

SECTION 01 11 00	SUMMARY OF WORK	3
SECTION 01 14 00	WORK RESTRICTIONS.....	8
SECTION 01 25 20	MOBILIZATION AND DEMOBILIZATION	12
SECTION 01 29 00	PAYMENT PROCEDURES.....	13
SECTION 01 31 19	PROJECT MEETINGS	17
SECTION 01 32 16.07	CONSTRUCTION PROGRESS SCHEDULE – BAR (GANTT) CHART	20
SECTION 01 33 00	SUBMITAL PROCEDURES.....	23
SECTION 01 35 29.06	HEALTH AND SAFETY REQUIREMENTS.....	30
SECTION 01 35 33	BRIDGE REPLACEMENT SPECIAL PROCEDURES	34
SECTION 01 35 43	ENVIRONMENTAL PROCEDURES	38
SECTION 01 45 00	QUALITY MANAGEMENT	46
SECTION 01 74 11	CLEANING.....	55
SECTION 01 77 00	CLOSEOUT PROCEDURES	57
SECTION 01 78 00	CLOSEOUT SUBMITTALS	58
SECTION 03 10 00	CONCRETE FORMING AND ACCESSORIES	63
SECTION 03 20 00	CONCRETE REINFORCING	66
SECTION 03 30 00	CAST-IN-PLACE CONCRETE	69
SECTION 05 14 12	METALWORK.....	74
SECTION 05 51 30	ELASTOMERIC BEARINGS	78
SECTION 31 00 00	EARTHWORKS	80
SECTION 31 11 00	TRAIL BUILDING.....	84
SECTION 31 37 00	RIP RAP	88
SECTION 32 32 34	REINFORCED CONCRETE BLOCK RETAINING WALL	92
SECTION 33 42 12	PIPE CULVERTS	97

DRAWINGS:

001	COVER SHEET, DRAWING LIST & LOCATION MAP
002	GENERAL ARRANGEMENT AND GENERAL NOTES
003	ABUTMENT LAYOUT
004	ABUTMENT REINFORCEMENT
005	APPROACH RETAINING WALLS
006	TRUSS LAYOUT
007	TRUSS CONNECTIONS 1
008	TRUSS CONNECTIONS 2
009	BRIDGE RAILING DETAILS
010	APPROACH RAILING

REFERENCE DOCUMENTS:

EXTRACTS FROM: TRAIL AND BACK COUNTRY FACILITY DESIGN GUIDELINES,
PARKS CANADA, MOUNTAIN PARKS DIVISION

DRAWING 1: 3.1.5.4 CROWNED TRAIL WITH FILL SURFACE

DRAWING 2: 3.1.6.2 TRAIL WITH FILL/CROSS-SLOPE

DRAWING 3: 3.1.6.5 TRAILS ON MODERATE SLOPE

IMAGE 1: BORROW PIT LOCATIONS

IMAGE 2: UPSTREAM WASHOUT LOCATIONS

IMAGE 3: TRAIL DIVERSION

SECTION 01 11 00 SUMMARY OF WORK

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 25 20 – Mobilization and Demobilization.
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 33 - Bridge Replacement Special Procedures.
- .5 Section 01 35 43 - Environmental Procedures.
- .6 Section 31 11 00 – Trail Building
- .7 Section 31 37 00 – Rip Rap
- .8 Section 32 32 34 – Reinforced Soil Retaining Wall
- .9 Section 33 42 12 – Pipe Culverts

1.2 REFERENCES

- .1 Not used.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work for this Contract comprises the replacement of the Cascade River Bridge, located North of the Banff Townsite, near Lake Minnewanka, approximately 12 Km from the trailhead in Banff National Park, Alberta. Lat 5682787 Long. 602264
- .2 Preparation of an “Environmental Protection Plan” (EPP).
 - .1 In preparation for and during replacement of the Cascade River Bridge, an “Environmental Protection Plan” (EPP) is to be prepared and followed by the successful Contractor to meet the requirements of Section 01 35 43 - Environmental Procedures, to ensure that minimal adverse effects are achieved. The Contractor’s EPP must be approved by the Departmental Representative on behalf of Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada’s Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the plan and contract specifications. The EPP will form part of this contract.
- .3 Without limiting the scope of the Work, the Work for this Contract generally comprises the following:
 - .1 Mobilization and site preparation;
 - .2 Demolition and removal of existing south abutment, north abutment back wall and existing superstructure, as described in Section 01 35 33 Bridge Replacement Special Procedures;
 - .3 Supply and installation of new reinforced concrete abutments;
 - .4 Supply and installation of approach reinforced concrete block retaining walls and approach trail construction, as described in Section 32 32 34 Reinforced Concrete Block Retaining Wall;

- .5 Supply and installation of Rip Rap to South embankment, as described in Section 31 37 00 Rip Rap;
- .6 Fabrication, supply and installation of new aluminum truss pedestrian bridge with timber bridge railing;
- .7 Construction of new timber pedestrian railing on approaches;
- .8 Trail building, as described in Section 31 11 00 Trail Building;
- .9 Trail repairs at two washout locations including culvert construction, as described in Section 31 11 00 Trail Building and Section 33 42 12 Pipe Culverts.
- .10 Clean-up and demobilization;

1.4 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.5 WORK BY OTHERS

- .1 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors, sharing his work space, and shall coordinate his operations with the other Contractors.

1.6 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, a meeting of parties in the Contract will be called by the Departmental Representative to discuss and resolve administrative procedures and responsibilities.
 - .1 Senior representatives of the Owner, the Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
 - .2 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Work Schedule.
 - .3 Requirements for temporary facilities, offices, storage sheds, utilities, fences.
 - .4 Site safety and security, in accordance with Section 01 14 00 - Work Restrictions and Section 01 35 43 - Environmental Procedures.
 - .5 Quality Management Plan in accordance with Section 01 45 00 - Quality Management.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .7 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .8 Schedule of submissions.
 - .9 Insurances and transcript of policies.
- .2 Comply with The Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, parking, and sanitary facilities.

- .3 Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .4 Coordinate field engineering and layout work with the Departmental Representative.
- .5 During course of Work prior to project completion, attend biweekly progress meetings as scheduled by the Departmental Representative.
- .6 The cost of attending meetings will be considered incidental to the Unit Price items and no additional payment will be made.

1.7 WORK SCHEDULE

- .1 Schedule Work progress to accommodate Owner/Departmental Representative's unrestricted access to inspect all phases of the Work.
- .2 Required stages:
 - .1 Mobilisation and South Abutment construction shall be completed by 2014 August 17.
 - .2 In-stream Works between 2014 August 17 and 2014 August 31st.
 - .3 Trail Building, trail restoration and culvert installations shall be completed by 2014 October 31st.
 - .4 Substantial Performance by 2014 December 1st.
 - .5 Final Completion by 2015 March 31st.
- .3 Work shall be carried out in accordance with Section 01 14 00 - Work Restrictions and Section 01 35 43 Environmental Procedures.
- .4 Submit detailed Project Schedule to include the following milestones and activity types:
 - .1 Award
 - .2 Submittal of Shop Drawings
 - .3 Other Submittals
 - .4 Material Fabrication
 - .5 Mobilization(s)
 - .6 In-stream Works
 - .7 Environmental Protection Plan, review and implementation
 - .8 Health and Safety Plan, review and implementation
 - .9 Quality Management Plan, review and implementation
 - .10 Abutment and Pier construction stages including concrete placement dates
 - .11 Truss In-shop inspection
 - .12 Proposed Truss installation date
 - .13 Completion of all remaining site works and clean-up
 - .14 Demobilization(s)
 - .15 List of proposed construction equipment
- .5 During progress of Work revise and resubmit schedule as directed by the Departmental Representative.

- .6 In addition to the project schedule, submit weekly schedules to the Departmental Representative showing Work planned for the following week on a day by day basis.

1.8 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of site, subject to Section 01 14 00 - Work Restrictions until Substantial Completion.
- .2 Coordinate use of premises under direction of the Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 The Contractor and any Subcontractors shall obtain a business license from the Parks Canada Administration Office in Banff, prior to commencement of the contract.
- .5 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Canada Administration Office in Banff.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operation condition of existing: equal to or better than that which existed before to the satisfaction of the Departmental Representative.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.10 CONSTRUCTION SIGNAGE

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

1.11 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Environmental Protection Plan (EPP).
 - .2 Contract Drawings.
 - .3 Specifications.
 - .4 Addenda.
 - .5 Reviewed Shop Drawings.
 - .6 List of Outstanding Shop Drawings.
 - .7 Change Orders.

- .8 Other Modifications to Contract.
- .9 Field Test Reports.
- .10 Copy of Approved Work Schedule.
- .11 Health and Safety Plan and Other Safety Related Documents.
- .12 Quality Management Plan
- .13 Other documents as specified.
- .14 Restricted Activity Permits

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

SECTION 01 14 00 WORK RESTRICTIONS

Part 4 General

4.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 35 33 – Bridge Replacement Special Procedures
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 01 77 00 – Closeout Procedures

4.2 ACCESS AND EGRESS

- .1 Access to the site is limited due to its backcountry location. The following equipment or approved equivalent shall be permitted for the following specified uses, any equipment not identified on the below list must be pre-approved prior to tender close or else it will not be permitted:
 - .1 Side by side quad ATV and trailer: daily trail access for transportation of labour, equipment and materials from trail head.
 - .2 A temporary platform/bridge may be constructed across Cascade River for personnel access to the North bank (not to be used for hauling of materials).
 - .3 A mini dump truck (max GVW 3 tonne).
 - .4 John Deere 135G zero swing excavator: mobilisation/demobilisation to site (see 1.3.10 of this section), excavation, abutment construction, stream crossing, rip-rap placement, all in-stream work and trail building/repair.
 - .5 John Deere 450D Bulldozer
 - .6 Skid Steer Loader approved by Departmental Representative
 - .7 Mini Backhoe/Excavator approved by Departmental Representative
 - .8 Ride-on material mover Power Buggy IPB-21 or smaller: transportation of material within site and across new bridge.
 - .9 Helicopter: transportation of ready-mix concrete and other construction materials and equipment as required.
 - .10 Heavy-Lift Helicopter minimum haul capacity 11,000lbs: may be used for transportation to site and erection of aluminium truss, and for removal of existing bridge span located in-stream.

4.3 USE OF THE WORK SITES

- .1 The Work Sites shall be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .2 While the Work Sites are under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Sites and of the Work, and for the security of the work of Other Contractors located on the Work Sites.
- .3 The Contractor shall keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary for the performance and inspection of the Work.

- .4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .5 The Contractor will not be permitted to establish a worker's accommodation camp inside Banff National Park.
- .6 Office/tool trailer and compound may be set up at the trail head at a location approved by the Departmental Representative. An office/tool trailer at the bridge site is not permitted.
- .7 The Contractor shall provide sanitary facilities for work force at trail head compound and bridge site in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .8 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.
- .9 Any damage caused to the access road/trails by construction equipment shall be repaired, which may include re-grading, levelling and seeding, to the satisfaction of the Departmental Representative at the Contractor's own expense.
- .10 Rigging mats may be required for mobilisation of the excavator from Minnewanka Road to the Cascade Trail head via field crossing to prevent damage depending on the field conditions.
- .11 All equipment permitted to use the Cascade trail shall not exceed 40 km/hr at any time.
- .12 The work must be performed during daylight hours, from 7:00 to 22:00 hours, seven days per week, unless authorized in writing by the Departmental Representative.
- .13 In-stream works are only permitted within the Fisheries and Oceans Canada designated construction window of 2014 August 17 to 2014 August 31.

4.4 SNOW CLEARING OF TRAILS

- .1 Snow clearing is not anticipated, however if required will be the responsibility of the Contractor.

4.5 UTILITIES

- .1 There no known utilities at the site.

4.6 SURVEY OF EXISTING SITE CONDITIONS

- .1 Submission of a tender is deemed to be confirmation that the Contractor has inspected the site and is completely familiar with all conditions or restrictions affecting execution and completion of the work.
- .2 Regularly monitor the condition of the Work Site throughout the construction period.
- .3 Monitor river flows and ensure construction work is protected from high flows at all times.
- .4 Undertake and submit a topographical survey of bridge abutments and approaches in accordance with Section 32 32 34 Reinforced Concrete Block Retaining Wall.

4.7 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable provincial safety regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.
- .3 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

4.8 USE OF PUBLIC AREAS

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.
- .2 All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .3 All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways or trails, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.
- .4 All activities shall be in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.

4.9 SUPERVISORY PERSONNEL

- .1 After award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.

The following personnel shall be included in the list:

- .1 Project Superintendent;
 - .2 Deputy Project Superintendent;
 - .3 Health and Safety Coordinator.
- .2 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
 - .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the Project Superintendent's absence.
 - .4 Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years site related working experience specific to activities associated with roadway construction.
 - .2 Have working knowledge of occupational safety and health regulations.

- .3 Be responsible for completing Contractor's Health and Safety training sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of the Project Superintendent.

4.10 MEETINGS

- .1 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .2 The Departmental Representative will schedule an initial meeting to be held on site after award notification. This meeting shall be attended by senior representatives of the Owner, the Departmental Representative, Contractor, major subcontractors and field inspectors.
- .3 Progress and status meetings will be held on a bi-weekly basis or more frequently as directed by the Departmental Representative.
- .4 Cost of attending the above meetings shall be considered incidental to the Unit Price items and no additional payment will be made.

4.11 WASTE DISPOSAL

- .1 Refer to Section 01 35 43 - Environmental Procedures.
- .2 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside Banff National Park unless specified otherwise in other sections of these Specifications.
- .3 Deposits of any construction debris into any waterway are strictly forbidden unless specifically instructed to within the contract documents or by the Departmental Representative.
- .4 Cost for waste disposal described above shall be considered incidental to the Work and no additional payment will be made.

4.12 WORK STOPPAGE

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

Part 5 Products

- .1 Not Used.

Part 6 Execution

- .1 Not Used.

END OF SECTION

SECTION 01 25 20 MOBILIZATION AND DEMOBILIZATION

Part 1 General

1.1 DESCRIPTION

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to those necessary for the movement of personnel, equipment, camp, buildings, shops, offices, supplies and incidentals to and from the project site and final cleanup.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.
- .3 For the purposes of mobilization and demobilization, "project site" means the bridge site location and/or the trailhead site compound.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for Mobilization and Demobilization shall meet the requirements in Section 01 29 00 Payment Procedures.

END OF SECTION

SECTION 01 29 00 PAYMENT PROCEDURES

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 14 00 - Work Restrictions.
- .3 Section 01 25 20 - Mobilization and Demobilization.
- .4 Section 01 35 33 - Bridge Replacement Special Procedures
- .5 Section 03 10 00 - Concrete Forming and Accessories.
- .6 Section 03 20 00 - Concrete Reinforcing.
- .7 Section 03 30 00 - Cast-In-Place Concrete.
- .8 Section 05 14 12 - Metalwork.
- .9 Section 31 11 00 - Trail Building
- .10 Section 31 37 00 - Rip Rap
- .11 Section 32 32 34 - Reinforced Earth Retaining Wall
- .12 Section 33 42 12 - Pipe Culverts

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 All work required to complete the Work shall be included in the Lump Sum Arrangement. No measurement or payment will be made for work considered incidental to this contract unless the Departmental Representative certifies that such extra expense is directly attributable to unforeseeable deterioration or existing condition of the existing structure substantially different than that indicated by the drawings and specifications.
- .2 The Work completed under the Lump Sum Arrangement shall include, but not be limited to, the following tasks as listed in the Lump Sum Price Breakdown:
 - .1 Mobilization and Demobilization**
 - .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project site and final clean-up.
 - .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.
 - .3 Mobilization and Demobilization:
 - .1 Payment shall be made under "Lump Sum Price Item 1 – Mobilization / Demobilization".
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.

- .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .4 Payment of only 5% of the total price tendered will be scheduled as outlined above. If the amount bid for Mobilization and Demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.
- .2 **Demolition, Removal and Disposal of Existing Bridge** includes all costs of labour, materials, equipment, tools, environmental requirements, safety requirements, submittals and associated Work required to demolish, remove, haul, and properly dispose of the existing bridge south abutment and superstructure and partial demolition of existing bridge north abutment. Payment will be as per the lump sum price in the Lump Sum Price Breakdown, pro-rated by the portion of the demolition Work completed and as accepted by the Departmental Representative.
- .3 **Supply and Construction of new Reinforced Concrete Abutments** includes all costs of labour, materials, equipment, tools, temporary works, environmental requirements, safety requirements, quality control testing, submittals, excavation, curing, heating, hoarding, surface finishing, backfill placement and compaction and associated works required for the supply and construction of reinforced concrete abutments with wing walls, timber railing and insulation as shown on the drawings. Payment will be as per the lump sum price in the Lump Sum Arrangement Table, pro-rated by the portion of the Work acceptably completed and as accepted by the Departmental Representative. Required backfill under this item will be to existing ground level with remaining backfill completed and paid for under item "Measure, Supply and Construction of Reinforced Concrete Block Retaining Wall, Approach Trail and Backfill of new Abutments"
- .4 **Fabrication of Aluminum Truss c/w decking, matting and bearings** includes all costs of labour, materials, equipment, tools, safety requirements, quality control testing, preparation of shop drawings, and associated works required for the fabrication of aluminium truss bridge and appurtenances including decking, rubber matting, elastomeric bearings and bumpers and railing support brackets. Payment will be as per the lump sum price in the Lump Sum Price Arrangement Table, to be paid upon delivery to site or to a designated Parks Canada Agency property as directed by the Departmental Representative.
- .5 **Transportation and Installation of Aluminum Truss** includes all costs of labour, materials, shipping, transportation, equipment, fuel, tools, access, falsework, environmental requirements, safety requirements, and associated Works required for the transportation from the fabrication shop and installation of the aluminium truss span in segments. Payment will be as per the lump sum price in the Lump Sum Price Breakdown, to be paid upon completion of full installation.
- .6 **Supply and Installation of Bridge Railing** includes all costs of labour, materials, equipment, tools, safety requirements, treatment, transportation,

preparation of shop drawings, and associated works required for the fabrication and installation of bridge railing system. Payment will be as per the lump sum price in the Lump Sum Price Breakdown.

.3 The Work completed under the Unit Price Arrangement shall include, but not be limited to, the following tasks as listed in the Unit Price Arrangement Table:

- .1 **Supply and Placement of Rip Rap** includes all costs of materials, royalties, permits, haul of materials, equipment, tools, labour, environmental controls and all other incidentals necessary to complete the work, including the preparation of the subgrade for the riprap, geotextile filter fabric, bedding material, trimming, excavation, backfill as required, and labour for measurement. Payment will be made at the unit price bid per cubic metre of Rock Riprap measured in place. The volume of rock paid for will be calculated from the thickness of the riprap as shown on the drawings, and the actual area covered. Overages in thickness or area beyond the limits shown on the drawings will not be paid for unless these changes were requested by the Departmental Representative.
- .2 **Supply and Construction of Reinforced Concrete Block Retaining Wall and Approach Trail**, includes all costs of labour, materials and equipment required for excavation, levelling pad, facing panels, soil reinforcing elements, coping, and various accessories and minor components needed for installation of reinforced block retaining walls as well as the sourcing, testing, grading, transportation, placement and compaction of imported and locally sourced material for the construction and retention of trail approaches and backfill of retaining wall up to wearing surface elevation for the full width between retaining walls. Payment will be at the unit price bid metre length of wall for each wall type measured in place as per the Unit Price Arrangement Table.

Wall Type	No. of Block Courses	No. of Geogrid Layers
A	9 – 13	6
B	6 – 9	4
C	4 – 6	3
D	4	None

- .3 **450 mm Diameter Pipe Culvert and 900mm Diameter Pipe Culvert** unit rates include all costs for labour, equipment, and materials to supply, excavate, install, backfill and reconstruct trail surface. Payment shall be in metres of culvert installed.
 - .1 If the existing culvert or portions thereof is reused for construction of the works a credit is to be applied for the supply of culvert to this Contract. The Contractor and the Departmental Representative shall assess the salvaged culvert and mutually decide on what can be reused and what will be installed new.
 - .2 If the existing culvert or portions thereof are not reused, they shall be disposed of off-site with no additional payment made.

- .4 **Trail Building – Clearing and Grubbing** includes all costs of labour, materials, equipment, tools, safety requirements, environmental requirements and associated works for the clearing and grubbing in preparation for new trail construction. Payment shall be per metre of trail cleared for construction.
- .5 **Trail Building - Construction** includes all costs of labour, materials, equipment, tools, safety requirements, environmental requirements and associated works for the excavation, grading, placement and compaction of materials for construction of new trail. Payment shall be per metre of trail constructed.
- .6 **Supply and Installation of Approach Railing** includes all costs of labour, materials, equipment, tools, safety requirements, treatment, transportation, preparation of shop drawings, and associated works required for the fabrication and installation of timber bridge railing and posts and concrete footings. Payment shall be per metre length of Railing system supplied and installed.

Part 2 Products

- .1 **Not Used.**

Part 3 Execution

- .1 **Not Used.**

END OF SECTION

SECTION 01 31 19 PROJECT MEETINGS

Part 4 General

4.1 RELATED SECTIONS

- .1 Not Used.

4.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 4 days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within 3 days after meetings and transmit to meeting participants and, affected parties not in attendance and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

4.3 PRECONSTRUCTION MEETING

- .1 After award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of the Owner, the Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: progress scheduling in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Environmental Protection Plan (EPP),
 - .4 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .5 Traffic Management Strategy
 - .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 14 00 – Work Restrictions.

- .7 Quality Management Plan in accordance with Section 01 45 00 – Quality Management
- .8 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances.

4.4 PROGRESS MEETINGS

- .1 During course of Work prior to project completion, schedule progress meetings monthly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 2 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review of communications with Utility companies and status of approvals.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Review construction budget, progress payments, cash flow and variances from contract.
 - .13 Review proposed changes for affect on construction schedule and on completion date.
 - .14 Review site safety and security issues.
 - .15 Traffic accommodation.
 - .16 Other business.

Part 5 Products

5.1 NOT USED

- .1 Not Used.

Part 6 Execution

6.1 NOT USED

.1 Not Used.

END OF SECTION

SECTION 01 32 16.07 CONSTRUCTION PROGRESS SCHEDULE – BAR (GANTT) CHART

Part 7 General

7.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.

7.2 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: Monday to Sunday, excluding Long Weekends, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

7.3 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

7.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

7.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 In-stream Works between 2014 August 17 and 2014 August 31st
 - .2 All trail building related works completed 2014 October 31st
 - .3 Substantial Performance 2014 December 1st
 - .4 Final Completion 2015 March 31st

7.6 MASTER PLAN

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

7.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Survey
 - .5 Mobilization.
 - .6 Verification of field measurements.
 - .7 Concrete Pours for Substructure (each abutment).
 - .8 Truss Fabrication
 - .9 Truss Transportation and Erection
 - .10 In-stream Works
 - .11 Trail Building, culvert installation and trail restoration
 - .12 Winter shutdown.
 - .13 Demobilization.
 - .14 Completion

7.8 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

7.9 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.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 8 Products

8.1 NOT USED

- .1 Not used.

Part 9 Execution

9.1 NOT USED

- .1 Not used.

END OF SECTION

SECTION 01 33 00 SUBMITAL PROCEDURES

Part 1 General

1.1 SECTION INCLUDES

- .1 Administrative.
- .2 Shop drawings and product data.
- .3 Certificates and transcripts.
- .4 Required Contractor Submittals.

Pre-mobilization Submittals

- .1 Lump Sum Price Items breakdown.
- .2 List of subcontractors and suppliers
- .3 Schedule in Microsoft Projects and paper document format.
- .4 Contractor Chain of Command.
- .5 Work Plan.
- .6 Quality Control Plan.
- .7 Site Access Plan (including access scaffolding and work platforms).
- .8 Environmental Protection Plan (EPP).
- .9 Emergency Procedures Protocol.
- .10 Health and Safety Plan.
- .11 Materials Safety Data Sheets.
- .12 Medical surveillance.
- .13 On-site contingency and emergency response plan.

Construction Phase Submittals

- .14 Weekly Progress Reports.
- .15 Quality Control/Quality Assurance Inspection Reports.
- .16 Shop Drawings.
- .17 Work Procedures for:
 - .1 Truss transportation
 - .2 Truss erection/lifting procedure
 - .3 Removal of existing bridge superstructure
 - .4 Supply and placement of abutment concrete
- .18 Progress Photographs.
- .19 Copies of Contractor Health and Safety Inspection Reports.
- .20 Copies of Environmental Monitor Reports
- .21 Copies of Federal or Provincial Safety Inspector Reports or Directions.
- .22 Copies of Incident or Accident Reports

Project Completion Submittals

- .23 Record Drawings.

.24 Quality Control/Quality Assurance Record

1.2 RELATED SECTIONS

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 35 33 – Bridge Replacement Special Procedures.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 03 20 00 - Concrete Reinforcing.
- .6 Section 03 30 00 - Cast-In-Place Concrete.
- .7 Section 05 12 33 - Steelwork

1.3 REFERENCES

- .1 Not used.

1.4 ADMINISTRATIVE

- .1 Submit to the Departmental Representative submittals listed for review. Submit with reasonable promptness (typically five working days) 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 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings and product data in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to the Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify the Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work is co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by the Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.5 SHOP DRAWINGS AND MIX DESIGNS

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

- .2 Submit drawings stamped and signed by professional engineer registered or licensed in, Alberta, Canada.
- .3 The term "mix design" means engineered design for proportioning materials in concrete including all supporting test results, materials properties and Contractor Engineer's letter of recommendation.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow 14 Calendar days for the Departmental Representative's review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the Departmental Representative in writing of revisions other than those requested.
- .8 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .9 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of shop drawing submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.

- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .10 After the Departmental Representative's review, distribute copies.
- .11 Submit an electronic copy of the shop drawings and/or mix design for each requirement requested in the Specification Sections and as requested by the Departmental Representative.
- .12 Submit electronic copies of product data sheets or brochures for requirements requested in Specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .13 Submit electronic copies of test reports for requirements requested in Specification Sections and as requested by the Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 6 months of date of contract award for project, if not separately identified in the project specifications.
- .14 Submit electronic copies of certificates for requirements requested in Specification Sections and as requested by the Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .15 Submit electronic copies of manufacturer's instructions for requirements requested in Specification Sections and as requested by the Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .16 Submit electronic copies of Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by the Departmental Representative.
- .17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before Work may proceed.
- .21 The review of shop drawings and mix designs by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that the Departmental Representative approves detail design inherent in documents, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions or of responsibility for meeting all requirements of construction and Contract Documents.
- .2 Without restricting generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertain solely to fabrication processes or to techniques of construction and installation, for field testing to confirm installed products meet the specifications and for co-ordination of Work of all sub-trades.

1.6 REQUIRED CONTRACTOR SUBMITTALS

- .1 General
 - .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
 - .2 Pre-Mobilization Submittals
 - .1 Submit the following plans and programs to the Departmental Representative for review a minimum of fifteen (15) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety or environmental concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
 - .1 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project (e.g., mobilization, construction sequencing, removal of deteriorated material, reconstruction of joints and demobilization).
 - .2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, and cell phone numbers including contact persons who are available on a 24-hour basis, in the event of emergencies.
 - .3 Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.
 - .4 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
 - .5 Environmental Protection Plans (EPP) which shall meet the requirements of Section 01 35 43 - Environmental Procedures.
 - .6 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. Parks Canada will supply the Contractor with a template with contact names and numbers to be used for this purpose.

- .7 Health And Safety Plan - The Contractor shall have a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.
- .8 Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 Site specific hazard assessment.
 - .5 General safety rules for project.
 - .6 Job specific safe work procedures.
 - .7 Inspection policy and procedures.
 - .8 Incident reporting and investigation policy and procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
- .9 Submit copies of Material Safety Data Sheets (MSDS).
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.
- .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .2 The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
- .3 Construction Phase Submittals
 - .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis.
 - .2 Quality Control Inspection Reports - The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
 - .3 Shop Drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum 30 days prior to fabrication.
 - .4 Detailed Work Procedures shall be submitted for the following construction activities a minimum of 14 days prior to the proposed activity:
 - .1 Transportation of Truss Segments to site;
 - .2 Truss Erection.
 - .5 Progress Photographs:
 - .1 Format: electronic .jpg files, minimum five mega pixels.

- .2 Submission requirements: one set of electronic files.
- .3 Identification: typewritten name and number of project, description of photograph, jpg file name, and date of photograph in upper right hand corner.
- .4 Viewpoints: 4 viewpoints determined by the Departmental Representative.
- .5 Submission Frequency: prior to commencement of work and weekly thereafter with progress statement, or as directed by the Departmental Representative.
- .6 Submit four copies of CD with all electronic pictures as part of closeout package.
- .6 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.
- .7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .8 Submit copies of incident and accident reports.
- .4 Project Completion Submittals
 - .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
 - .2 Quality Control/Quality Assurance Records – The Contractor shall submit a bound and itemized set of project quality control and quality assurance records.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

SECTION 01 35 29.06 HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure that PCA shows due diligence towards health and safety on construction sites.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures

1.3 REFERENCES

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

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and the authority having jurisdiction weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS Material Safety Data Sheets (MSDS) to the Departmental Representative, in accordance with Section 02 81 01 - Hazardous Materials.
- .7 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to the Departmental Representative within 7 days after receipt of comments from the Departmental Representative.
- .8 The Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.

1.5 FILING OF NOTICE

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

1.6 SAFETY ASSESSMENT

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

1.7 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Conduct weekly safety meetings at the beginning of each week to discuss the scheduled work for that week and the associated safety hazards.

1.8 GENERAL REQUIREMENTS

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

1.9 RESPONSIBILITY

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

1.10 COMPLIANCE REQUIREMENTS

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

1.11 UNFORSEEN HAZARDS

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

1.12 HEALTH AND SAFETY CO-ORDINATOR

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

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

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

1.15 BLASTING

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

1.16 POWDER ACTUATED DEVICES

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

1.17 WORK STOPPAGE

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

Part 2 Products

- .1 Not used.

Part 3 Execution

.1 Not used.

END OF SECTION

SECTION 01 35 33 BRIDGE REPLACEMENT SPECIAL PROCEDURES

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 14 00 - Work Restrictions
- .2 Section 01 29 00 - Payment Procedures
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 03 10 00 - Concrete Forming and Accessories.
- .5 Section 03 20 00 - Concrete Reinforcing.
- .6 Section 03 30 00 - Cast-In-Place Concrete.
- .7 Section 05 14 12 - Metalwork.

1.2 WORK INCLUDED

- .1 **Truss Installation:** Installation of new pre-fabricated aluminum truss bridges including transportation, placement and final fit-out for use.
- .2 **Demolition and Disposal of Existing Bridge:** Break-up of existing south abutment and re-use materials when possible integrating into Rip Rap embankment protection, partial demolition and removal of North Abutment, demolition and removal of existing superstructure.

Part 2 Products

- .1 Aluminum Truss shall be:
 - .1 All new materials fabricated in accordance with the drawings and Section 05 14 12 Metalwork.
- .2 Bearing Pads shall be:
 - .1 New laminated elastomeric bearings in accordance with the drawings and Section 05 51 30 Elastomeric Bearings.
- .3 Bumper Pads shall be
 - .1 Plain elastomeric bearings in accordance with the drawings and Clause 2.2 "Miscellaneous Neoprene Pads" of Section 05 51 30 Elastomeric Bearings.
- .4 Rubber Mats for wearing surface shall be:
 - .1 Eco-flex industrial floor matting 25.4mm thickness; or
 - .2 An approved equivalent acceptable to the Departmental Representative.
- .5 Aluminum Decking shall be:
 - .1 Fisher and Ludlow 21/1" x 1/4" I-Bar bearing bar standard mesh bar grating; or
 - .2 An approved equivalent acceptable to the Departmental Representative.

- .6 Bridge and Approach railing shall be:
 - .1 Hemlock-Fir Grade No. 2 or better treated with a preservative approved for pedestrian contact in accordance with CAN/CSA-S6-06 and *Parks Canada Agency Guidelines for the Use, Handling and Disposal of Treated Wood*.

Part 3 Execution

3.1 TRUSS TRANSPORTATION

- .1 Prior to shipping, submit a procedure for transportation to include:
 - .1 Transportation route and exact drop-off location;
 - .2 Any temporary bracing proposed for transportation;
 - .3 Rigging locations and lifting procedure for placement onto and removal from transportation vehicle;

3.2 TRUSS INSTALLATION

- .1 Prior to installation of truss, undertake and submit the following:
 - .1 Submit falsework drawings signed and sealed by a professional engineer registered in Alberta.
 - .2 Complete survey of anchor bolt locations, compare with post-fabricated measurements of trusses and confirm variances are within accepted tolerance.
 - .3 Provide written confirmation by fabricator of total mass of each truss segment.
 - .4 Provide a lifting procedure signed and sealed by a professional engineer registered in Alberta in accordance with rigging requirements as specified on the drawings. This should include:
 - .1 Rigging locations;
 - .2 Any temporary bracing proposed during erection;
 - .3 The methodology for guiding the truss into the correct position and the fixing of splice connections;
 - .4 The proposed method for release of the truss once placed in the correct position;
 - .5 Emergency release methods
 - .6 Site lifting location and proposed helicopter route (if appropriate)
 - .5 Following placement of all segments, nuts to be installed and hand tightened to finger-tight only.
 - .6 Stainless Steel Bolt Pre-tensioning
 - .1 Stainless steel truss connection bolts shall be pre-tensioned to a torque of 162 N-m (119 ft-lbs), unless noted otherwise.
 - .2 Prior to arrival on-site, the Contractor shall submit a bolt pre-tension procedure detailing the approach used to apply and verify the specified torque.

- .7 Aluminum Block Inside HSS and Top Chord Guide Plug Tolerance – The Contractor shall measure the maximum total gap (difference between the inner dimension of the HSS and outer dimension of Aluminum Block Inside HSS or Top Chord Guide Plug) in either width or depth direction after fabrication and prior to shipping to site. The Contractor shall submit these measurements to the Departmental Representative for review. Measurement accuracy shall be not less than 0.25 mm and no measurement shall be larger than 2 mm.
- .8 Truss end segments to be placed on bearings within +/- 5 Degrees C of the assumed installation temporary of 20 Degrees C. For installations outside of this temporary range, a methodology for tilting the bearings prior to placement shall be submitted to the Departmental Representative for approval prior to lowering of truss onto bearings.
- .9 Rubber matting to be installed as described on the drawings and as directed by the Departmental Representative. Mats may be field cut if required using a method recommended by the manufacturer.
- .10 If, once installed, truss is to be used by construction equipment for the transportation of equipment and backfill material, temporary construction flooring shall be installed on the top of the permanent deck grating to prevent damage during construction.
- .11 Jacking locations shown on the design drawing 006 are for future bearing replacement. The jacking locations have been designed to work in tandem based on equal loads and a minimum 200 x 200 x 25 mm bearing plate placed between the jacks has been considered. If the Contractor wishes to use the jacking position shown for installation of the bridge, the Contractor shall submit a jacking procedure to the Departmental Representative for review as part of the lifting procedure, signed and sealed by a Professional Engineer registered in Alberta.

3.3 DEMOLITION AND DISPOSAL OF EXISTING BRIDGE

- .1 South Abutment
 - .1 Break-up the existing reinforced concrete south abutment currently located in-stream and relocate useable blocks to be incorporated in to the bank protection works at the new south abutment.
 - .2 Useable material shall be solid blocks without fractures meeting size and weight requirements for Class 2 Rip Rap as defined in Section 31 37 00 Rip Rap. Non-useable material, including all loose reinforcement is to be disposed of off-site.
- .2 North Abutment
 - .1 Remove existing backwall on north abutment as shown on the drawings and modify ground profile as required.
 - .2 Backwall sections may be incorporated in to the bank protection works at the new south abutment provided each block meets size and weight requirements for Class 2 Rip Rap as defined in Section 31 37 00 Rip Rap.
- .3 Superstructure
 - .1 Existing superstructure to be removed from site and disposed.

- .2 Submit a demolition and removal procedure minimum 14 days prior to commencement of removal.
- .3 Removal to be completed in full compliance with section 01 35 43 Environmental Procedures.
- .4 In-stream demolition to be minimised.

END OF SECTION

SECTION 01 35 43 ENVIRONMENTAL PROCEDURES

Part 1 General

1.1 RELATED SECTIONS

- .1 All Specifications.

1.2 MEASUREMENT PROCEDURES

- .1 The cost to the Contractor to meet the environmental and aesthetic protection requirements described below shall be considered incidental to the Work and no additional payment will be made.

1.3 GENERAL

- .1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter any river, waterway, ditch, or wetland within Banff National Park.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.
 - .1 The Contractor shall refer to the Basic Impact Analysis prepared for the Work which is provided as a reference document.

1.4 NATIONAL PARK REGULATIONS

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

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2003 and subsequent amendments.
- .2 The Contractor shall identify
- .3 The Contractor is required to prepare an Environmental Protection Plan (EPP), which will include the topics in the following sub sections.
- .4 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.
- .5 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonably timely manner of any actual or potential environmental incidents or failure of protection measures, and immediately of any violations of environmental approvals, permits, authorizations or EPP measures.

1.6 RELICS AND ANTIQUITIES

- .1 Give immediate notice to Parks Canada if evidence of archaeological finds are encountered during construction, and wait for written instructions before proceeding with Work in this area.
- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.
- .3 Provide 48 hours notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

1.7 WILDLIFE

- .1 Avoid or terminate activities on site that attract or disturb wildlife.
- .2 Pets are not allowed on the work site, or in any administrative or laydown areas.
- .3 All personnel will be instructed by Parks Canada's ESO the procedures to follow in the event of wildlife appearance near or intrusion into the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The Banff Warden Services will be called to determine the course of action. The general presence of wildlife observed near the construction site, any carcasses or unusual wildlife observations shall be reported to the ESO and the Departmental Representative.

1.8 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control dispersal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 The Contractor's EPP will detail how the dewatering will be undertaken, with special attention to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting and settlement pond reclamation.

1.9 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic fire fighting equipment – e.g. three shovels, two pulaskis, and two 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.

- .3 Care shall be taken while smoking on the construction site to ensure that accidental ignition of any flammable material is prevented. Fires or burning of waste materials are not permitted.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Banff Fire Duty Officer. Fire prevention care is to be commensurate with the fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Deliberately lighting of fires or burning of waste materials is strictly not permitted.

1.10 SITE ACCESS AND PARKING

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access and facilities at trail head and within the work limits, including day-to-day entry/egress and plans for delivery and approach for large dimension materials will be anticipated and described. Any proposed use of a helicopter shall be detailed. The access plan shall describe worker transportation to and from the construction site, and parking of workers' private vehicles. Specific details of any vehicles to transport workers to site or site equipment to be used on the trails are to be provided.
- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A construction office is anticipated for the bridge contract. The construction office may be located at a trail head, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer and ESO trailer and toilets.
- .5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.
- .6 A workers' accommodation camp will not be permitted.

1.11 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative.

- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.12 CONTRACTOR'S OPERATIONS

- .1 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond those work limits without the written permission of the Departmental Representative.
- .2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.
- .3 Provide sufficient sanitary facilities and maintain in a clean condition.
- .4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .5 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 staked or designated work area, the Contractor shall be responsible, at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Parks Canada.
- .6 Failure to comply with or observe environmental protection requirements as identified in these specifications may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

1.13 WORK AROUND AND OVER WATER

- .1 The construction project is such that some work will need to take place inside the wetted perimeter of Cascade River, which may only take place during the designated working window of August 17 to August 31st 2014. Dependant on river levels, this work may include: demolition of the old south abutment, removal of the old steel span, placement of rock rip-rap protection on the south bank and construction of timber falsework to support the superstructure. Concrete construction for abutments is expected to be outside the wetted perimeter but could potentially be exposed in a flash flood. The Contractor is to describe precautionary measures in the EPP to be employed to ensure fugitive materials, and especially deleterious substances do not enter the river or any other waterway – e.g. material produced by placement of concrete and concrete curing. Refer to section 01 35 33 Bridge Replacement Special Procedures for specific directions with respect to demolition of the existing bridge.
- .2 Due to access restrictions, access to the north bank at the site requires localised crossing of the Cascade River. Crossing of the River within the designated working window is permitted. Crossing of the River outside of the designated working window is limited to one crossing each way of the approved equipment for construction of the north abutment and trail repair and construction.
- .3 All equipment/machinery crossing the river is to be washed down in a designated area away from the river to remove sediments and other deleterious material immediately prior to completing the crossing. This may not be possible returning from the north bank, in this instance reasonable effort shall be made to remove large pieces of debris from tracks/wheels prior to crossing.
- .4 Sediment control measures shall be to the satisfaction of the PCA Environmental Officer.

- .5 Fuel management requirements are explained in the Equipment Fuelling, and Spill Containment sub section.

1.14 POLLUTION CONTROL

- .1 Maintain all temporary erosion and pollution control features for this project.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting, demolition dust, and other extraneous materials from contaminating air beyond application area by providing suitable, temporary enclosures or mats to the satisfaction of the Departmental Representative and the ESO.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and on-site work.

1.15 START-UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site shall attend a briefing regarding their individual and collective responsibilities lasting approximately 1 hour, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Each employee, having received the environmental briefing, will be issued a certification sticker to be displayed on their helmet. Employees of other service and materials providers who attend at the site – e.g. concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

1.16 HAZARDOUS PRODUCTS AND MATERIALS

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to; grout, fuel, concrete finishing agents, paint, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP. Hazardous products shall be stored no closer than 100 m from any waterway.

1.17 SPILL CONTAINMENT PLAN

- .1 A spill response plan shall be presented in the EPP. Elements to be addressed shall include, but not necessarily limited to:
 - .1 Spill response kit capable of dealing with the largest possible spill for the equipment on site shall be maintained in good working order on the construction site.

- .2 Staff shall be informed of the location of the response kit, and be trained in its use.
- .3 Hazardous materials are to be stored and used in minimal required quantities in accordance with all applicable federal and provincial legislation.
- .4 All spills are to be immediately contained with the source of spill arrested, reported to the Departmental Representative and cleanup initiated. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment.

1.18 EQUIPMENT FUELLING AND MAINTENANCE

- .1 Equipment used on the project shall be fuelled with E10 gasoline and low sulphur diesel fuels.
- .2 A fuel delivery, storage and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
 - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 meters from rivers.
 - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
 - .3 Fuelling personnel shall maintain immediate attention to and presence at the fuelling operation.
 - .4 Fuelling sites will be identified by the Departmental Representative and the ESO.
 - .5 Lubricant changes and minor repairs shall be conducted at a location identified by the Departmental Representative in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from Banff National Park to recycling or certified disposal sites.
 - .6 Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order.
 - .7 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds and any debris or external contaminants outside the national park before delivery to the work site.

1.19 WASTE MATERIAL STORAGE AND REMOVAL

- .1 The Contractor shall prepare a Construction and Waste management plan as a part of the EPP. The Plan shall include the following basic principle:
 - .1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:
 - .1 Describe the management of waste.
 - .2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.
 - .3 A concerted effort to reduce, reuse and recycle materials is expected.

- .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .5 Provide containers to deposit recyclable materials.
- .6 Transport all recyclable materials to an approved recycling facility off site.
- .7 Waste materials are to be disposed at a certified construction waste landfill outside Banff National Park. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Banff National Parks.
- .8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.
- .9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.
- .3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .6 Provide bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel and make arrangement for collection and disposal on a daily basis or when directed by the Departmental Representative.
- .7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.
- .8 Do not dispose of or allow dispersing waste or volatile materials such as mineral spirits, oil or paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.

1.20 VEGETATION REMOVAL AND PROTECTION OF THE WORK LIMITS

- .1 The EPP shall detail how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur. No vegetation or tree removal is required for this contract. Any vegetation willfully or negligently removed shall be replaced in size and kind two fold.

1.21 SENSITIVE AND NO-GO ZONES

- .1 The ESO may identify sensitive areas and no-go zones in proximity to the work site. Even though these areas may lie outside the construction limit they must not be intruded into by personnel. The Contractor shall describe measures to be employed to achieve that goal.

Part 2 Products

- .1 Not Used.

Part 3 Execution

3.1 CONCRETE MANAGEMENT

- .1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which addresses concrete batch plant location, operation, and reclamation where required, to the satisfaction of the Departmental Representative. This plan shall include the following concrete management elements:
 - .1 During saw-cutting, only pure water may be used as a cooling fluid. If possible this fluid should be contained, collected and disposed of at an approved location.
 - .2 Concrete mixer washout shall be contained in a buried or above ground tank, with wash products moved back to the concrete batching yard or an approved facility for disposal.
 - .3 Water contaminated in the mixing, placement, and curing of concrete shall be contained and removed from the site to an approved disposal facility.
 - .4 If a concrete batching plant is used it shall be operated pursuant to applicable dust, air emission, and water quality control regulations.

3.2 STORAGE AND CONTAINMENT OF EXCAVATED MATERIAL

- .1 The EPP shall detail the plan for both temporary storage and permanent disposal of surplus excavated material.

3.3 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1

END OF SECTION

SECTION 01 45 00 QUALITY MANAGEMENT

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 77 00 – Closeout Procedures
- .3 Section 01 78 00 – Closeout submittals

1.2 MEASUREMENT PROCEDURES

This Work shall be incidental to contract and will not be measured for payment.

1.3 DEFINITIONS

- .1 Quality Control (QC): The process of checking specific product or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.
- .2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

1.4 QUALITY MANAGEMENT PROGRAM

- .1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Quality Management Plan shall at a minimum include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and test equipment including methods and frequency of calibration;

- .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the tests;
 - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance; and
 - .15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.
- .4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
 - .5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.
 - .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors, will periodically (shall be a minimum of 10% of the Quality Control checks) perform a second independent check to assess if the Quality Control process is being followed. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
 - .7 The Contractor must facilitate any independent Quality Assurance checks by representatives designated by the Departmental Representative.

At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control

Manager and Quality Assurance Manager and submitted to the Departmental Representative.

1.5 TESTING

- .1 Testing required to provide Quality Control and Quality Assurance to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - .1 Testing of all structural concrete, reinforcing steel, granular material and compaction, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;
 - .2 Coating test patches including over-wintering;
 - .3 All testing specified in the Contract Documents; and
 - .4 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
 - .1 The more stringent of the testing requirements in the 2010 Alberta Transportation Standard Specifications for Highway Construction Manual and subsequent updates or Alberta Transportation - Standard Specification for Bridge Construction 2013. Should one of these specifications be silent on a particular testing frequency the testing frequency shall be as defined in the BC MoT Standard Specifications (Highway Construction and or Bridge Construction, latest edition).
 - .2 Wherever these standard specifications refer to standards (e.g., CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
 - .3 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.
- .3 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;
 - .3 Within one Day after completion of testing, submit test results to the Departmental Representative; and
 - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work.

- .6 Quality Assurance testing will be undertaken by the Contractor through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspections, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.
- .7 The Contractor shall be responsible for third party testing of materials incorporated into the works.
- .8 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:
 - .1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.
 - .2 Submit samples and/or materials required for testing, as specifically requested in the Specifications or as requested by the Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site.

1.6 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections, or approvals before such is made; Contractor shall uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such Work is found not in accordance with Contract Documents, the Contractor shall correct such Work and pay costs of examination and correction.

1.7 INDEPENDENT INSPECTION AGENCIES

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

1.8 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.9 REJECTED WORK

- .1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).
- .2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).
- .3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage; and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.
- .4 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.
- .5 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Total Bid Amount the difference in value between Work performed and that called for by the Contract Documents, amount of which shall be determined by the Departmental Representative.

1.10 REPORTS

- .1 Submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 Submittals Procedures.
- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

SECTION 01 61 00 COMMON PRODUCT REQUIREMENTS

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Management.
- .2 All Technical Specification sections.

1.2 REFERENCES

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

1.3 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 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. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout project.

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 the 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.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and miscellaneous metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store coating materials (paint) shall be stored in a clean, dry, well-ventilated area, protected from sparks, flame, direct rays of the sun and extreme heat or cold. If stored on a concrete floor the material shall be elevated (e.g. on a pallet) while being stored. Storage conditions shall meet requirements of the Supplier product data sheet.
- .8 Remove and replace damaged products at own expense and to satisfaction of the Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to the Departmental Representative's satisfaction. Use touch-up materials to match original.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by the Departmental Representative. Unload, handle and store such products.

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 the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative may establish a course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation 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 the 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. The 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 the Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

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

1.10 CONCEALMENT

- .1 The Departmental Representative will inspect all work prior to any concrete pours or backfilling. The Contractor shall notify the Departmental Representative 24 hours before any pour or backfilling operation for inspection.
- .2 Concealment of work that has not been inspected shall be considered just cause for rejection of said work.

1.11 REMEDIAL WORK

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

1.12 FASTENINGS

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

1.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.

- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

- .1 Product Data Sheets and MSDS for all alternate proposed products shall be provided to Departmental Representative for approval a minimum of 1 week prior to intended use.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

SECTION 01 74 11 CLEANING

Part 1 General

1.1 RELATED SECTIONS

- .1 Not Used.

1.2 REFERENCES

- .1 Not Used.

1.3 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from access to site.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .7 Inspect finishes and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean finished overlay surface and paved areas within the work site.
- .11 Clean downspouts and drainage systems.
- .12 Remove debris and surplus materials from site.
- .13 Remove snow and ice from access to site.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Not Used.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

SECTION 01 77 00 CLOSEOUT PROCEDURES

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 78 00 - Closeout Submittals

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
- .2 Substantial Performance Inspection:
 - .1 Notify the Departmental Representative in writing when Work is considered ready for Substantial Performance and request the Departmental Representative's inspection
 - .2 Accompany the Departmental Representative on preliminary inspection to determine items listed for completion or correction.
 - .3 Comply with the Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.
 - .4 Notify the Departmental Representative of completion of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.
- .3 Completion Tasks: submit certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies have been completed.
 - .3 Work: complete and ready for final inspection.
- .4 Final Inspection:
 - .1 When completion tasks noted above have been completed, request final inspection of Work by the Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

- .1 Undertake a final cleaning of the site at project completion:
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 All disturbed areas shall be returned to their original condition.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

SECTION 01 78 00 CLOSEOUT SUBMITTALS

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 77 00 - Closeout Procedures

1.2 AS -BUILT DOCUMENTS AND SAMPLES

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

1.3 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not shown on original Contract Drawings.
 - .5 References to related shop drawings and modifications.

- .4 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

1.4 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Warranty management plan to include required actions and documents to assure that the Departmental Representative receives warranties to which it is entitled.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Submit, warranty information made available during construction phase, to the Departmental Representative for approval prior to each monthly pay estimate.
- .5 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.
- .6 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.
- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

SECTION 02 81 01 HAZARDOUS MATERIALS

Part 4 General

4.1 RELATED SECTIONS

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

4.2 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHWR Regulations), SOR/92-637.
- .2 National Fire Code of Canada 1995.
- .3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T-19.01).
- .4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/85-77, SOR/85-585, SOR/85-609, SOR/86-526).

4.3 DEFINITIONS

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

4.4 SUBMITTALS

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

4.5 STORAGE AND HANDLING

- .1 Coordinate storage of hazardous materials with the Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

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

4.6 TRANSPORTATION

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

- .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide a photocopy of all shipping documents and waste manifests to the Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to the Departmental Representative.
- .9 Report any discharge, emission, or escape of hazardous materials immediately to the Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 5 Products

5.1 MATERIALS

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

Part 6 Execution

6.1 DISPOSAL

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

END OF SECTION

SECTION 03 10 00 CONCRETE FORMING AND ACCESSORIES

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 00 - Payment Procedures.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 01 35 33 - Bridge Replacement Special Procedures.
- .5 Section 03 20 00 - Concrete Reinforcing
- .6 Section 03 30 00 - Cast-in-Place Concrete.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA S269.1, Falsework for Construction Purposes.
 - .5 CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork and falsework.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta, Canada.
- .3 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings and CAN/CSA-S269.3 for formwork drawings.
- .4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .5 Indicate sequence of erection and removal of formwork/falsework.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Place materials defined as hazardous or toxic in designated containers.

- .2 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
- .3 Dispose concrete waste in accordance with Section 01 35 43 - Environmental Procedures and as approved by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
- .2 Formwork shall have sufficient supports, strong-backs and/or walers to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of a least 20 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in colour.
- .7 Form release agent shall be non-toxic, biodegradable, and low VOC.
- .8 Falsework materials shall conform to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with Drawings.
- .2 Obtain the Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.
- .3 Fabricate and erect falsework in accordance with CSA S269.1.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1/A23.2.
- .7 Align form joints and make watertight. Keep form joints to minimum.

- .8 Use 20 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise on the drawings.
- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Build in anchors, sleeves, and other inserts required to accommodate Work as shown on the drawings and specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .11 Pier foundation formwork shall be watertight to prevent river contamination.
- .12 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 2 days for cast-in-place concrete barriers, deck cantilevers and other structural members if the temperature is maintained at a minimum of 15°C .
- .2 Remove formwork when concrete has reached 67 % of its design strength or minimum period noted above, whichever comes later, or replace immediately with adequate reshoring.
- .3 Reuse formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

SECTION 03 20 00 CONCRETE REINFORCING

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 00 – Payment Procedures
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 33 - Bridge Replacement Special Procedures.
- .4 Section 01 35 43 - Environmental Procedures.
- .5 Section 03 10 00 - Concrete Forming and Accessories
- .6 Section 03 30 00 - Cast-in-Place Concrete.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- .2 CSA International
 - .1 CSA-A23.1-09/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3, Design of Concrete Structures.
 - .3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA- G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-[M92(R2003)], Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
- .4 Concrete Reinforcement Work shall be in accordance with British Columbia Standard Specifications for Highway Construction, Section 412, "Concrete Reinforcement."

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta, Canada.
 - .1 Indicate placing of reinforcement and:

- .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by the Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

1.5 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Management and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: upon request, provide the Departmental Representative with certified copy of mill test report of reinforcing steel.
 - .2 Upon request submit in writing to the Departmental Representative proposed source of reinforcement material to be supplied.

1.6 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by the Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400W, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1.
- .6 Mechanical splices: subject to approval of the Departmental Representative.
- .7 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.
- .2 All hooks and bends shall be bent using the pin diameters and dimensions as recommended in the Reinforcing Steel Institute of Canada (RSIC), Manual of Standard Practice.
- .3 Obtain the Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Upon approval of the Departmental Representative, weld reinforcement in accordance with CSA W186.
- .5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

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

Part 3 Execution

3.1 FIELD BENDING

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

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on drawings and in accordance with CSA-A23.3.
- .2 Prior to placing concrete, obtain the Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Welding of reinforcement is not permitted.

3.3 CLEANING

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

END OF SECTION

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 00 – Payment Procedures
- .2 Section 01 32 16.07 – Construction Progress Schedule - Bar (Gantt) Chart
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 29.06 - Health and Safety Requirements
- .5 Section 01 35 43 - Environmental Procedures.
- .6 Section 01 45 00 - Quality Management.
- .7 Section 01 74 11 - Cleaning.
- .8 Section 03 10 00 - Concrete Forming and Accessories.
- .9 Section 03 20 00 - Concrete Reinforcing.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 This work shall be incidental to and included within the lump sum amount for Supply and Construction of new Reinforced Concrete Abutments as described in Section 01 29 00 - Payment Procedures.

1.3 REFERENCES

- .1 Abbreviations and Acronyms:
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
Type GU, GUb and GUL - General use cement and HS or HSb – for sulphate resistant cement.
 - .2 Fly ash:
 - .1 Type F - with CaO content less than 15%.
 - .3 GGBFS - Ground, granulated blast-furnace slag.
- .2 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.
 - .3 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .2 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.

- .3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 ADMINISTRATIVE REQUIREMENTS

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

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 QUALITY ASSURANCE

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

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 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.
 - .2 Deviations to be submitted for review by Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials.

Part 2 Products

2.1 DESIGN CRITERIA

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

2.2 PERFORMANCE CRITERIA

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

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU, GUb, GUL, HS or HSb, as appropriate.
- .2 Supplementary cementing materials: with maximum 25% Type F fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1/A23.2.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494.
 - .3 Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Curing compound: to CSA A23.1/A23.2.

2.4 MIXES

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

- .1 Uniformity: as required by CSA A23.1/A23.2.
- .2 Workability: free of surface blemishes, loss of mortar, segregation.
- .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: S-2.
 - .2 Compressive strength at 28 day age: 30 MPa minimum.
 - .3 Intended application: Bridge Abutments and Railing Footings
 - .4 Aggregate size 28 mm maximum.
- .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .5 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

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

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.

- .1 Schedule:
 - .1 Exposed abutment surfaces - Sack rubbed finish.
 - .2 Buried abutment surfaces – rough form finish
 - .3 Bearing seats – troweled finish
- .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1 to tolerance schedule as indicated.
 - .1 Bearing seats: less than 1mm gap under a 1m straightedge
 - .2 All other surfaces: less than a 12mm gaps under a 3m straightedge

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Departmental Representative may take additional test cylinders at their discretion. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

3.5 CLEANING

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

SECTION 05 14 12 METALWORK

Part 4 General

4.1 METALWORK INCLUDES

- .1 Structural Aluminum for Truss Elements and Bridge Appurtenances
- .2 Structural steel for Approach Pedestrian Railing and Connection Brackets
- .3 Stainless Steel Fasteners and Anchor Bolts
- .4 Steel plates for retaining abutment backfill

4.2 RELATED SECTIONS

- .1 Section 01 29 00 - Payment Procedures.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 33 - Bridge Replacement Special Procedures.
- .4 Section 01 15 43 - Environmental Procedures.

4.3 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

4.4 REFERENCES

- .1 CSA International
 - .1 CAN/CSA S6-06, Canadian Highway Bridge Design Code.
 - .2 CAN/CSA S16-09, Design of Steel Structures.
 - .3 CAN/CSA S157-05, Strength Design in Aluminum.
 - .4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W59, Welded Steel Construction.
 - .7 CSA W59.2, Welded Aluminum Construction.
 - .8 CSA W47.1, Certification of companies for fusion welding of steel
 - .9 CSA W47.2, Certification of companies for fusion welding of aluminium.
- .2 ASTM
 - .1 ASTM A-252 Standard Specification for Welded and Seamless Steel Pipe Piles.
 - .2 ASTM B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .3 ASTM B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .4 ASTM B308, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
 - .5 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

- .6 ASTM F594, Standard Specification for Stainless Steel Nuts
- .3 ANSI
 - .1 ANSI H35.1/H35.1M, Alloy and Temper Designation System for Aluminum.
- .4 PCA
 - .1 PCA Directive for Design, Construction, and Inspection of Vehicular and Pedestrian Bridges, January 2008.

4.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural aluminium and structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59 or W59.2 welding symbols as applicable.
 - .2 Submit welding procedures stamped and approved by Canadian Welding Bureau.

4.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection of truss and truss members.
 - .2 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than 3 tonnes.
 - .3 Protect unpainted weathering steel, before erection, with waterproof covering.
 - .4 Ensure that no portion of steel comes into contact with ground.

4.7 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with the Departmental Representative in carrying out inspection and tests required.

Part 5 Products

5.1 STRUCTURAL ALUMINUM FOR TRUSS

- .1 Structural aluminium HSS: to be alloy and temper 6061-T6 in accordance with ASTM B221 and ANSI H35.1/H35.1M
- .2 Structural aluminum I-Sections: to be alloy and temper 6061-T6 in accordance with ASTM B308 and ANSI H35.1/H35.1M
- .3 Structural aluminum plates: to be alloy and temper 6061-T651 in accordance with ASTM B209 and ANSI H35.1/H35.1M
- .4 Structural aluminum square bar: to be alloy and temper 6061-T6511 in accordance with ASTM B221 and ANSI H35.1/H35.1M

5.2 ANCHOR RODS, ANCHOR BOLTS AND CONNECTION BOLTS

- .1 Structural bolts and Anchor Rods: to be stainless steel marking F593C in accordance with ASTM F593, unless noted otherwise.
- .2 Structural nuts: to be stainless steel marking F594C in accordance with ASTM F593, unless noted otherwise.
- .3 Washers: to be Type 304 stainless steel

5.3 STEEL PEDESTRIAN RAILINGS

- .1 All steel pedestrian railings, shall be supplied, fabricated and installed in accordance with the design drawings.
- .2 Structural steel HSS: to be 48mm O.D. to ASTM A 53 Grade 240 MPa galvanized.
- .3 Structural steel plates: to CSA G40.21, grade 350W galvanized.
- .4 Anchor bolts: to ASTM F1554 grade 55 galvanized.
- .5 Hot-dip galvanizing: to CSA G164, Table 1, minimum zinc coating of 600 g/m².
- .6 Welding: to CSA W59

5.4 MISCELLANEOUS STEELWORK

- .1 All other miscellaneous steelwork shall be supplied, fabricated and install in accordance with applicable CSA International provisions.

5.5 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21 and CSA W47.1.
- .2 Aluminum producer qualifications: certified in accordance with CSA W47.2

Part 6 Execution of Truss Fabrication

6.1 EXAMINATION

- .1 At completion of fabrication prior to shipping, fabricator to place truss segments on scaffold/horses for inspection and testing with NDT equipment and to provide minimum

7 days' notice to Departmental Representative to arrange inspection. Subsequent modifications and re-work to be completed at the Contractor's expense and shall be documented and submitted for quality records.

6.2 PREPARATION

- .1 Clean surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Field welding is not permitted.
- .3 All faying surfaces shall be sandblasted.
- .4 All connections to be test-fitted on complete truss segments prior to shipping.
- .5 Bolt threads shall be excluded from shear planes

6.3 TRANSPORTATION

- .1 Prior to shipping, submit a lifting procedure including all temporary lifting connections, any required temporary bracing, and geometry control plan. Temporary connections and bracing shall be designed to prevent damage to the aluminum structure. The lifting procedure shall be stamped and signed by professional engineer registered or licensed within the Province of Alberta, Canada.
- .2 Total lifting weight including truss, rigging, and any temporary bracing shall not exceed 11,000 lbs.

6.4 STAINLESS STEEL BOLT PRE-TENSIONING

- .1 Stainless steel structural bolts shall be pre-tensioned to a torque of 162 N-m (119 ft-lbs), unless noted otherwise.
- .2 Prior to arrival on-site, the Contractor shall submit a bolt pre-tension procedure detailing the approach used to apply and verify the specified torque.

END OF SECTION

SECTION 05 51 30 ELASTOMERIC BEARINGS

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 00 - Payment Procedures
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 35 33 - Bridge Rehabilitation Special Procedures

1.2 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.3 REFERENCES

- .1 CAN/CSA-S6-06 Section 11 - Joints and Bearings

1.4 SUBMITTALS

- .1 Submit certified mill test reports for all bearing materials.
- .2 Submit certified reports for short-duration and long-duration compression test of fabricated bearings.

Part 2 Products

2.1 ELASTOMERIC BEARINGS

- .1 All laminated elastomeric bearings shall conform to CAN/CSA-S6-06 Section 11.
- .2 Elastomer shall be virgin natural rubber (polyisoprene), 55 ±4 durometer, in accordance with Table 11.5 of CAN/CSA-S6-06.
- .3 The laminae of steel reinforced elastomeric bearings shall conform to CSA G40.21 Grade 250MPa.
- .4 Grout shall be non-shrink cementitious grout with a minimum compressive strength of 20MPa at 48 hours, and 45 MPa at 28 days.
- .5 All elastomeric bearings shall be fabricated in accordance with the design drawings

2.2 MISCELLANEOUS NEOPRENE PADS

- .1 All neoprene products used permanently in the works shall conform to CAN/CSA-S6-06 Section 11.
- .2 Elastomer shall be virgin natural rubber (polyisoprene), 55 ±4 durometer, in accordance with Table 11.5 of CAN/CSA-S6-06.

Part 3 Execution

3.1 INSTALLATION

- .1 Elastomeric bearings shall be installed as per the design drawings and manufacturer's instructions/specifications.
- .2 Truss end segments to be placed on bearings within +/- 5 Degrees C of the assumed installation temporary of 20 Degrees C. For installations outside of this temporary range, a methodology for tilting the bearings prior to placement shall be submitted to the Departmental Representative for approval prior to lowering of truss onto bearings.

END OF SECTION

SECTION 31 00 00 EARTHWORKS

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 00 - Payment Procedures.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 33 - Bridge Replacement Special Procedures.
- .4 Section 01 15 43 - Environmental Procedures.
- .5 Section 32 32 34 – Reinforced Concrete Block Retaining Wall
- .6 Section 31 11 00 – Trail Building

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ;) (600kN-m/m ;).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

- .1 Granular Fill
 - .1 Granular Fill to be well-graded compactible aggregate, 5 mm-38 mm with no more than 10% passing the #200 sieve (ASTM D422) or an equivalent alternate to be approved by the Departmental Representative.
 - .2 Material may be imported from commercial gravel supplier or obtained from screening material from identified borrow pit sites provided above specifications can be acceptably met. Suitability of borrow pit site material for this purpose is not guaranteed and should not be solely relied upon.
 - .3 Granular fill is to be used within, behind and below blocks for retaining wall and for abutment backfill at locations as directed by Departmental Representative.
 - .4 The minimum compaction standard shall be 95% of Standard Proctor Maximum Dry Density (SPD).
- .2 Trail Surface Course
 - .1 Trail surface course to be a well-graded 10 mm – 19mm compactible aggregate with 10% - 30% passing the #200 sieve (ASTM D422) or an equivalent alternate to be approved by the Departmental Representative.

- .2 Material may be imported from commercial gravel supplier or obtained from screeding material from identified borrow pit sites provided above specifications can be acceptably met. Suitability of borrow pit site material for this purpose is not guaranteed and should not be solely relied upon.
- .3 Trail surface course is to be used for the top 75mm of trail on both trail build and rebuild sections and bridge approach trail construction.
- .4 The minimum compaction standard shall be 95% of SPD.
- .5
- .3 **Infill**
 - .1 Excavated material may be used as infill following inspection and approval by Departmental Representative
 - .2 Imported infill material shall be soils obtained from the identified borrow sites. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the reinforced soil mass. Fine grained cohesive soils may be used in wall construction, but additional backfilling, compaction and water management efforts may be required as instructed by the geotechnical engineer.
 - .3 The internal friction angle of the infill must meet or exceed 25 degrees.
 - .4 The material must be free of debris and consist of one of the following inorganic USCS soil types: GP, GW, SW, SP meeting the following gradation as determined in accordance with ASTM D422.

Sieve Size	Percent Passing
1 in (25 mm)	100 - 75
No. 4	100 - 20
No. 40	0 - 60
No. 200	0 - 35
 - .5 Borrow pit locations for infill are identified in the reference documents Image 1: Borrow Pit Locations. Primary sites are those expected to have suitable materials for use. Secondary sites may have only limited amounts of suitable material.
 - .6 Infill material is to be used for the backfilling of bridge abutments and retaining walls.
 - .7 The minimum compaction standard shall be 95% of SPD.

Part 3 Execution

3.1 PREPARATION

- .1 Temporary erosion and sedimentation control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent waterway.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

3.2 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Alberta regulations.
- .2 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .1 Stockpile topsoil on site for later use.
- .3 Excavate as required to carry out work.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Departmental Representative when excavations are complete.
 - .3 Bearing surfaces shall be reviewed and approved by geotechnical personnel.
 - .4 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work. Remedial measures shall be directed by the geotechnical engineer or by the Departmental Representative, as appropriate.
 - .5 Excavation taken below depths shown without Departmental Representative's written authorization to be filled with granular fill meeting these specifications at Contractor's expense.

3.3 FIELD QUALITY CONTROL

- .1 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.

3.4 BACKFILLING

- .1 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .2 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .3 Placing:
 - .1 Place backfill, fill and base course material in 150 mm lifts: add water as required to achieve specified density.
- .4 Compaction: compact each layer of material to 95% of Proctor Density to ASTM D698
- .5 Against foundations: excavated material or imported material with no stones larger than 100 mm diameter within 600 mm of structures.

3.5 GRADING

- .1 Grade so that water will drain away from abutments.

3.6 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment

END OF SECTION

SECTION 31 11 00 TRAIL BUILDING

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Environmental Procedures
- .2 Section 33 42 13 – Pipe Culverts

1.2 DESCRIPTION

- .1 Trail Diversion
 - .1 This item consists of building trail diversion as indication on reference document Image 3: Trail diversion and as directed by the Departmental Representative, and includes:
 - .1 Clearing and Grubbing for a finished trail width of 5 metres and estimated length of 567 metres.
 - .2 Stripping of organic material and top soil.
 - .3 Trail and borrow excavation.
 - .4 Construction of 75mm road/trail bed using borrow material on site.
 - .5 Compaction of borrow material to the satisfaction of Departmental Representative using walk behind vibrating roller compactor or plate compactor.
 - .6 Grading, contouring shoulders and installing ditches.
 - .7 Hand seeding shoulders/ditches at a rate of 25kg/ha (seed supplied by Parks Canada)
 - .2 Trail Restoration at Washout Locations
 - .1 This item consists of reconstruction of trail at washout locations indicated in reference document Image 2: Upstream Washout Locations, and includes:
 - .1 Trail and borrow excavation.
 - .2 Installation of 900mm diameter culverts, 9 metres in length at each washout location in accordance with section 33 42 12 Pipe Culverts.
 - .3 Reconstruction of trail approaches for a distance of approximately 20m each side of culvert as directed by the Departmental Representative. Finished trail shall be 5m wide with 75mm road/trail bed in accordance with reference document drawings 1-3 as appropriate to address site conditions.
 - .4 Compaction of borrow material to the satisfaction of Departmental Representative using walk behind vibrating roller compactor or plate compactor.
 - .5 Grading, contouring shoulders and installing ditches.
 - .6 Hand seeding shoulders/ditches at a rate of 25kg/ha (seed supplied by Parks Canada).

1.3 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.4 DEFINITIONS

- .1 Clearing: cutting off trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees and stumps, in addition to surface debris on site as directed by Departmental Representative.
- .2 Grubbing: excavation and disposal of stumps and roots to not less than specified depth below existing ground surface.
- .3 Stripping: excavation of organic material and topsoil covering original ground.
- .4 Borrow Material: material obtained from a borrow pit on site within 100 metres of the start of the trail.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to trees, landscaping, natural features, water courses, and root systems of trees which are to remain.
- .2 Repair damaged items to approval of Departmental Representative.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Trail Surface Course in accordance with Section 31 00 00 Earthworks.

Part 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative alignment, grades and dimensions.

3.3 CLEARING

- .1 Clear as directed by Departmental Representative, by cutting trees and vegetative growth.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.

- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .4 All clearing shall be felled in such a manner that surrounding vegetation is preserved along construction limits. Stumps remaining within 3.0 metres of cleared perimeter are to be cut flush with ground and vegetative mat left undisturbed.

3.4 GRUBBING

- .1 Remove and dispose of roots and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.

3.5 STRIPPING

- .1 Topsoil/Organic material stripping of a given area shall commence upon approval by the Departmental Representative after clearing and grubbing debris have been removed.
- .2 Do not mix topsoil with subsoil.
- .3 Stockpile topsoil in locations prescribed by Departmental Representative.
- .4 Upon completion of road/trail bed construction, spread previously stripped Topsoil/Organic material on slopes, shoulders and ditches.

3.6 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials to disposal area designated by Departmental Representative.

3.7 ROAD/TRAIL BED BUILDING

- .1 Excavate, load and haul borrow material to trail site. Spread borrow material to depth suitable for a finished, compacted lift of 75mm thickness.

3.8 3.08 COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture for the entire layer depth.
- .2 Deposit, spread and level trail bed material in layers of 150mm maximum thickness before compaction.
 - .1 Compact until compaction equipment achieves no further significant consolidation.
- .3 Compact to minimum 95% maximum dry density: ASTM D 698
- .4 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.9 COMPACTION EQUIPMENT

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

3.10 3.10 FINISHING

- .1 Shape and Crown entire Trail bed.
- .2 Finish slopes, ditch bottoms and borrow pits true to lines and grades set out by Departmental Representative, where applicable.
- .3 Trim between constructed slopes and edge of clearing to provide drainage free of humps, sags and ruts.

END OF SECTION

SECTION 31 37 00 RIP RAP

Part 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 29 00 - Payment Procedures.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 33 - Bridge Replacement Special Procedures.
- .4 Section 01 15 43 - Environmental Procedures.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 The measurement and payment procedure for this Section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.3 DESCRIPTION

- .1 This specification is for the supply, delivery, and installation of heavy rock riprap. This work shall include all necessary trimming, excavation, and fill required to satisfactorily place the rock riprap, such as:
 - .1 excavation, trimming and shaping headslope
 - .2 excavation at headslope toe, and for rock apron
 - .3 excavation for rock in stream bank transition zone
 - .4 supply and placing of geotextile filter fabric
 - .5 supply and placing of gravel or granular bedding material
 - .6 backfill over rock in stream bank transition zone to restore lines of natural bank.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert left over aggregate materials from landfill to local quarry for reuse as approved by Engineer.
- .2 Divert left over geotextiles to local plastic recycling facility for reuse as approved by Engineer.

1.5 PERMITS

- .1 The Contractor shall obtain whatever permits, agreements, and authorizations are necessary, prior to loading the riprap. He shall advise the Engineer of any special provisions required under such permits, and must provide evidence satisfactory to the Engineer that the requirements of the permits have been fully complied with before final payment will be made.

Part 2 PRODUCTS

- .1 Stone

- .1 The rock 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. 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". The minimum dimension of any single rock shall be not less than one third of its maximum dimension. The minimum acceptable unit weight of the rock is 2.5 t/m³.
- .2 The Contractor shall provide the Departmental Representative with evidence of the acceptability of the riprap material. Reliable performance records of proposed material, other than fieldstone, will be considered evidence of acceptability. Fieldstone shall be considered to have a reliable performance record, and will be accepted if it meets the gradation requirements.
- .3 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. The material provided for the required Class 2 rock shall have a gradation that conforms to the following:

		CLASS			
		1M	1	2	3
Nominal Mass (kg)		7	40	200	700
Nominal Diameter (mm)		175	300	500	800
None greater than:	kg or mm	40 300	130 450	700 800	1800 1100
20% to 50%	kg or mm	10 200	70 350	300 600	1100 900
50% to 80%	kg or mm	7 175	40 300	200 500	700 800
100% greater than:	kg or mm	3 125	10 200	40 300	200 500

Percentages quoted are by mass.

Sizes quoted are equivalent spherical diameters, and are for guidance only.

- .4 Rip Rap shall meet the following minimum requirements for specific gravity, absorption and durability:
 - .1 California Department of Transportation Minimum Specific Gravity = 2.60
 - .2 Method of Test for Specific Gravity and Absorption of Coarse Aggregate Maximum Absorption = 2.0 percent (California Test 206)

.3 California Department of Transportation Minimum Durability Index = 52

.1 Method of Test for Durability Index Durability Index may be less than 52 if $DAR^* > 23$ (California Test 229) * Durability Absorption Ratio (DAR) = Durability Index / (Absorption % + 1%)

.2 Geotextile Filter:

.1 Where geotextile filter fabric is specified, the slope shall be graded to provide a smooth, uniform surface. All stumps, large rock, brush or other debris that could damage the fabric shall be removed. All holes and depressions shall be filled so that the fabric does not bridge them. Loose or unstable soils shall be replaced. Non-woven geotextile filter fabric shall be used under all riprap in accordance with the following table of minimum average roll value properties (MARV's) for each specific Class of riprap:

Non-Woven Geotextile Filter Fabric		
Specifications and Physical Properties		
	Class 1M, 1 and 2	Class 3
Grab Strength	650 N	875 N
Elongation (Failure)	50%	50%
Puncture Strength	275N	550 N
Burst Strength	2.1 MPa	2.7 MPa
Trapezoidal Tear	250 N	350 N
Minimum Fabric Lap to be 300 mm		

.2 The non-woven geotextile filter fabric shall meet the specifications and physical properties as listed above or an equivalent alternate to be approved by the Departmental Representative.

Part 3 EXECUTION

3.1 PLACEMENT OF FABRIC

- .1 The fabric shall be laid parallel to the slope direction. It shall be placed in a loose fashion, however folds and wrinkles shall be avoided. Adjacent strips of fabric shall be overlapped a minimum of 300 mm, except where placed underwater, the minimum lap width shall be 1 m. Overlaps shall be pinned using 6 mm diameter steel pins fitted with washers and spaced at 1 m intervals along the overlaps.
- .2 The top edge of the filter fabric shall be anchored by digging a 300 mm deep trench, inserting the top edge of the fabric and backfilling with compacted soil.

- .3 Care shall be taken to prevent puncturing or tearing the geotextile. Any damage shall be repaired by use of patches that extend at least 1 m beyond the perimeter of the tear or puncture. The fabric shall be covered by rock riprap within sufficient time so that ultraviolet damage does not occur; in no case shall this time exceed 7 days for ultraviolet material and 14 days for ultraviolet protected and low ultraviolet susceptible polymer geotextiles. Riprap placement shall commence at the base of the blanket area and proceed up the slope. Heavy equipment will not be permitted to operate directly on the geotextile. The non-woven geotextile filter fabric shall meet the specifications and physical properties as listed above.
- .4 The height of drop of riprap shall be limited to 1.0 m or less, and the riprap shall not be allowed to roll down the slope. Heavy equipment will not be permitted to operate directly on the geotextile. The non-woven geotextile filter fabric shall meet the specifications and physical properties as listed above.
- .5 The fabric shall be laid parallel to the slope direction. It shall be placed in a loose fashion, however folds and wrinkles shall be avoided. Adjacent strips of fabric shall be overlapped a minimum of 300 mm, except where placed underwater, the minimum lap width shall be 1 m. Overlaps shall be pinned using 6 mm diameter steel pins fitted with washers and spaced at 1 m intervals along the overlaps.
- .6 The top edge of the filter fabric shall be anchored by digging a 300 mm deep trench, inserting the top edge of the fabric and backfilling with compacted soil.

3.2 PLACEMENT OF ROCK

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place rip-rap to thickness and details as indicated on the drawings. The rock shall be handled, dumped or placed into position to conform to the specified gradation and to the cross section shown on the drawings. The finished surface shall be reasonably uniform, free from bumps or depressions, and with no excessively large cavities below or individual stones projecting above the general surface.
- .4 Place stones in manner approved by Engineer to secure surface and create a stable mass. Place larger stones at bottom of slopes.

END OF SECTION

SECTION 32 32 34 REINFORCED CONCRETE BLOCK RETAINING WALL

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 29 00 Payment Procedures
- .2 Section 01 35 33 Bridge Replacement Special Procedures

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C1372 Standard Specification for Segmental Retaining Wall Units.
 - .2 ASTM 1262 Evaluating the Freeze Thaw Durability of Manufactured CMU's and Related Concrete Units
 - .3 ASTM D698 Moisture Density Relationship for Soils, Standard Method
 - .4 ASTM D422 Gradation of Soils
 - .5 ASTM C140 Sample and Testing Concrete Masonry Units

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Submit to Departmental Representative detailed topographical survey of full extent of abutments and approaches a minimum of 40m each end of bridge extending to tree line each side. Survey collection points on a maximum spacing of 2.5m in both directions. Submit minimum of 3 weeks prior to ordering materials for construction.
- .3 Departmental Representative to confirm wall geometry and alignment prior to ordering of materials.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address. Check materials upon delivery to assure that the proper material has been received.
- .2 Storage and Handling Requirements:
 - .1 Follow storage and handling recommendation of supplier of reinforced soil type retaining wall system.
 - .2 Prevent excessive mud, cementitious material, and like construction debris from coming in contact with the materials
 - .3 Protect the materials from damage. Damaged material shall not be incorporated in the project (ASTM C1372)
 - .4 Store geogrid at temperature above minus 23 degrees C.

Part 2 Products

2.1 MODULAR WALL UNITS

- .1 Wall units shall be Allan Block Retaining Wall units as produced by a licensed manufacturer or approved equivalent.
- .2 Wall units shall have minimum 28 day compressive strength of 20 MPa in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection in accordance with ASTM C1372 or an average absorption rate of 120 kg/m³.
- .3 Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 3 mm.
- .4 Wall units shall provide a minimum of 555 kg/m³ total weight. Fill contained within the units may be considered 80% effective weight.
- .5 Exterior face shall be textured. Color as specified by owner.

2.2 FILL MATERIALS

- .1 Granular fill for use behind and within the blocks and used as base material shall be in accordance with 2.1.1 of Section 31 00 00 Earthworks.
- .2 Trail surface course for use as the top 75mm of material within trail area shall be in accordance with 2.1.2 of Section 31 00 00 Earthworks.
- .3 Infill for reinforced concrete block retaining wall shall be in accordance with 2.1.3 of Section 31 00 00 Earthworks.

2.3 GEOGRID

- .1 Geogrid shall be Strata SG200 Geogrid reinforcement or approved equivalent.

Part 3 Execution

3.1 EXCAVATION

- .1 Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown.
- .2 Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.2 FOUNDATION SOIL PREPARATION

- .1 Foundation soil shall be defined as any soils located beneath a wall.
- .2 Foundation soil shall be excavated as dimensioned on the plans and compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material.
- .3 Foundation soil shall be examined by the Departmental Representative to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not

meeting the required strength shall be removed and replaced with acceptable material, as directed by the Departmental Representative.

3.3 BASE

- .1 The bedding layer beneath the first course (base) shall be the same as the Granular Fill (Section 2.2).
- .2 Base material shall be placed as shown on the construction drawing. Top of base shall be located to allow bottom wall units to be buried to proper depths as per wall heights and specifications.
- .3 Base material shall be installed on undisturbed native soils or suitable replacement fills compacted to a minimum of 95% Standard Proctor (ASTM D698).
- .4 Base shall be compacted at 95% Standard Proctor (ASTM D698) to provide a level hard surface on which to place the first course of blocks. The base shall be constructed to ensure proper wall embedment and the final elevation shown on the plans. Well graded sand can be used to smooth the top 15 mm on the base material.
- .5 Base material shall be a 100 mm minimum depth for walls under 1.2 m and a 150 mm minimum depth for walls over 1.2 m.

3.4 UNIT INSTALLATION

- .1 The first course of wall units shall be placed on the prepared base per the manufacturers installation recommendations. The units shall be checked for level and alignment as they are placed.
- .2 Ensure that units are in full contact with base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
- .3 Fill all cores and cavities and a minimum of 300 mm behind the base course with granular fill. Use infill soils behind the granular fill and approved soils in front of the base course to firmly lock in place. Check again for level and alignment. Use a plate compactor to consolidate the area behind the base course. All excess material shall be swept from top of units.
- .4 Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3 in. (75 mm) minimum offset is recommended. Check each block for proper alignment and level. Fill all cavities in and around wall units and to a minimum of 12 in. (300 mm) depth behind block with wall rock.
 - .1 Spread infill soil in uniform lifts not exceeding 8 in. (200 mm) in uncompacted thickness and compact to 95% of Standard Proctor (ASTM D698) behind the consolidation zone.
- .5 The consolidation zone shall be defined as 3 ft (0.9 m) behind the wall. Compaction within the consolidation zone shall be accomplished by using a hand operated plate compactor and shall begin by running the plate compactor directly on the block and then compacting in parallel paths from the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. (200 mm). Expansive or fine-grained soils may require additional compaction passes and/or specific compaction equipment such as a sheepsfoot roller. Maximum lifts of 4 inches (100 mm) may be required to achieve

adequate compaction within the consolidation zone. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Final compaction requirements in the consolidation zone shall be established by the Departmental Representative.

- .6 Install each subsequent course in like manner. Repeat procedure to the extent of wall height.
- .7 Geogrid shall be installed in between every second course to the lengths specified in accordance with manufacturers recommendations.
- .8 As with any construction work, some deviation from construction drawing alignments will occur. Variability in construction of SRWs is approximately equal to that of cast-in-place concrete retaining walls. As opposed to cast-in-place concrete walls, alignment of SRWs can be simply corrected or modified during construction. Based upon examination of numerous completed SRWs, the following recommended minimum tolerances can be achieved with good construction techniques.
 - .1 **Vertical Control** - ± 1.25 in. (32 mm) max. over 10 ft (3 m) distance.
 - .2 **Horizontal Location Control** - straight lines ± 1.25 in. (32 mm) over a 10 ft (3 m) distance.
 - .3 **Rotation** - from established plan wall batter : 2.0°
 - .4 **Bulging** - 1.0 in. (25 mm) over a 10 ft (3.0 m) distance
- .9 Filter fabric is to be placed between units and concrete abutment wing wall as shown on the drawings.

3.5 BACKFILLING

- .1 Backfill behind facing panels to requirements as follow:
 - .1 Place backfill by closely following erection of each lift of facing panels and in accordance with wall system supplier's written recommendations.
 - .2 At each level of soil reinforcing elements, grade and compact backfill to same elevation as connections with facing panels, before placing reinforcing.
 - .3 Place backfill to ensure reinforcing elements do not buckle or are displaced.
 - .1 Avoid sudden braking and sharp turning of tracked and rubber-tired equipment on backfill.
 - .2 Place backfill in direction away from facing panels.
 - .3 Before operating tracked vehicles over geogrid area, place fill thickness of 200 mm minimum above level of geogrid reinforcing.
 - .4 Place and compact backfill without causing displacement or rotation of facing panels beyond supplier tolerances.
 - .1 Use only hand-held or hand-guided compacting equipment within 1 m of facing panels.
 - .5 Compact backfill at moisture content not exceeding optimum value in accordance with ASTM D698.
 - .6 Ensure that backfill is in contact with soil reinforcing elements for full length of each element.
 - .1 Ensure backfill occupies open spaces between solid components of wire mesh and geogrids.

- .7 Place toe berm/reconstruct slope in front of wall as soon as required alignment of facing panels is assured and when approved by Departmental Representative.

3.6 FINISH TOLERANCES

- .1 Precast facing panels and coping: all dimensions within plus or minus 10 mm, including diagonals measured between opposite corners of panels.
- .2 Levelling pad: top surface within plus or minus 25 mm of directed elevation.
- .3 Wall verticality: not to deviate more than 10 mm from vertical over 2 m height.
- .4 Panel joints: horizontal and vertical offsets at individual joints not to exceed 20 mm.
- .5 Wall alignment: horizontal alignment not to deviate more than 18 mm over 3 m distance.

END OF SECTION

SECTION 33 42 12 PIPE CULVERTS

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittals
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 31 11 00 - Trail Building

1.2 DESCRIPTION

- .1 This item consists of the supply and installation of corrugated steel pipe culverts in conformity with the drawings and as detailed by the Departmental Reprehensive, and includes:
 - .1 3 - 450mm CSP culverts, each 6 metres long (for new trail)
 - .2 2 – 900mm culverts, each 9 metres (trail wash outs)

1.3 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 For the trail washouts, the original 900 mm culverts that were in the trail have been washed away from the crossing during the June floods and may be salvageable for the works defined in the Contract. The Contractor is to recover and evaluate the condition of the culvert to assess whether or not they are reusable to incorporate into the Works.

1.4 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .2 CSA International
 - .1 CAN/CSA G401-07, Corrugated Steel Pipe Products.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Certification: to be marked on pipe.
- .3 Test and Evaluation Reports:
- .4 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

1.6 DELIVERY, STORAGE AND HANDLING

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

- .2 Store and protect pipes from damage.
- .3 Replace defective or damaged materials with new.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 PRODUCTS

2.1 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CAN/CSA-G401.
- .2 Culverts to be annular or spiral with annular ends. Coupling bands to be two piece annular bolted with minimum width of nine corrugations.
- .3 Minimum wall thickness to be 2.0 mm.
- .4 Corrugations to be 68 mm x 13 mm.
- .5 For all exposed culvert ends, 2:1 mitred end sections will be required.

2.2 CUT ENDS

- .1 All exposed ends of CSP to have sloped end sections.
- .2 All cut edges shall be made smooth by grinding so that all burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.
- .3 Where an existing culvert is extended, up to 3 m of the existing culvert end shall be removed as directed by the Departmental Representative.

2.3 GRANULAR BEDDING AND BACKFILL

- .1 Granular bedding and backfill material to be screened out of borrow material by the Contractor, meeting requirements for Granular Fill as specified in Section 31 00 00 Earthworks.

Part 3 EXECUTION

3.1 BEDDING

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

- .2 Place 200 mm minimum thickness of approved granular fill material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D 698.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.2 LAYING CORRUGATED STEEL PIPE CULVERTS

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.3 JOINTS: CORRUGATED STEEL CULVERTS

- .1 Match corrugations or indentations of coupler with pipe sections before tightening.
- .2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.
- .3 Insert and tighten bolts.
- .4 Repair spots where damage has occurred to spelter coating by applying two coats of zinc rich paint approved by the CSP supplier. Allow each coat to dry before placing second coat, bedding or backfill.

3.4 BACKFILLING

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place granular backfill material in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 98% maximum density to ASTM D 698 taking special care to obtain required density under haunches.
- .4 .Protect installed culvert with minimum 300 mm cover of compacted fill before heavy equipment is permitted to cross.
 - .1 During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.
- .5 Place backfill in unfrozen condition.

3.5 CLEANING

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

END OF SECTION