian Highway Bridge Design Code.
  - .3 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .4 CSA W59, Welded Steel Construction (Metal Arc Welding).
  - .5 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
  - .2 Provide sufficient information that fabrication can be completed without reference to the Drawings.

**1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates (including mill tests) signed by manufacturer and certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Fabricator shall be certified under CSA W47.1, Division 1 or Division 2.1.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle in accordance with Section 01 61 00 Common Product Requirements and with Manufacturer's written instructions.

- .2 Provide protective blocking for lifting, transportation and storing.
  - .1 Exercise care during fabrication, transportation and erection so as not to damage members.
  - .2 Do not notch edges of members.
  - .3 Do not cause excessive stresses.
- .3 Mark mass on members weighing more than 3 tonnes.
- .4 Protect unpainted weathering steel, before erection, with waterproof covering.
- .5 Ensure that no portion of steel comes into contact with ground.
- .6 Provide Departmental Representative with delivery schedules minimum seven (7) days prior to shipping.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel shall be atmospheric corrosion resisting (“weathering”, “Corten”, “Cor-Ten”) steel. Grade 350A or better in accordance with CSA G40.21, ASTM A606 Type 4, ASTM A588 or approved equivalent only.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48.
- .4 Welding materials shall be selected to have weathering characteristics similar to the base steel material.
- .5 Bolts shall be Grade A325, Type 3 in accordance with ASTM F3125, unless noted otherwise.
- .6 Anchor bolts: Hilti HAS-R316SS or approved equivalent only, embedded using Hilti HIT HY-200 or approved equivalent only.

### **2.2 SOURCE QUALITY CONTROL**

- .1 Steel producer shall be certified in accordance with CSA G40.20/G40.21.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.

- .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
- .2 Ensure reamed holes are no more than 2 mm larger than bolt size used.
- .4 Fabricate and install bearings as indicated.
- .5 Place anchor bolts at elevations and locations indicated.

### 3.2 INSTALLATION

- .1 Do falsework in accordance to CSA S269.1.
- .2 Do fabrication and erection of structural steel in accordance with CSA S6, Canadian Highway Bridge Design Code.
- .3 Do welding in accordance with CSA W59, except where specified otherwise.
  - .1 Do welding in shop unless otherwise permitted in writing by Departmental Representative.
  - .2 Weld only at locations indicated.
- .4 High strength bolting: in accordance with CSA S6. Use 'turn-of-nut' tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .6 Allowable tolerance for bolt holes:
  - .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
  - .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.
  - .3 Centre-to-centre distance between any two holes of group, or between any two groups of holes to vary by not more than 2 mm from dimensioned distance.
  - .4 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .7 Span length tolerances:
  - .1 Girders and beams: plus or minus 6 mm
  - .2 Centre-to-centre of bearing stiffeners and bearing plates: plus or minus 3 mm.
- .8 Shop splices:
  - .1 Use complete joint penetration groove welds finished flush.
  - .2 Details of joints to CSA W59.
  - .3 Use only as approved by Departmental Representative.
- .9 Field splices: to approval of Departmental Representative.
- .10 Mark members in accordance with CSA G40.20/G40.21.
  - .1 Do not use die stamping.
  - .2 Place marking at locations hidden from view in the finished structure.
- .11 Match marking: shop mark bearing assemblies and splices.

- .12 Protect exposed concrete surfaces of substructures from staining due to weathering of unpainted steel as follows:
  - .1 Apply two coats of resin to concrete surfaces prior to erection of steel.
    - .1 Resin: quick drying clear co-polymer resin, based on methyl methacrylate formulation.
    - .2 Apply resin in accordance with manufacturer's instructions.
  - .2 Use stainless steel anchors as specified for anchorage to concrete.

### **3.3 WEATHERING STEEL APPEARANCE**

- .1 It is essential that the uniformity of rust formation is not adversely affected by the Contractor's work.
- .2 The Contractor shall exercise utmost care and provide the necessary protection to prevent marking or staining of weathering steel members.
- .3 If foreign material spills onto weathering steel members despite the protection provided, the Contractor shall clean off, wash, and lightly abrasive blast the contaminated areas, to the satisfaction of the Departmental Representative.
- .4 If exposed weathering steel surfaces become contaminated with foreign material, stained or marked, the Contractor shall clean off, wash and abrasive blast the surfaces and weather the surfaces such that uniformity of color is achieved.
- .5 Weathering shall be achieved by repeatedly fogging the surfaces with clean water and then, allowing to dry. Fogging shall leave the surfaces wet but not running wet, and be repeated when the surfaces are completely dry until a finish acceptable to the Departmental Representative achieved.
- .6 The cost of protection and stain prevention shall be included in the price bid. No separate or additional payment will be made for the cost of protecting the steel surfaces, nor for any cleaning, abrasive blasting or "weathering" made necessary by the Contractor's work.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A588, Standard Specification for High-Strength Low-Alloy Structural Steel, up to 345 MPa Minimum Yield Point, with Atmospheric Corrosion Resistance.
  - .2 ASTM A606, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - .3 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - .4 ASTM F3125, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- .2 CSA Group (CSA)
  - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA S16, Design of Steel Structures.
  - .3 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .4 CSA W59, Welded Steel Construction (Metal Arc Welding).

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings:
  - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
  - .2 Provide sufficient information that fabrication can be completed without reference to the Drawings.

**1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates (including mill tests) signed by manufacturer and certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 Common Product Requirements and with Manufacturer's written instructions.



**Part 2 Products**

**2.1 MATERIALS**

- .1 Steel shall be atmospheric corrosion resisting ("weathering", "Corten", "Cor-Ten") steel. Grade 350A or better in accordance with CSA G40.21, ASTM A606 Type 4, ASTM A588 or approved equivalent only.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48.
- .4 Welding materials shall be selected to have weathering characteristics similar to the base steel material.
- .5 Bolts shall be Grade A325, Type 3 in accordance with ASTM F3125, unless noted otherwise.
- .6 Hex-head bolts, carriage bolts and other fasteners shall be stainless steel in accordance with ASTM Standard F593, or approved equivalent only.
- .7 Anchor bolts: Hilti HAS-R316SS or approved equivalent only, embedded using Hilti HIT HY-200 or approved equivalent only.

**2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work ready for erection.
- .3 Welds shall be continuous. File or grind welds smooth and flush.

**Part 3 Execution**

**3.1 ERECTION - GENERAL**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect steel work square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

**3.2 WEATHERING STEEL APPEARANCE**

- .1 It is essential that the uniformity of rust formation is not adversely affected by the Contractor's work.
- .2 The Contractor shall exercise utmost care and provide the necessary protection to prevent marking or staining of weathering steel members.
- .3 If foreign material spills onto weathering steel members despite the protection provided, the Contractor shall clean off, wash, and lightly abrasive blast the contaminated areas, to the satisfaction of the Departmental Representative.
- .4 If exposed weathering steel surfaces become contaminated with foreign material, stained or marked, the Contractor shall clean off, wash and abrasive blast the surfaces and weather the surfaces such that uniformity of color is achieved.

- .5 Weathering shall be achieved by repeatedly fogging the surfaces with clean water and then, allowing to dry. Fogging shall leave the surfaces wet but not running wet, and be repeated when the surfaces are completely dry until a finish acceptable to the Departmental Representative achieved.
- .6 The cost of protection and stain prevention shall be included in the price bid. No separate or additional payment will be made for the cost of protecting the steel surfaces, nor for any cleaning, abrasive blasting or “weathering” made necessary by the Contractor’s work.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .2 CSA International
  - .1 CSA O86 Consolidation, Engineering Design in Wood.
  - .2 CSA O141, Softwood Lumber.
- .3 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber.

**1.2 ACTION AND INFORMATION SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 For prefabricated elements, submit manufacturer's instructions, printed product literature and data sheets including product characteristics, performance criteria, physical size, finish and limitations.
- .3 For shop or site fabricated elements, submit shop drawings showing complete details of the assembly, including connections and other details.
- .4 Submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

**1.3 QUALITY ASSURANCE**

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 Common Product Requirements and with Manufacturer's written instructions.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Wood: to NLGA standard Grading Rules for Canadian Lumber
- .2 Wood for decks surfaces and railings shall be D.Fir-Larch, No. 1 or better.
- .3 All other wood shall be Western Red Cedar, Structural No. 1 or better.
- .4 Wood shall be sound and free of major checks and cracks.
- .5 The appearance of all wood is subject to review by Departmental Representative.

- .6 All wood shall be unfinished – no preservative or finish treatments of any kind are acceptable.
- .7 All wood materials shall have a maximum moisture content of 15%.
- .8 Hex-head bolts, carriage bolts and other fasteners shall be stainless steel in accordance with ASTM Standard F593, or approved equivalent only.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Do wood work to CSA O86 except where specified otherwise.

END OF SECTION

**Part 1 General**

**1.1 NOMENCLATURE**

- .1 The terms “rock” and “stone” are used interchangeably within the Contract Documents. Both “rock” and “stone” refer to the same material.

**1.2 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 D698, Standard Test Methods For Laboratory Compaction Characteristics Of Soil Using Standard Effort.
  - .4 D4791, Standard Test Method For Flat Particles, Elongated Particles, Or Flat And Elongated Particles In Coarse Aggregate.
- .2 International Standards Organization (ISO)
  - .1 ISO565, Test Sieves - Metal Wire Cloth, Perforated Metal Plate And Electroformed Sheet - Nominal Sizes Of Openings.
- .3 Canadian Standards Association (CSA)
  - .1 A179, Mortar and Grout for Unit Masonry.
  - .2 A3001, Cementitious Materials for Use in Concrete.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one (1) sample of each material proposed for use.
  - .1 Size of sample to be appropriate for typical test procedures.
  - .2 Deliver sample to the PCA offices in WLNP or to another location acceptable to the Departmental Representative.
- .3 Produce a sample of exposed aggregate concrete, minimum 1.5m x 1.5m in size, to allow the Departmental Representative to assess the appearance of the proposed aggregate and the effectiveness of the methods proposed to expose those aggregates.
  - .1 Produce additional samples as required by the Departmental Representative.
  - .2 Once approved, the sample panel will be the basis for acceptance of the Work.

**1.4 QUALITY ASSURANCE**

- .1 Allow continual sampling by Departmental Representative during production.
- .2 Provide Departmental Representative with access to source and processed material for sampling.

- .3 Supply the Departmental Representative with clean sample bags or containers appropriate to aggregate materials being sampled.
- .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

## 1.5 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of materials and provide access for sampling a minimum of three (3) weeks before planned start of production.
- .2 If materials from proposed source do not meet the specified requirements, locate alternative source.
- .3 Advise Departmental Representative a minimum of two (2) weeks in advance of any proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if field performance is found to be unsatisfactory.

## Part 2 Products

### 2.1 AGGREGATE MATERIALS

- .1 Unless specifically noted, all materials shall be obtained from sources outside WLNP.
- .2 Aggregate shall be sound, hard, durable rock free from soft, thin, elongated or laminated particles, organic material, minerals, free from adhered coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .3 Aggregate shall be tested for flat and elongated particles using Method A of ASTM Standard D4791.
  - .1 Greatest dimension shall not exceed 5 times least dimension.
- .4 Fine aggregates shall be a blend of one or more of the following:
  - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .5 Coarse aggregates shall be a blend of one or more of the following:
  - .1 Crushed rock.
  - .2 Gravel composed of naturally formed particles of stone.
- .6 Gradation shall be determined in accordance with ASTM C117, using sieve sizes in accordance with ISO 565.
- .7 Gradation shall display a smooth curve when plotted on a semi-log grading chart, without sharp breaks.
- .8 Gradation shall be within the following limits:

Sieve Size (µm)	Percent Passing By Mass	
	Trail Base / Roadway Surface Material	Trail Surface Material

25 000	100	
20 000	82-97	
16 000	70-94	
10 000	52-79	
9 000		90-100
5 000	35-64	
4 500		70-100
1 250	18-43	
630	12-34	
425		40-70
315	8-26	
160	5-18	
75		<40
80	2-10	
50		>25

- .9 Aggregate materials shall display the following physical properties:

Property	Limit
% Fractured, 2 faces, by mass	60 min*
Los Angeles abrasion loss, %	45 max
Liquid limit, %	25 max
Plasticity index, %	6 max
Lightweight particles, by mass	5 max
California Bearing Ratio (CBR) (when compacted to 100% relative density in accordance with ASTM D698)	80 min

\* Limit applies to each sieve designation range, using ranges as defined in ASTM C136

## 2.2 PIT RUN GRAVEL

- .1 PCA will have pit run gravel available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
- .2 This material may be required for grading of trails to be abandoned and may be useful to the Contractor for temporary uses such as surfacing of laydown areas.

## 2.3 HEAVY ROCK RIPRAP

- .1 Heavy rock riprap supplied shall be hard, durable and angular in shape, resistant to weathering and water action, free from overburden, spoil, shale or shale seams and organic material, and shall meet the gradation requirements for the class specified.
- .2 In general, no sandstone will be permitted for all classes, however if the proposed material meets or exceeds the minimum requirements, consideration may be given to accepting the material. For these occurrences, further testing shall be done to ensure

acceptability. This would include testing of the material in accordance with CSA A23.2-15A "Petrographic Examination of Aggregates".

- .3 The minimum dimension of any single rock shall be not less than one third of its maximum dimension.
- .4 The minimum acceptable unit weight of the rock material is 2.5 t/m<sup>3</sup>.
- .5 The Contractor shall provide the Engineer with evidence of the acceptability of the heavy rock riprap material.
  - .1 Reliable performance records of proposed material, other than fieldstone, will be considered evidence of acceptability.
  - .2 Angular fieldstone shall be considered to have a reliable performance record, and will be accepted if it meets the gradation requirements.
  - .3 Sampling and testing are required for Class 2 and 3 heavy rock riprap for which no performance records are available. Sampling and testing are not required for Class 1 heavy rock riprap and field stone.
  - .4 Tests are based on the Durability Index and Durability Absorption Ratio as developed by the State of California, Department of Transportation.
  - .5 The Contractor shall submit samples of the proposed material to an independent certified testing laboratory of his choice and provide written reports of the test results to the Consultant.
  - .6 The reports shall be stamped by a Professional Engineer registered in the Province of Alberta.
  - .7 The Contractor shall be responsible for all associated costs for heavy rock riprap sample testing including, but not limited to, transporting samples to an independent certified testing laboratory, testing, disposing of samples after testing, and providing written reports to the Engineer.
  - .8 A representative sample of 70 kg minimum is required for each type and source of rock to be tested, and shall contain a number of pieces ranging up to 25 kg mass. The acceptance of rock samples from a particular source or quarry site shall not necessarily be construed as constituting acceptance of all material from that location.
- .6 The material provided shall meet the gradation requirements in Table 1:

Table 1:

GRADATION		HEAVY ROCK RIPRAP CLASS			
REQUIRED PROPERTIES	UNITS	1M	1	2	3
Nominal mass	kg	7	40	200	700
Nominal diameter	mm	175	300	500	800
None greater than	kg	40	130	700	1800
	mm	300	450	800	1100
20% to 50%	kg	10	70	300	1100



	mm	200	350	600	900
50% to 80%	kg	7	40	200	700
	mm	175	300	500	800
100% greater than	kg	3	10	40	200
	mm	125	200	300	500

- .1 Percentages quoted are by mass.  
Sizes quoted are equivalent spherical diameters, and are for guidance only.

- .7 PCA will have material suitable for use available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.

## 2.4 OTHER ROCK MATERIALS

- .1 Stone Steps
- .1 Rock for step construction shall be dense hard thick-bedded Wack-quartzite or approved equivalent only.
  - .2 One potential rock supplier is RSSS Quarries Ltd. of Cranbrook, BC. ([www.rsssrocksbc.com](http://www.rsssrocksbc.com)).
  - .3 Provide samples of the proposed material for review by the Departmental Representative.
- .2 Stone Features / Culverts / Curbs / Walls
- .1 Rock for stone features shall be hard, durable and angular in shape, resistant to weathering and water action, free from overburden, spoil, shale or shale seams and organic material.
  - .2 The minimum dimension of any single rock shall be not less than one third of its maximum dimension.
  - .3 The minimum acceptable unit weight of the rock is 2.5 t/m<sup>3</sup>.
  - .4 PCA will have material suitable for stone features available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
- .3 Flagstones
- .1 Flagstones will be supplied by PCA.
  - .2 PCA will have flagstones available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
- .4 All imported rock materials shall be produced by a rock quarry that follows recommended best practices with respect to invasive species (weeds).
- .1 Provide documentation of inspections and/or certifications relating to invasive species as required by the authority having jurisdiction over the quarry.

**Part 3            Execution**

**3.1                PREPARATION**

- .1      Use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .2      Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .3      Screen, crush, wash, classify and process aggregates with suitable equipment as required to meet specified requirements.
- .4      Blend aggregates as required to meet the specified requirements.
- .5      Use only methods and equipment approved in writing by Departmental Representative.

**3.2                STOCKPILING:**

- .1      Stockpile aggregates on site, at locations designated by the Departmental Representative.
- .2      Stockpile aggregates in sufficient quantities to meet project schedules.
- .3      Stockpile sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4      Provide suitable base materials to prevent contamination of aggregate.
- .5      Do not incorporate bottom 300 mm of stockpile into the work.
- .6      Separate different aggregates to prevent intermixing.
- .7      Do not use intermixed or contaminated materials.
- .8      Remove and dispose of rejected materials within 48 hours of rejection.
- .9      Do not cone piles or spill material over edges of piles.
- .10     Do not use conveying stackers.
- .11     Stockpile height shall not exceed 2 meters.
- .12     Prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

**END OF SECTION**

## **Part 1 General**

### **1.1 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A123, Standard Specification For Zinc (Hot-Dip Galvanized) Coatings On Iron And Steel Products.
  - .2 ASTM A313, Standard Specification for Stainless Steel Spring Wire.
  - .3 ASTM A764, Standard Specification for Metallic Coated Carbon Steel Wire, Coated at Size and Drawn to Size For Mechanical Springs.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Gabion baskets:
  - .1 Factory fabricated so that sides, ends, lid and internal diaphragms can be readily assembled at site into rectangular baskets of sizes as indicated.
  - .2 Single unit construction or with joints having strength and flexibility equal to that of mesh.
  - .3 Provide diaphragms of same mesh as gabion walls when length exceeds width. Number of diaphragms shall be sufficient to divide basket into equal cells of length not exceeding width.
  - .4 Wire mesh:
    - .1 Uniform hexagonal pattern wire woven in triple twist pattern with openings of approximately 80 x 100 mm, non-ravelling.
    - .2 Securely selvedge perimeter edges to form joints connecting selvedges with same strength as mesh body.
    - .3 Wire to have following dimensions:
      - .1 Mesh: Minimum 3.0 mm diameter.
      - .2 Selvedges: Minimum 3.8 mm diameter.
      - .3 Binding: Minimum 2.0 mm diameter.
    - .4 Wire shall be hot-dip galvanized with minimum coverage of 260 g/m2 in accordance with ASTM A123.
- .2 Stone fill:
  - .1 Hard, durable, abrasion resistant, capable of resisting degradation from action of wetting and drying and from freezing and thawing cycles.
  - .2 Minimum 100 mm to maximum 200 mm dimension for individual stones.

**Part 3            Execution**

**3.1                INSTALLATION**

- .1        Install gabions to lines and grades as indicated, as directed or as required.
- .2        Follow manufacturer's instructions with respect to assembly of baskets.
- .3        Do not place gabions below the high water level.

**3.2                PLACING GABIONS**

- .1        Place gabion baskets in position prior to filling with stones.
- .2        Join adjacent baskets together at corners. Ensure joints are as strong as mesh.

**3.3                FILLING BASKETS AND MATS**

- .1        On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce satisfactory alignment and appearance.
- .2        Place round cardboard forms (e.g. Sonotube) as required for anchorage of posts of other features. Place rock fill to provide uniform support around all sides of the form without crushing or otherwise damaging the form.
- .3        Fill gabion cells in lifts not to exceed 300 mm.
- .4        Connect opposite walls with tie wires after each lift, using size and spacing of tie wires recommended by the Manufacturer.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCE STANDARDS**

- .1    American Society for Testing and Materials (ASTM)
  - .1        D698, Standard Test Methods For Laboratory Compaction Characteristics Of Soil Using Standard Effort.
  - .2        D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

**1.2                PRODUCTS**

**1.3                NOT USED**

- .1    Not Used

**Part 2            Execution**

**2.1                FINISHING AND COMPACTING**

- .1    Scarify exposed surface to depth of 150 mm minimum before placing fill over existing ground.
- .2    Compact to the following corrected maximum dry density in accordance with ASTM D698, making adjustments to moisture content as required:
  - .1        85% under landscaped areas.
  - .2        95% under all other areas.
- .3    Field density of compacted soils shall be determined in accordance with ASTM D6938.
- .4    Compact to a level slightly above the desired grade, and cut back to the final elevation.
- .5    Remove all loose material from the subgrade surface.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 D698, Standard Test Methods For Laboratory Compaction Characteristics Of Soil Using Standard Effort.
  - .2 D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 PREPARATION**

- .1 The subgrade shall be in a firm dry condition and must be approved by the Departmental Representative before base course is placed.
- .2 The depositing of material on a soft, muddy or rutted subgrade will not be permitted.

**3.2 PLACING**

- .1 Place material on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
- .2 Place using methods which do not lead to segregation or degradation of aggregate. Use approved methods to create uniform windrow of material along a crown line or high side of a one-way slope.
- .3 Place material in layers not exceeding 150 mm in compacted thickness.
- .4 Shape each layer to a smooth contour and compact to the specified density before succeeding layer is placed.
- .5 Remove and replace any portion of a layer in which material becomes segregated.

**3.3 COMPACTING**

- .1 Moisture condition of granular base course and surface course materials shall be within plus or minus 3 percent of the optimum moisture content for the material.
- .2 Compact to the following corrected maximum dry density in accordance with ASTM D698:
  - .1 85% under landscaped areas.
  - .2 95% under all other areas.
- .3 Field density of compacted soils shall be determined in accordance with ASTM D6938.

- .4 Compact to a level slightly above the desired grade, and cut back to the final elevation.
- .5 Shape and compact alternately to obtain a smooth, even and uniformly compacted base.
- .6 Remove all loose material from the completed surface.

**3.4 FINISH TOLERANCES**

- .1 Finished surface shall be within plus or minus 25 mm of required grade, but not uniformly high or low.
- .2 Correct surface irregularities by loosening the surface, adding or removing materials and re-compacting until surface is within the specified tolerances.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 America Society for Testing and Materials (ASTM)
  - .1 D5, Standard Test Method for Penetration of Bituminous Materials
  - .2 D1856, Standard Test Method for Recovery of Asphalt From Solution by Abson Method.
  - .3 D3549, Standard Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 DEFINITIONS**

- .1 End Product Specification (EPS) – A specification whereby the methods of construction are not defined. Under EPS the Departmental Representative will monitor the Contractor's control of the process that produces the items of construction and will accept or reject the end product according to a specified acceptance plan. The Contractor is responsible for Quality Control. End product acceptance, including Quality Assurance is responsibility of the Departmental Representative. Asphalt Concrete Pavement (ACP) for this project is an EPS item.
- .2 Lot – A lot is a portion of the Work being considered for acceptance. For this project, each lot will consist of a contiguous area of a single mix type that is placed in a single day.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt mixes and aggregate and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 degrees C, to the Departmental Representative a minimum of four (4) weeks prior to planned start of paving work.
- .2 Samples:
  - .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling a minimum of four (4) weeks prior to planned start of paving work.



## 2.2 MIX DESIGN

- .1 Prepare and submit asphalt mix design to the Departmental Representative for review and approval at least two (2) weeks prior to the planned start of paving.
- .2 The mix design shall be submitted under the seal of a qualified professional engineer licensed to practice in the Province of Alberta.
- .3 The mix design shall follow the Marshall method of mix design as outlined in the latest edition of the Asphalt Institute Manual Series No. 2 (MS-2), and shall include five separate trial values of asphalt content.
- .4 Design of mix:
  - .1 Mix Type III – 75 blows on each face of test specimens.
- .5 Include the following data with mix design submission
  - .1 Aggregate specific gravity and asphalt absorption.
  - .2 Sand equivalent, coarse aggregate fracture, flat and elongated particles, and percent manufactured sand values.
  - .3 Asphalt cement supplier/refinery, specific gravity and mixing and compaction temperatures, based on temperature-viscosity properties of asphalt cement.
  - .4 Job mix formula including aggregate gradation and blending proportions, and design asphalt content.
  - .5 Maximum relative density at each trial asphalt content.
  - .6 Where reclaimed asphalt pavement (RAP) is to be incorporated into the mix supply, RAP gradation, RAP asphalt cement content and design recycle percentage.
- .6 The proposed mix shall meet the following requirements:

PROPERTY	REQUIREMENTS		
	Mix Type		
		III	
Marshall Stability (kN)		5.4 min.	
Marshall Flow (0.25 mm units)		8 – 14	
Air Voids (%)		2.8 – 3.2	
Voids in Mineral Aggregate (VMA) (%)		14.0 – 16.0	
Voids Filled With Asphalt (VFA) (%)		70 – 80	
Film Thickness (µm)		7.0 min.	

## 2.3 JOB MIX FORMULA

- .1 Subject to approval by the Departmental Representative, the aggregate proportioning (including RAP), target gradation, asphalt content and air void content from the Mix Design will become the Job Mix Formula (JMF) for the supply of hot mix asphalt.
- .2 Once established, no alterations to the Job Mix Formula will be permitted unless the Contractor submits a new Job Mix Formula and approved by the Departmental Representative.
- .3 If the sum of any alterations to the Job Mix Formula is in excess of any one of the following limits, a new Mix Design is required.
  - $\pm 5\%$  passing the 5 000  $\mu\text{m}$  sieve size
  - $\pm 1\%$  passing the 80 $\mu\text{m}$  sieve size
  - $\pm 0.30\%$  asphalt content
- .4 Any alteration to the Job Mix Formula shall not result in properties which do not meet the requirements of this Specification.

## 2.4 PRODUCTION TOLERANCES

- .1 All mixtures shall be supplied to the Job Mix Formula within the range of tolerances specified.
- .2 Asphalt cement content:  $\pm 0.30\%$  of JMF value.
- .3 Temperature: Mix temperature at point of plant discharge shall not vary from that specified in the JMF by more than  $\pm 10^{\circ}\text{C}$ .
- .4 Aggregate Gradation ( $\mu\text{m}$ ):

Max. Size to 5 000	$\pm 5.0$
2 500 & 1 250	$\pm 4.0$
630 & 315	$\pm 3.0$
160	$\pm 2.0$
80	$\pm 1.0$
- .5 Air Voids:  $\pm 1.0\%$  of the JMF value.
- .6 Moisture in Mix: Maximum permissible moisture, at point of plant discharge, is 0.2% by mass of mix.
- .7 Asphalt cement recovered from freshly produced hot mix by the Abson Method, ASTM D1856 and subsequently tested in accordance with ASTM D5, shall retain a minimum value of 50% of its original penetration value.

## **Part 3 Sampling And Testing**

### **3.1 GENERAL**

- .1 The Departmental Representative shall have access to all production processes and materials used for the work to monitor material quantity as often as deemed necessary. Such inspection and testing shall not relieve the Contractor of the responsibility for meeting the requirements of this specification.
- .2 At least four (4) weeks prior to commencing work, inform the Departmental Representative of the proposed source of aggregates and provide access for sampling, and provide samples of asphalt cement.

### **3.2 QUALITY CONTROL**

- .1 Quality control is the responsibility of the Contractor throughout every stage of the work from aggregate processing to the final accepted product. Tests performed by the Departmental Representative will not be considered as quality control tests.
- .2 The Contractor shall be totally responsible for production of materials and construction that meets all specified requirements.
- .3 All Quality Control shall be conducted by qualified personnel. The Contractor shall bear the cost of all Quality Control testing and consulting services.
- .4 Quality Control test data shall be reported to the Departmental Representative daily as the work proceeds.

### **3.3 ACCEPTANCE SAMPLING AND TESTING**

- .1 Within this specification, certain requirements, limits and tolerances are specified regarding supplied materials and workmanship. Compliance with these requirements shall be determined from acceptance testing as described in this section.
- .2 Acceptance testing is the responsibility of the Departmental Representative.
- .3 Sampling and acceptance testing is described in the table below.

Acceptance Testing Requirements

Acceptance Testing	Test Standard	Minimum Frequency
Hot Mix Asphalt Analysis (including Binder Content, Aggregate Gradation, Marshall Density, Maximum Relative Density, Void Properties, Marshall Stability and Flow)	ASTM D 6307 ASTM C 117 ASTM C 136 ASTM D 2041 ASTM D 3203	For each mix type, one test for each 3,500 sq.m. of placement, or three tests per lot, whichever is greater. See note 1.

Compaction Testing (Core Density) and Thickness Determination	ASTM D 2726 ASTM D 3549	For each mix type, one test for each 2,000 sq.m. of placement, or three tests per lot, whichever is greater.
Hot Mix Asphalt Temperature	-	No minimum frequency.

Note 1: The Departmental Representative may, at their discretion, acquire the minimum number of mix samples, but reduce the number of tests to a minimum of one (1). Should non-compliance be indicated by the sample(s) tested, the Departmental Representative reserves the option to test the remaining samples.

.4 Acceptance Sampling Procedures:

- .1 Loose mix samples shall be acquired from the Work site in accordance with Albert Transportation Test (ATT) procedure ATT-37. Auger samples may be used if approved by both the Departmental Representative and the Contractor.
- .2 The timing of mix sampling shall be stratified, with each sample representing a similar production quantity.
- .3 Core locations will be selected using stratified random sampling procedures. The lot will be divided into segments meeting or exceeding the minimum frequency and of approximately equal area. In each segment a test site will be located using random numbers to determine the longitudinal and transverse coordinates.

.5 Reporting Protocols

- .1 Test reporting accuracy shall be as stipulated in the referenced test procedures, including:
  - .1 Gradation to the nearest whole number, except the percent passing the 80  $\mu$ m sieve, which shall be reported to the nearest 0.1%.
  - .2 Binder content to the nearest 0.01%.
  - .3 Air voids and compaction to the nearest 0.1%.
  - .4 Thickness to the nearest whole millimeter (mm).
- .2 Lot averages shall be reported to the same accuracy as test results.

**Part 4 Execution**

**4.1 MIX PRODUCTION**

- .1 Preparation of Mineral Aggregate
  - .1 The Mineral aggregates shall be at as low a temperature as is consistent with proper mixing and lay down and in no case to exceed 165°C.
- .2 Composition of Mixture

- .1 The mineral aggregate, reclaimed asphalt pavement (where applicable) and asphalt cement shall be mixed in a manner to produce a homogeneous mixture in which all particles of the mineral aggregate are uniformly coated.
- .2 Incorporate RAP such that it does not come in direct contact with the burner flame.
- .3 Plant emissions shall not exceed the limits set by Alberta Environment.

#### **4.2 PREPARATION FOR PAVING**

- .1 The Contractor shall provide the Departmental Representative a minimum of six hours notice of the intention to commence paving over any previously approved primed or tacked surface.
- .2 The hot asphalt mixture shall be laid upon a dry firm surface, true to grade and cross section and free from all loose or foreign material. No hot mix shall be placed when the surface is wet or when other conditions prevent proper spreading, finishing or compaction.
- .3 If undercutting, and subsequent backfill with asphalt concrete is done, the backfill operation shall be performed sufficiently far ahead of the paving operation to allow the asphalt concrete time to cool down enough to support equipment.

#### **4.3 HOT MIX ASPHALT PLACING TEMPERATURE**

- .1 No hot mix asphalt shall be dispatched to the field unless the temperature, as issued by Environment Canada, is rising and meets the following minimum temperature requirements.
  - .1 Thickness less than 50 mm: 7°C
  - .2 Thickness greater than 50 mm: 2°C
- .2 A tolerance will be permitted for plant start-up.
- .3 No surface lift asphalt shall be placed regardless of ambient temperature until the road surface is 5°C or higher.

#### **4.4 HOURS OF OPERATION**

- .1 No loads of hot mix asphalt shall be dispatched from the plant after sunset or during hours of darkness unless loads can be placed and compacted in accordance with these specifications, and suitable artificial illumination is provided, all subject to the Departmental Representative's approval.

#### **4.5 TRANSPORTATION OF HOT MIX ASPHALT**

- .1 Trucks shall be equipped with tarpaulins of sufficient weights and size to cover the entire open area of the truck box. Regardless of weather conditions, tarpaulins shall be used.
- .2 Vehicles used for the transportation of hot mix asphalt from the plant to the site of work shall have tight metal boxes previously cleaned of all foreign matter. The inside surface may be lightly lubricated with a soap solution just before loading. Excess lubrication will not be permitted.

- .3 For purposes of checking asphalt mixture temperatures, trucks shall have an accessible 13 mm diameter hole drilled into the driver's side of the truck box, at a distance of 0.3 metres from the bottom of the box and 150 mm clear of the reinforcing ribs.
- .4 The speed and weight of hauling trucks shall be regulated so that, in the opinion of the Departmental Representative, no damage will occur to any portion of the work underway. The Contractor at their own expense shall repair any damage to the tack coat, prime coat or the existing surface caused by the Contractor's equipment.

#### **4.6 HOT MIX ASPHALT SPREADERS**

- .1 The spreading machine shall be self-propelled and capable of placing a uniform layer of asphalt mix to the depth and grades as shown on the plans or as indicated by the Departmental Representative.
- .2 The screed shall include a tamping bar or vibratory strike-off device for use when required. The screed shall strike-off the mix to the depth and cross-section specified and produces a finished surface of uniform texture.
- .3 Control of the screed shall be by automatic sensing devices. Longitudinal control shall be accomplished by a sensor, which follows a string line, ski, or other reference. The grade sensor shall be movable and mounts provided so that grade control can be established on either side of the paver. A slope control sensor shall also be provided to maintain the proper transverse slope of the screed. Use automatic grade control for paving operations.

#### **4.7 HAND TOOLS**

- .1 Only lutes shall be used during the spreading operation and when the asphalt is worked by hand in areas in which the paver cannot reach.
- .2 Tamping irons may be used to consolidate the material in areas inaccessible to the rollers. Mechanical compaction equipment, satisfactory to the Departmental Representative, may be used instead of tamping irons.
- .3 For purposes of checking the finished surface, the Contractor must provide and carry on each paving machine a 3 metre straight edge and slope measuring level.

#### **4.8 PRE-LEVELLING FOR ASPHALT CONCRETE**

- .1 Pre-levelling of uneven surfaces over which asphalt concrete is to be placed shall be accomplished by the use of asphalt concrete placed with a grader, paver, hand or by a combination of these methods.
- .2 After placement, the asphalt concrete used for pre-levelling shall be compacted thoroughly with pneumatic tired rollers.

#### **4.9 PAVING OPERATIONS**

- .1 The asphalt concrete shall be placed to the design thickness as shown on the contract drawings. On new construction where an established reference is lacking, a string-line reference will be required. Adjacent mats on the same lift are to be controlled by use of the grade sensor. No relaxation of the above procedure will be permitted without written approval of the Departmental Representative.

- .2 The spreader shall be operated in such a manner as to distribute the asphalt concrete mix to proper cross section, width and thickness without causing segregation of the mix. Segregated areas, which may occur, shall be corrected immediately. The forward motion of the spreader shall be controlled so that no irregularities in the pavement surface are caused by excessive speed. The rate of placement of the mixture shall be uniform, and shall be co-ordinated with the production rate of the asphalt plant without intermittent operation of the spreader.
- .3 Any failure of the machine or operation to produce a smooth, uniformly dense mat, free from irregularities, shall be corrected immediately to the satisfaction of the Departmental Representative.

#### **4.10 AREAS INACCESSIBLE TO THE PAVING MACHINE**

- .1 Areas that are inaccessible to the paving machine may be paved by other methods, as approved by the Departmental Representative.
- .2 In small areas or where the use of mechanical equipment is not practical, the mix may be spread and finished by hand. The asphalt mixture shall be dumped on the area and immediately thereafter distributed into place by shovels and spread with lutes in a loose uniform layer uniform density and correct depth. Material must be handled so as to avoid segregation.

#### **4.11 COMPACTION**

- .1 The Contractor shall supply sufficient compaction equipment to:
  - .1 Provide a compaction rate that will equal or exceed the placing rate of the spreader.
  - .2 Ensure the specified compaction is attained before the temperature of the mat falls below 80°C.

#### **4.12 LONGITUDINAL AND TRANSVERSE JOINTS**

- .1 Longitudinal and transverse joints shall be made in a manner consistent with industry standards. Coarse aggregate removed from the hot mix during joint preparation shall not be broadcast onto the mat.
- .2 Paving joints shall not be placed in the same vertical plane. Longitudinal joints shall be offset at least 150 mm and transverse joints shall be offset at least 2 metres.
- .3 Longitudinal joints shall not be located within travel lanes, unless approved by the Departmental Representative.
- .4 Edges where additional pavement is to be placed shall be vertically formed to true line. A lute shall be used immediately behind the paver when required to obtain a true line and vertical edge.
- .5 At the end of each day's paving of the surface course and upper lift of the base course mix, the uncompleted paving mats shall be provided with vertically cut transverse joints. Joints between old and new pavements or between successive days' work shall be carefully made in such a manner as to ensure a thorough and continuous bond between the old and new surfaces.

#### **4.13 OPENING TO TRAFFIC**

- .1 Prior to any application of traffic, paving mats shall be sufficiently cool to resist and deformation or surface scuffing.
- .2 The Departmental Representative may, at their discretion, require means of cooling (e.g. application of water) completed pavements prior to opening to traffic.
- .3 At their discretion, the Departmental Representative may prohibit traffic from travelling on newly paved surfaces for any length of time deemed necessary.

### **Part 5 Quality Control**

#### **5.1 QUALITY CONTROL**

- .1 The Contractor shall provide an end product conforming to the quantity and tolerance requirements of this specification. Where no tolerances are specified, the standard of workmanship shall be in accordance with accepted industry standards.
- .2 Acceptance of any Lot at full or increased payment will occur if there are no obvious defects and the Lot mean results for asphalt content, pavement density, and thickness meet or exceed the specified tolerances.

#### **5.2 PAVEMENT COMPACTION FOR MACHINE PLACED ASPHALT**

- .1 For full or increased payment, the Lot Mean Pavement Compaction must be equal to or greater than 93% of the Lot Mean Maximum Relative Density.
- .2 Payment adjustment for pavement compaction is as follows:

Pavement Compaction % of Maximum Relative Density	Payment Adjustment Factor
94.6 to 95.5 (Note 1)	1.03
93.5 to 94.5 (Note 1)	1.02
93.0 to 93.4	1.00
90.0 to 92.9	As per Chart B
Less than 90.0	Reject (Note 2)

Note 1: Where no individual test result is less than 93% otherwise the payment adjustment factor is 1.00.

Note 2: Subject to removal and replacement at the discretion of the Departmental Representative.



**5.3 THICKNESS (NEW CONSTRUCTION AND TOP LIFT ONLY)**

- .1 Pavement of any type found to be deficient in thickness by more than 7.0 mm shall be removed and replaced by pavement of specified thickness, at the Contractor's expense.
- .2 The Lot Mean Thickness for any Lot will be determined on the basis of the acceptance cores. Core thickness shall be determined in accordance with ASTM D3549.
- .3 If the deficiency of any individual core exceeds 7 mm, additional cores may be extracted in the proximity to the location of the core of excessive deficiency, to identify the extremities of the pavement area subject to be removed and replaced. The Contractor shall pay for such additional coring.
- .4 For full payment, the Lot Mean Thickness must be equal to, or greater than, the specified thickness.
- .5 Payment adjustment for the thickness is as follows:

Average Thickness Compared to Specified Thickness	Payment Adjustment Factor (Note 1)	
	Total Thickness (Single or Multiple Lifts)	Top Lift Thickness (Multiple Lifts)
Compliant or Greater	1.00	1.00
More than 7 mm Deficient	Reject (Note 1)	Reject (Note 1)

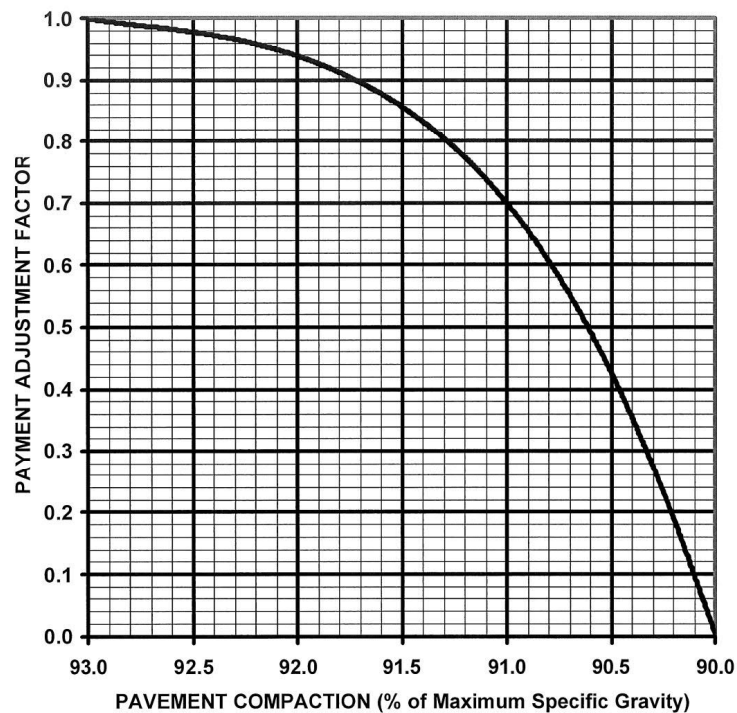
Note 1: Subject to removal and replacement at the discretion of the Departmental Representative.

**5.4 SEGREGATION**

- .1 The finished surface shall have a uniform texture and be free of segregated areas. A segregated area is defined as an area of the pavement where the texture differs visually from the texture of the surrounding pavement.
- .2 All segregation will be evaluated by the Departmental Representative to determine repair requirements.
- .3 The severity of segregation will be rated as follows:
  - .1 Slight: The matrix of asphalt cement and fine aggregates is in place between the coarse aggregate particles, however there is more stone in comparison to the surrounding acceptable mix.
  - .2 Moderate: Significantly more stone than the surrounding mix, and exhibit a lack of surrounding matrix.
  - .3 Severe: Appears as an area of very stony mix, stone against stone, with very little or no matrix.
- .4 Segregated areas shall be repaired by the Contractor. The following methods of repair are identified.
  - .1 Slight: Squeegee asphalt to completely fill the surface voids.

- .2 Moderate: Slurry seal for full mat width.
- .3 Severe: Removal and replacement or overlay.
- .5 All repairs shall be regular in shape and finished using good workmanship practices to provide and appearance suitable to the Departmental Representative.
- .6 Any other methods of repair proposed by the Contractor will be subject to the approval of the Departmental Representative.
- .7 Repairs will be carried out by the Contractor at their expense.

**CHART B**  
**COMPACTION**  
**PAYMENT ADJUSTMENT FACTOR**



**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 America Society for Testing and Materials (ASTM)
  - .1 D140, Standard Practice For Sampling Bituminous Materials.

**1.2 MEASUREMENT PROCEDURES**

- .1 Asphalt prime coat will not be measured for payment. It is considered incidental to asphalt paving.

**1.3 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit two -1 L samples of asphalt primer proposed for use in clean, air tight sealed, wide mouth, plastic lined cans.
- .3 Submit to Departmental Representative at least two (2) weeks prior to planned start of paving.
- .4 Samples shall be gathered in accordance with ASTM D140.

**1.4 QUALITY ASSURANCE**

- .1 Submit manufacturer's test data and certification that asphalt prime coat material meets requirements of this section.

**Part 2 Products**

**2.1 MATERIAL**

- .1 Asphalt material: CGSB-16.2 grade SS-1.
- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter

**Part 3 Execution**

**3.1 EQUIPMENT**

- .1 Pressure distributor to be:
  - .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 5 m.
    - .3 Applied at controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.

- .4 Distributed in uniform spray without atomization at temperature required.
- .2 Equipped with meter registering meters of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
- .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
- .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
- .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.
- .8 Cleaned if previously used with incompatible asphalt material.

### **3.2 APPLICATION**

- .1 Obtain Departmental Representative approval of granular base surface before applying asphalt prime coat.
- .2 Apply asphalt prime coat at rate not to exceed 2 L/m<sup>2</sup>.
- .3 Do not apply on wet or frozen surfaces.
- .4 Do not apply prime coat when air temperature is less than 10 °C or when rain is forecast within 2 hours.
- .5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .6 Prevent overlap at junction of applications.
- .7 Do not prime surfaces that will be visible when paving is complete.
- .8 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .9 Keep traffic off primed areas until asphalt prime has cured.
- .10 Permit prime to cure before placing asphalt paving.

### **3.3 USE OF SAND BLOTTER**

- .1 If asphalt prime coat fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess primer to be absorbed as directed departmental Representative.
- .3 Apply second application of sand blotter as required.
- .4 Sweep and remove excess blotter material.

**END OF SECTION**

**Part 1 General**

**1.1 GOVERNING SPECIFICATIONS**

- .1 Complete pavement markings in accordance with Section 19 “PAINTED ROADWAY MARKINGS” of the Alberta Transportation Standard Specifications for Bridge Construction, Edition 16, 2017 (SSBC) and Section 7.2 “PAINTED ROADWAY LINES” of the Alberta Transportation Standard Specifications for Highway Construction, Edition 15, 2013 (SSHC).
- .2 SSBC may be downloaded from the Alberta Transportation website at the following link:  
  
<http://www.transportation.alberta.ca/Content/docType246/Production/StandardSpecificationsforBridgeConstruction2017.pdf>
- .3 SSHC may be downloaded from the Alberta Transportation website at the following link:  
  
[http://www.transportation.alberta.ca/images/Standard\\_Specifications\\_for\\_Highway\\_Construction\\_2013.pdf](http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf)

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 PARKING LOT PAVEMENT MARKINGS**

- .1 Parking stall pavement lines shall be white paint and 150 mm wide.
- .2 Parking medians shall be yellow paint. Fill pattern shall be alternating 150 mm wide lines and 150 mm spaces. Lines shall be placed at a 45 degree angle to the primary direction of the median.
- .3 Handicap parking spots shall be identified by the International Symbol for Access in accordance with ISO Standard 7001. The height of the symbol shall be at least 1000 mm.

**3.2 CROSSWALK PAVEMENT MARKINGS**

- .1 Crosswalk pavement lines shall be white paint.
- .2 Crossings shall be “zebra” style, consisting of 600 mm wide painted bands with 600 mm clear between each band.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA-Z809, Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001, FSC Principle and Criteria for Forest Stewardship.
- .3 Sustainable Forestry Initiative (SFI)
  - .1 SFI Standard.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's instructions, printed product literature and data sheets for furnishings, including product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Provide maintenance data for care and cleaning of site furnishings for incorporation into a Maintenance Manual at project close-out.
- .3 Shop Drawings:
  - .1 Submit shop drawings for each site furniture element, which includes the model number, colour and finish, dimensions, sizes, assembly instructions, mounting/anchorage and installation details and quantity for each furnishing specified, for approval prior to ordering.

**1.3 QUALITY ASSURANCE**

- .1 Sustainable Standards Certification:
  - .1 Certified Wood: Provide listing of wood products and materials used in accordance with CSA-Z809, FSC or SFI.
  - .2 Recycled Plastic: Material must be made with 100% recycled plastic.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 Common Product Requirements and with Manufacturer's written instructions.

**Part 2 Products**

**2.1 BENCHES**

- .1 Type 1 New Bench: The following specifications shall apply to the new benches at a minimum:

- .1 Benches shall be 1830 mm in length with steel end arm rests (each end), with backs and available in both a surface mount and in-ground mount installation type.
- .2 Bench planks shall be 89 mm x 89 mm or 38 mm x 89 mm and made of a 100% recycled plastic guaranteed to be a consistent material throughout the length of each plank that will not rot, warp, split or twist in direct sunlight and cold or hot temperatures ranging from -40°C to +30°C.
- .3 Planks must be in a dark brown color. Provide sample for approval prior to ordering.
- .4 Steel type: 89 mm x 10 mm flat bar frame with 76 mm x 51 mm rectangular tube legs.
- .5 Frame and bracing must be constructed of galvanized steel.
- .6 All hardware must be stainless steel or galvanized steel.
- .7 In ground installation: by concrete footing, where indicated in the drawings. Concrete footing as per manufacturer's specifications.
- .8 Surface mounted installation: by threaded rod anchored to concrete paving or concrete pad, where indicated on the drawings. Anchoring as per the manufacturer's specifications.
- .9 Bench manufacturer to provide a minimum 15-year warranty on the bench planks.
- .10 Type 1 New Benches shall be manufactured by one of the following suppliers, or approved equivalent only:
  - .1 Maglin Site Furniture Inc.,  
27 Bysham Park Drive, Woodstock, Ontario  
N4T 1P1 Canada.  
Toll Free: (800) 716.5506  
Phone: (519) 539.6776  
Fax: (877) 260.9393  
Website: [www.maglin.com](http://www.maglin.com)  
E-mail: [sales@maglin.com](mailto:sales@maglin.com)
- .2 Type 2 New Bench: The above specifications shall apply to the new Type 2 benches at a minimum, and including the following:
  - .1 Type 2 Benches shall be curved, with standard radii available to match dimensions in the drawings.
  - .2 Benches to include options with backs and wall mount with wall mount brackets.
  - .3 Type 1 New Benches shall be manufactured by one of the following suppliers, or approved equivalent only:
    - .1 Maglin Site Furniture Inc.,  
27 Bysham Park Drive, Woodstock, Ontario  
N4T 1P1 Canada.  
Toll Free: (800) 716.5506  
Phone: (519) 539.6776  
Fax: (877) 260.9393  
Website: [www.maglin.com](http://www.maglin.com)  
E-mail: [sales@maglin.com](mailto:sales@maglin.com)



.3 New Backless Timber Bench

- .1 New Backless Timber Bench shall be constructed on site with dimensions as indicated.

**2.2 GARBAGE BINS**

.1 New Garbage Bins

- .1 New Garbage Bins shall be Hide-A-Bag II (Haul-All) SP-HBIIS-N complete with HBII-572 concrete pads.

**2.3 BICYCLE RACKS**

.1 Bicycle Racks shall be the following, or approved equivalent only:

- .1 Model MBR350 (standard 4 rings) as manufactured by:

.1 Maglin Site Furniture Inc.,  
27 Bysham Park Drive, Woodstock, Ontario  
N4T 1P1 Canada.  
Toll Free: (800) 716.5506  
Phone: (519) 539.6776  
Fax: (877) 260.9393  
Website: [www.maglin.com](http://www.maglin.com)  
E-mail: [sales@maglin.com](mailto:sales@maglin.com)

- .2 Install bicycle racks in accordance with Manufacturer's installation guidelines.

- .3 Anchor bicycle racks securely in place.

**2.4 PICNIC TABLES**

.1 The following specifications shall apply to the new picnic tables at a minimum:

- .1 Standard picnic tables must be freestanding and 1830 mm in length.
- .2 Accessible picnic tables shall be equipped with an additional 610 mm extension.
- .3 Surface Mounted Picnic Tables: by threaded rod anchored to a concrete pad, where indicated on the drawings. Anchoring as per the manufacturer's specifications.
- .4 Moveable Picnic Tables: No anchoring required for moveable picnic tables.
- .5 Picnic table planks shall be 51 x 152 (wider planks will be considered upon review) and made of a 100% recycled plastic guaranteed to be a consistent material throughout the length of each plank that will not rot, warp, split or twist in direct sunlight and cold or hot temperatures ranging from -40°C to +30°C. Plank sample to be provided for approval.
- .6 Planks must be in a dark brown color. Color sample to be provided for approval
- .7 Maximum acceptable clear span between supports along the length of the planks is 550 mm.
- .8 Maximum acceptable overhang of planks is 254 mm. Exception for extended accessible tables may be considered.
- .9 Each table must be equipped with a sturdy non-flammable rust-resistant platform adequate for a tabletop barbeque or propane stove, which attaches to and extends

past the 1830 mm length of a table. The tray must be equipped with diagonal supports on both sides.

- .10 Step thru frame design (no A-frame).
- .11 Frame must be a minimum of 60 mm diameter.
- .12 Frame and bracing must be constructed of galvanized steel.
- .13 All hardware must be stainless steel or galvanized steel.
- .14 Picnic table weight must be a minimum of 80 kg.
- .15 The picnic table manufacturer to provide a minimum 15-year warranty on the picnic table planks.

## **2.5 CONCRETE CURB STOPS**

- .1 New Concrete Curbs
  - .1 New Concrete Curbs shall be as follows:
    - .1 Precast under controlled plant conditions.
    - .2 Minimum 180 mm tall x 180 mm wide x 2 100 mm long.
    - .3 Supplied complete with hardware (pins) required for installation unless stated otherwise.

## **2.6 TIMBER FEATURES**

- .1 Timber features shall be Douglas Fir or approved equivalent only.
- .2 Minimum diameter of 300 mm, minimum length of 2400 mm.
- .3 Flat bottom surface.
- .4 All surfaces shall be free of loose bark of other debris.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Identify, locate and protect utility lines.
- .2 Notify and acquire written acknowledgement from utility authorities before beginning installation Work

### **3.2 INSTALLATION**

- .1 Assemble furnishings in accordance with manufacturer's written recommendations.
- .2 Install furnishings in accordance with manufacturer's written recommendations or as shown on contract drawings.
- .3 Touch-up damaged finishes to approval of Departmental Representative.

### **3.3 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 SCOPE**

- .1 This section describes construction features for the different types of trail construction required as part of the Work.

**Part 2 Products**

**2.1 AGGREGATE AND ROCK MATERIALS**

- .1 Refer to Section 31 05 16.

**2.2 CROWNED (GRANULAR) TRAIL**

- .1 Remove organic material to a minimum depth of 50 mm. If ground disturbance for removal of organic material is greater than 50 mm in depth, inform the Departmental Representative prior to proceeding.
- .2 Small trees or shrubs within the trail alignment shall be completely removed, including root balls. Fill the resulting depression as follows:
  - .1 250 mm or less in depth: existing locally-excavated material.
  - .2 Greater than 250 mm in depth: fill with Trail Base Material, compacted in maximum 150 mm lifts and to a minimum SPD of 98%.

**2.3 TRAIL AND PICNIC AREA IMPROVEMENTS**

- .1 To be constructed by grading existing trails and reusing existing materials to fill depressions and/or to improve and correct drainage.
- .2 Small trees or shrubs within the trail alignment shall be completely removed, including root balls.
- .3 Fill any depressions in the trail surface as follows:
  - .1 250 mm or less in depth: existing locally-excavated material.
  - .2 Greater than 250 mm in depth: fill with Trail Base Material, compacted in maximum 150 mm lifts and to a minimum SPD of 98%.
- .4 Spread any excess removed material on the downslope side of the trail, ensuring that placement doesn't affect the natural drainage for the area. Placement of excess material shall be dispersed such that no large piles remain preventing growth of existing organic material.

**2.4 ASPHALT OVERLAY**

- .1 Asphalt overlay to be in accordance with Section 32 00 03 –Asphalt Concrete Pavement and Section 32 12 13 – Asphalt Prime Coat.

**2.5 ASPHALT TRAIL**

- .1 Asphalt trail to be in accordance with Section 32 00 03 –Asphalt Concrete Pavement.

## **2.6 ABANDONED TRAIL RECLAMATION**

- .1 Existing trails being removed / abandoned shall be reclaimed as follows:
  - .1 Strip organic material from the trail area. Where there is no existing organic material to be removed, scarify existing trail surface to a minimum depth of 50 mm.
  - .2 Wherever possible, maintain vegetation intact in the form of sods.
  - .3 Temporarily store removed organic material and vegetation adjacent to the trail, vegetation side up.
  - .4 Refer to Section 02 41 13 Selective Site Demolition for additional information regarding partial sod salvage.
  - .5 Place and compact locally excavated mineral soil and/or pit run gravel imported from the Red Rock Soil Management Site (SMS) to match the ground surface adjacent to the trail, making allowance for the organic material to be replaced and ensuring positive drainage of all areas.
  - .6 Replace the organic soil and vegetation removed and stored in Step 1.

## **2.7 TRAIL DRAINAGE IMPROVEMENTS**

- .1 Drainage Depressions
  - .1 Construct drainage depressions by locally grading existing trails to create a depression in the trail surface to allow for water flow directly down the hill.
- .2 Rock Waterbar
  - .1 Material for waterbar will be provided by PCA. Material is available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
  - .2 Rock waterbar material is a screened drainage material ranging in gradation from 25 mm to 80 mm in size. The drainage stone is intended to contain voids within the aggregate matrix after placement.
  - .3 Construct a 150 mm depression in trail after trail installation prior to installation of the rock waterbar material.
  - .4 Install compacted rock material at a 30 – 40 degree angle to the trail surface.
  - .5 Extend 1.0 m from the edge of the trail to deflect the run-off water from the trail surface and into the surrounding vegetation.

## **Part 3 Execution**

### **3.1 INSPECTION**

- .1 Before proceeding with any trail construction schedule a mandatory site review with Departmental Representative to ensure a good understanding of the work conditions and the schedule of the work is to be arranged by the Contractor.
- .2 Cooperation and agreement on the methods to complete trail work is very important to successful trail construction.
- .3 Work limits are to be staked by Contractor prior to construction.

### **3.2 PREPARATION**

- .1 For removal of organic sod material to be reused (partial sod salvage), refer to Section 02 41 13 Selective Site Demolition.
- .2 Contractor shall maintain the subgrade to the specified standards, free from ruts, waves and undulations until either granular base is placed or rock installation. The subgrade shall be in a firm dry condition and must be approved by the Departmental Representative before installation. The depositing of granular base or rock placement on a soft, muddy or rutted subgrade will not be permitted.

### **3.3 EQUIPMENT AND WORK PLACE**

- .1 Standard landscaping construction hand and portable equipment shall be used for all construction work.
- .2 Trails are not easily accessible with motorized equipment and other equipment commonly used for construction work.
- .3 Departmental Representative shall approve all operations during the duration of construction. Contractor must work with the Departmental Representative in a mutually respectful manner in order to achieve a quality end product for the trail reconstruction work. This respect and cooperation is required to fully understand conditions of existing trail and the best method for trail construction and for trail drainage improvements.

### **3.4 TRAIL COMPACTION**

- .1 Compact all sub-grade and base areas to minimum 95% standard Proctor density (SPD).
- .2 Apply additional water for compaction as necessary. If water is required for compaction, request information from the Departmental Representative with respect to water source locations. Water for the construction work may be available at the Parks Compound location if approved by the Departmental Representative. Contractor to provide all fittings, hoses, containers, etc. to facilitate use of water in compaction.
- .3 Ensure identified trail cross section or crowned slope is made at the top area of the trail surface.

### **3.5 TRAIL DRAINAGE IMPROVEMENTS CONSTRUCTION**

- .1 Stake proposed locations for trail drainage improvements and review with the Departmental Representative prior to construction.

### **3.6 FINISH TOLERANCES**

- .1 Finished trail elevations shall be within plus or minus 10 mm of desired grade, but not uniformly high or low.
- .2 Correct surface irregularities by loosening then adding and/or removing material and re-compacting to achieve the desirable elevation.

### **3.7 MAINTENANCE**

- .1 Maintain base grade in a condition conforming to this section until succeeding material is applied or until acceptance.

**END OF SECTION**

**Part 1 General**

**1.1 SCOPE**

- .1 This section describes the construction requirements for various types of Stone Work required as part of the Work.

**1.2 PROJECT CONDITIONS FOR STONE MASONRY WORK**

- .1 Do not do stone masonry work unless air temperatures are between 4°C and 27°C and are predicted to remain so for at least 48 hours after completion of work.

**1.3 QUALITY ASSURANCE**

- .1 Stone masons shall be certified under the Interprovincial Standards Red Seal Program.
- .2 Flagstone Layout and Pointing:
  - .1 Prepare a sample area minimum 2m by 2m in size to demonstrate the proposed flagstone layout, placement methods, joint sizes, pointing details and quality of workmanship to be expected.
  - .2 Once approved, the sample area will be the basis for acceptance of the Work.

**1.4 SAMPLES**

- .1 At least three (3) weeks prior to commencing work, provide Departmental Representative with rock samples, source of stone work materials and supplier information. The Departmental Representative will review and approve the rock material for use within the project.

**Part 2 Products**

**2.1 STONE STEPS**

- .1 Stone step size shall be the following:
  - .1 Typical stone steps shall be rectangular, a minimum of 200 mm thick x 1200 mm wide x 600 mm long.
  - .2 Foundations steps shall be rectangular, a minimum of 1200 mm wide x 300 mm long, with the minimum thickness as shown on the Drawings. The minimum weight of each element shall be 300 kg.
- .2 Rock material shall be in accordance with Section 31 05 16.
- .3 Stone steps shall be laid out with a riser height of 200 mm to 250 mm and a minimum tread length of 300 mm.
- .4 Each step shall be placed so that the top surface of the step is a cut surface.
- .5 The riser face perimeter edges shall be hand chiseled.
- .6 The riser face shall be finished with an acetylene-fired flamed finished.



- .7 Stone steps shall be fully supported with no movement. If required, provide granular material base to ensure stone steps are free of any movement after placement. Supply and placement of granular material (if required) will be considered incidental to stone step installation.

## **2.2 STONE CURBS**

- .1 Stone curb rock material sizes shall be the following:
  - .1 Stone curbs shall be rectangular, minimum of 300 mm deep x 1100 mm long x 200 mm wide.
- .2 Rock material shall be in accordance with Section 31 05 16.
- .3 Stone curbs shall be placed so that the finished cut face is the top surface.
- .4 Stone curbs shall be fully supported with no movement. If required, provide rock mortar base below and/or between levels to ensure stone curbs are free of any movement after placement. Supply and placement of rock mortar (if required) will be considered incidental to stone curb installation.

## **2.3 STONE CULVERTS**

- .1 Rock material shall be in accordance with Section 31 05 16.
- .2 Stone culverts shall be fully supported with no movement. If required, provide rock mortar base below and/or between levels to ensure stone culverts are free of any movement after placement. Supply and placement of rock mortar (if required) will be considered incidental to stone culvert installation.

## **2.4 STONE FEATURES**

- .1 Rocks and boulders to be used for stone features shall be obtained on site whenever feasible.
- .2 Boulders obtained on site for re-use as stone features shall be stockpiled on site for review and acceptance by the Departmental Representative.
- .3 The locations and quantities shown on the Drawings are approximate and to be used as a guide. Final locations and quantity will be reviewed on site with the Departmental Representative at construction start-up and throughout construction.
- .4 When no rocks or boulders are available on site, PCA will have material suitable for stone features available for pickup at no cost from the Red Rock Soil Management Site (SMS), located off the Red Rock Parkway approximately 1.2 km from the intersection with Highway 5.
- .5 The rocks shall be hard, durable, resistant to weathering and water action, free from overburden, spoil, shale or shale seams and organic material.
- .6 The rocks shall be round or angular in shape with minimal sharp angles.
- .7 Stone feature material sizes shall be the following:
  - .1 The minimum dimensions range from 300mm x 300mm to a maximum size of 800mm x 800mm.

- .2 The minimum dimension of any single rock shall be not less than one third of its maximum dimension.
- .3 The minimum acceptable unit weight of the rock is 2.5 t/m<sup>3</sup>.
- .8 All imported rock materials shall be produced by a rock quarry that follows recommended best practices with respect to invasive species (weeds).
  - .1 Provide documentation of inspections and/or certifications relating to invasive species as required by the authority having jurisdiction over the quarry.

## **2.5 ROCK MORTAR**

- .1 Mortar for rock construction shall confirm to CSA A179. SikaMur-102 Masonry or approved equivalent only.

## **2.6 FLAGSTONE PAVING**

- .1 Mortar Materials
  - .1 Portland Cement: ASTM C 150, Type I.
  - .2 Hydrated Lime: ASTM C 207, Type S.
  - .3 Mortar Aggregate: Natural or manufactured sand. Sand with rounded edges shall be used for pointing mortar.
  - .4 Water: Clean, free of oils, acids, alkalis and organic matter.
- .2 Cleaning Materials and Equipment
  - .1 Limestone Cleaner: Manufacturers as indicated below for cleaning for cut and rough cut limestone.
  - .2 Approved Manufacturers:
    - .1 Sika Corporation
    - .2 ProSoCo Inc.
    - .3 Thuro
  - .3 Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
    - .1 Warm Water: Heat water to a temperature between 60°C and 82°C.
    - .2 Brushes: Fiber bristle only.
- .3 Pointing Mortar
  - .1 Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure.
  - .2 Mix materials in a clean mechanical batch mixer.
  - .3 Thoroughly mix cementitious and aggregate materials together before adding any water.
  - .4 Continue to mix, again only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball.
  - .5 Maintain mortar in this dampened condition for between 1 and 2 hours.
  - .6 Add remaining water in small portions until mortar of desired consistency is reached.

- .7 Use mortar within 30 minutes of final mixing.
- .8 Do not retemper or use partially hardened material.

### **Part 3 Execution**

#### **3.1 INSPECTION**

- .1 Before starting any stone work, arrange a meeting at site with the Departmental Representative to discuss expectations and to confirm location and other details.
- .2 Contractor to review and inspect flagstone materials prior to construction and bring forward any issues or concerns that may inhibit the final product prior to starting work.

#### **3.2 PREPARATION**

- .1 Contractor shall maintain the subgrade to the specified installation, free from ruts, waves and undulations until either granular base is placed or rock installation. The subgrade shall be in a firm dry condition and must be approved by the Departmental Representative before installation. The depositing of granular base or rock placement on a soft, muddy or rutted subgrade will not be permitted.

#### **3.3 POINTING MASONRY**

- .1 Joint Pointing:
  - .1 Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
  - .2 Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 10mm until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
  - .3 After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Take care not to spread mortar over edges onto exposed masonry surfaces, or to feather edge mortar.
  - .4 When mortar is thumbprint hard, tool joints to match required appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
  - .5 Cure mortar by maintaining in a damp condition for not less than 72 hours.
  - .6 The Departmental Representative shall have the right to perform periodic tests to verify depth of repointing. Contractor shall repair with like materials area where mortar has been removed to ascertain depth of repointing.
- .2 Cleaning
  - .1 Prevent grout or mortar used in pointing and from staining face of surrounding flagstone and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.

- .2 After mortar has fully hardened thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
- .3 Use of metal scrapers or brushes will not be permitted.
- .4 Use of acid or alkali cleaning agents will not be permitted.

### **3.4 EQUIPMENT AND WORK PLACE**

- .1 Standard landscaping construction hand and portable equipment shall be used for all construction work. The Contractor must be very familiar with the terrain, the steep grades, and bedrock materials as work is located in mountainous terrain.

### **3.5 CONSTRUCTION**

- .1 All exposed vertical stone surfaces shall be backfilled within one week of placement.
- .2 Place 25 mm minus crushed gravel backfill a minimum of 50 mm above the bottom of all exposed vertical faces, to redirect run-off away from the steps.

**END OF SECTION**

**Part 1 General**

**1.1 NOT USED**

**Part 2 Materials**

**2.1 TOPSOIL / SOD**

- .1 No topsoil or sod is to be imported from outside WLNP. All native sods are to be salvaged from the site (See Section 02 41 13 Selective Site Demolition)

**2.2 SALVAGED LOGS, ROCKS, AND STUMPS**

- .1 Salvage logs, rocks, braches and stumps from the new trail construction to install at specified locations including where trails being eliminated intersect with new trails.

**Part 3 Execution**

**3.1 PREPARATION OF FINAL GRADE**

- .1 Verify grades, correct as required.
- .2 Eliminate uneven areas and low spots; ensure positive drainage.
- .3 Remove soil contaminated with calcium chloride, petroleum products or other toxic materials.
- .4 Remove debris which protrudes more than 75 mm above surface.
- .5 Dispose of removed material off site.

**3.2 PLACING**

- .1 Where required, excess soils salvaged from new trail construction shall be installed as fill and top-dressed with the partial sod salvage material.
- .2 Place salvaged sods after Departmental Representative has accepted subgrade.
- .3 Place all salvaged sod vegetation side up.
- .4 Place excess salvaged soil around the sods to over exposed roots and fill any voids to eliminate air pockets. Manually compact in place very lightly to remove any air pockets.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- .6 Place salvaged logs, stumps and rocks in a manner that provides a barrier to foot traffic but allows for revegetation and animal travel. Locations to be confirmed by Departmental Representative.

**3.3 COMPACTION**

- .1 Consolidate topsoil using equipment approved by Departmental Representative.
- .2 Leave surfaces smooth, uniform and firm against deep foot printing.

**END OF SECTION**

**Part 1 General**

**1.1 GENERAL**

- .1 This specification covers preparation of the area to be seeded, the supply and application of seed and fertilizer, and the finishing of seeded areas.
- .2 Areas to be seeded shall include any disturbed or exposed earth surfaces within the limits of construction shown on the Drawings, including locations where trail removal (rehabilitation) has been carried out.
- .3 Broadcast seeding shall be used; hydro-seeding is not permitted.

**Part 2 Products**

**2.1 SUPPLY OF MATERIAL**

- .1 Seed mix will be supplied by PCA.
- .2 All other required materials shall be supplied by the Contractor.
- .3 Seed and other materials shall be stored dry and protected from direct sunlight and other detrimental conditions. Materials that have been subjected to detrimental conditions, as determined by Departmental Representative, will not be accepted for use on the project.

**2.2 WATER**

- .1 Water supplied by the Contractor shall be free of any impurities that might inhibit germination of the seed.

**2.3 APPLICATION RATE**

- .1 Seed shall be applied at a minimum rate of 10 kg/ha.

**Part 3 Execution**

**3.1 NOTIFICATION OF COMMENCEMENT OF WORK**

- .1 Notify the Departmental Representative a minimum of 48 hours prior to any seeding work. Seeding operations shall not commence until all areas designated for seeding have been prepared to the satisfaction of the Departmental Representative.

**3.2 SURFACE PREPARATION**

- .1 Grading or topsoil placement shall be completed to the satisfaction of the Departmental Representative prior to any surface preparation.
- .2 All eroded areas shall be corrected prior to surface preparation, as determined by the Departmental Representative, using imported material or material adjacent to the area being filled.

- .3 Areas to be seeded shall be finished to a smooth and uniform surface, loosened to a depth of not less than 25 mm at the time of seeding. Where necessary, the surface shall be scarified and the Contractor shall dispose of stones and other debris as determined by the Departmental Representative.
- .4 Seeding will not be permitted on hardened, crusted or rutted soil.
- .5 After seeding, lightly work to incorporate the seed into the soil surface.

### **3.3 WEATHER CONDITIONS**

- .1 The Contractor shall not proceed with the Work when, in the opinion of the Departmental Representative, weather conditions are unsuitable for successful placement and/or germination. Such situations include, but may not be limited to:
  - .1 The Departmental Representative will not allow work to proceed when wind conditions are such that material is being carried beyond the designated work areas or that the material is not being uniformly applied.
  - .2 The Departmental Representative will not allow work to proceed when hot, dry weather is likely to inhibit germination.

### **3.4 RESEEDING**

- .1 At locations that fail to show a uniform stand of grass for any reason during the calendar year following the year of initial seeding, the Contractor shall repair the defective locations as determined by the Departmental Representative. A uniform stand of grass will be considered growth that shows no deterioration or bare spots greater than 1 square meter in size, and provides a minimum of 80 percent ground cover as determined by the Departmental Representative.
- .2 The initial inspection of seeding will occur during the month of May of the calendar year following the year of initial seeding. The Contractor shall complete any required reseeding work prior to June 15 of that year. This date will be extended if, in the opinion of the Departmental Representative, the weather conditions prior to June 15 are not suitable for reseeding work.
- .3 Contractor will not be required to reseed any area more than once during the warranty period.
- .4 Seed mix for reseeding will be supplied by PCA.
- .5 The Contractor shall complete all reseeding work at no additional cost to PCA.

**END OF SECTION**