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1077-01-006	BEARING DETAILS
1077-01-007	DECK MODIFICATIONS
1077-01-008	DECK JOINT REPLACEMENT
1077-01-009	CAST-IN-PLACE BARRIER LAYOUT AND REINFORCEMENT
1077-01-010	BICYCLE RAILING
1077-01-011	PRECAST TRANSITION BARRIER
1077-01-012	PRECAST DRAINAGE BARRIER AND SPILLWAY DETAILS

REFERENCE DRAWINGS:

1956 ORIGINAL DESIGN, OTTERTAIL RIVER BRIDGE, YOHO NATIONAL PARK B.C. M.12.9,
DEPARTMENT OF PUBLIC WORKS CANADA

1 OF 6	PLAN & ELEVATION
2 OF 6	ABUTMENTS NORTH & SOUTH
3 OF 6	ABUTMENTS REINFORCING
4 OF 6	PIERS NORTH & SOUTH
5C OF 6	DECK PRESTRESSED CONCRETE ALTERNATIVE 'C'
6 OF 6	STANDARD HANDRAIL DETAIL

2008 DECK JOINT REPLACEMENT, OTTERTAIL RIVER BRIDGE ON HWY 1 NEAR FIELD,
YOHO NATIONAL PARK, MOST ENGINEERING LTD.

S1-704	DECK JOINT REPLACEMENT – SHEET 1
S2-704	DECK JOINT REPLACEMENT – SHEET 2

REFERENCE MATERIAL:

EIA Checklist – Ottertail River Bridge Rehab, 2017 February 23
Parks Canada National Best Management Practices: Roadway, Highway, Parkway and Related
Infrastructure, May 2015

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises rehabilitation of the Ottertail River Bridge, located at km 107.2 along the Trans-Canada Highway from the Banff National Park East Gate and is located in Yoho National Park.
- .2 Preparation of an Environmental Protection Plan for the Work.
 - .1 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 any adverse effects are minimal. 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 work, the work of this Contract generally comprises the following:
 - .1 Mobilization and site preparation.
 - .2 Project management and coordination.
 - .3 Traffic management during construction.
 - .4 Quality control and quality assurance of all construction activities.
 - .5 Health and Safety management during construction.
 - .6 Protection of utilities and coordination of utility relocations.
 - .7 Construction in Stages.
 - .8 Removal and disposal of existing bridge railings, curbs, deck drains, deck overhangs, asphalt wearing surface, deck joints, and bearings.
 - .9 Modifications of abutment back walls and return walls.
 - .10 Substructure concrete repairs as directed by departmental representative.
 - .11 Supply, fabrication, installation and post-tensioning of high strength bars at pier caps.
 - .12 Supply, fabrication and installation of new elastomeric bearings.
 - .13 Cold milling of concrete deck.
 - .14 Partial depth concrete deck repairs when authorized by Departmental Representative.
 - .15 Supply and placement of new concrete deck overhangs and concrete overlay.
 - .16 Supply, fabrication and installation of new deck drains.
 - .17 Supply, fabrication and installation of new deck joints.

- .18 Construction of new cast-in-place barriers.
- .19 Supply, fabrication and installation of new precast transition and drainage barriers.
- .20 Re-positioning of existing precast approach barriers.
- .21 Supply, fabrication and installation of new bicycle railings.
- .22 Construction of drainage spillways at embankments
- .23 Modification of approach roadway.
- .24 Application of lane markings on new finished road surface.
- .25 Demobilization.

1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.4 WORK SEQUENCE

- .1 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .2 Required stages:
 - .1 The bridge shall be rehabilitated in three stages. One lane of traffic in each of the eastbound (EB) and westbound (WB) directions must be provided at all times.
 - .2 Substantial completion – 2017 October 01.
 - .3 Final Completion – 2017 October 31.
- .3 Maintain fire access/control.
- .4 Work shall be carried out in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.5 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Public usage.
- .2 Co-ordinate 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 Lake Louise, 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 at the Parks Canada Administration Office in Lake Louise.
- .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 operations condition of existing work: equal to or better than that which existed before new work started.

1.6 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.

1.7 CONSTRUCTION SIGNAGE

- .1 No sign or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages.
 - .1 Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
 - .2 Use approved translation list for signage.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.
- .4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.

Signage shall be coordinated with other Contractors.

1.8 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Environmental Protection Plan.
 - .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 Copy of Accepted Erection Plans and Work Procedures.
 - .12 Health and Safety Plan and Other Safety Related Documents.
 - .13 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

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Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General**1.1 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .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 Keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of the source. Remove snow 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 Construction camps inside Yoho National Park are not permitted.
- .6 Office / tool trailer may be set up near the bridge sites at a location approved by the Departmental Representative.
- .7 Provide sanitary facilities for work force in accordance with governing regulations and Environmental Procedures for this project. 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 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.
- .10 No additional work is permitted that will slow or stop traffic during the following periods:
 - .1 From 22:00 April 13 to 06:00 April 18
 - .2 From 22:00 May 18 to 06:00 May 23
 - .3 From 22:00 June 29 to 06:00 July 4
 - .4 From 22:00 August 3 to 06:00 August 8
 - .5 From 22:00 August 31 to 06:00 September 5
 - .6 From 22:00 October 6 to 06:00 October 10

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING STRUCTURES

- .1 Execute work with least possible interference or disturbance to public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 The locations of Utilities, if any, shown or not shown on the Drawings, are subject to verification by the Contractor.
- .3 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .4 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall advise and obtain written approval for the intended methods of preserving the Utilities during Construction from all affected Utility Owners a minimum three (3) weeks prior to affecting any Utility. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities at the Construction Progress meetings.
- .5 The Contractor shall immediately report any damages to Utilities to the Departmental Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.5 SURVEY OF EXISTING PROPERTY 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 work.
- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts, and landscaped areas.

1.6 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of the Workers' Compensation Board of British Columbia (WorkSafeBC), the Provincial OH&S Act and 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.

1.7 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, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spill 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.
- .5 Hauling units are not to exceed legal highway load limits.

1.8 SUPERVISORY PERSONNEL

- .1 Within five Days 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.
- .2 The following personnel shall be included in the list:
 - .1 Project Superintendent;
 - .2 Deputy Project Superintendent;
 - .3 Health and Safety Coordinator.
- .3 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.
- .4 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
- .5 Health and Safety Coordinator must:
 - .1 Have minimum 2 years site-related working experience specific to activities associated with roadway and 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.

1.9 MEETINGS

- .1 Hold meetings in accordance with Section 01 31 19 – Project Meetings.

- .2 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.
- .3 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of Parks Canada, the Departmental Representative, Contractor, major subcontractors, and field inspectors, shall attend this meeting.
- .4 Cost of attending the above meetings shall be considered incidental to the Contract items and no additional payment will be made.

1.10 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 Yoho National Park unless specified otherwise in other sections of these Specifications.
- .3 Deposits of any construction debris into any waterway are strictly forbidden.
- .4 Cost for waste disposal described above shall be considered incidental to the Contract items and no additional payment will be made.

1.11 WORK STOPPAGE

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

1.12 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANNTT) Chart.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 Project Supplementary Conditions

1.2 PRIME COST SUM

- .1 Include in Contract Price a Prime Cost Sum of \$300,000.
- .2 Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.
- .3 Prime Cost Sum provided for in the lump sum arrangement table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of Contract.
- .4 Prime Cost Sum items may include but are not limited to;
 - .1 Removal and re-installation of existing signs or installation of additional signage as directed by the Departmental Representative.
 - .2 Additional pier partial depth concrete patch repairs as directed by the Departmental Representative beyond the quantity provided in the unit price table.
 - .3 Supply and placement of additional reinforcing due to corrosion.
 - .4 Re-positioning of existing precast approach barriers.
 - .5 Additional repairs as directed by the Departmental Representative.
- .5 Once a Prime Cost Sum item has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

1.3 MEASUREMENT PROCEDURES

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour, and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current B.C. Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
 - .2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.
 - .3 Labour rates and material costs shall be paid in accordance with the General Conditions.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

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ALLOWANCES
Page 2

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

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, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 MEASUREMENT PROCESS

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under "Lump Sum Price Item 1 – Mobilization / Demobilization"
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
- .2 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.
- .3 Payment of only 5% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 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 four 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 three days after meetings and transmit to meeting participants, 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.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, 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: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Record drawings in accordance with Section 01 33 00 – Submittal Procedures.

- .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Appointment of inspection and testing agencies or firms.
- .11 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings biweekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 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 submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

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PROJECT MEETINGS
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END OF SECTION

Part 1 General**1.1 DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five 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 Contractor to enable monitoring of Project work in relation to established Milestones.

1.2 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 5 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.

1.3 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.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Completion of each Stage of construction.
 - .2 Substantial Completion.
 - .3 Total Completion.

1.5 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 10 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 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.
 - .3 Permits.
 - .4 Submittals.
 - .5 Mobilization.
 - .6 Environmental Protection Plan, review and implementation.
 - .7 Traffic Management Plan, review and implementation.
 - .8 Health and Safety Plan, review and implementation.
 - .9 Quality Management Plan, review and implementation.
 - .10 Construction Staging.
 - .11 Fabrication of components (including but not limited to bearings, bicycle railing, and deck drains).

Parks Canada

- .12 Each stage of removal and disposal of existing bridge railings, concrete curbs, deck overhangs, deck joints, deck drains, asphalt wearing surface.
- .13 Removal and disposal of existing bearings.
- .14 Installation of new bearings.
- .15 Each stage of modifications of abutment back walls and return walls.
- .16 Substructure concrete repairs.
- .17 Post-tensioning of pier cap.
- .18 Each stage of cold milling of concrete deck.
- .19 Installation of deck drains.
- .20 Installation of new deck joints.
- .21 Each stage of construction of cast-in-place deck overhangs.
- .22 Each stage of placement of concrete overlay.
- .23 Each stage of construction of cast-in-place barriers.
- .24 Installation of precast concrete transition and drainage barriers.
- .25 Each stage of installation of new bicycle railings.
- .26 Modification of approach roadway.
- .27 Construction of new drainage spillways.
- .28 Application of lane markings.
- .29 Demobilization.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on weekly 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.

1.8 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 2 Products

2.1 NOT USED

- .1 Not used.

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SCHEDULE – BAR(GANTT)
CHART
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Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and 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 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 are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada, where required.
- .3 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 14 days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 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.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with 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.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by 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 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturers' 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.
- .14 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by 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.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Not used.

1.4 MOCK-UPS

- .1 Not Used.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

1.6 REQUIRED CONTRACT 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 fourteen (14) 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 concerns. Authorizations of the programs shall not relieve the contractor for 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 in accordance with Section 032 32 16.07 Construction Progress Schedules – Bar (GANTT) Chart.
 - .2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
 - .3 List of Sub-Contractors and Suppliers
 - .4 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.
 - .1 Include procedure for jacking girders to allow bearing replacement.
 - .2 Including procedure for post-tensioning high strength bars at pier cap.
 - .5 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
 - .6 Traffic Accommodation Strategy, in accordance with the requirements of Section 01 35 00.06 – Special Procedures for Traffic Control.
 - .7 Environmental Protection Plans (EPP) and Environmental Construction Operations Plans (ECO Plans) which shall meet the requirements of Section 01 35 43 – Environmental Procedures.
 - .8 Site Access Plan which shall include but not be limited to, engineering Drawings and procedures for accessing all areas of the Work. This shall include access scaffolding, fixed and suspended work platforms, temporary railings, etc.
 - .9 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada.
 - .10 Health and Safety Plan – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental

Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.

- .11 Health and Safety Plan must include:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 Site specific hazard assessment.
 - .5 General safety rules for project.
 - .6 Job specific safe work procedures.
 - .7 Inspection policy and procedures.
 - .8 Incident reporting and investigation policy and procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
 - .12 Submit copies of Material Safety Data Sheets (MSDS).
 - .13 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.
 - .14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .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-to-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 Traffic Accommodation logs.
 - .4 Shop drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum twenty-one days (three weeks) prior to fabrication.
 - .5 Concrete Mix Designs and supporting data.
 - .6 Product Data Sheets.
 - .7 Mill certificates.
 - .8 Deck surveys.
 - .9 Progress Photographs:

- .1 Formats:
 - .1 Electronic: .jpg files
 - .2 Quality: minimum five (5) mega pixels, full-colour, and not scanned.
- .2 Identification: spreadsheet listing name and number of project, description of each photograph with the corresponding file name and date taken.
- .3 Viewpoints: four (4) viewpoints determined by the Departmental Representative.
- .4 Detail Documentation: photographs documenting key details of the construction and as requested 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 two (2) copies of CD with all electronic pictures and the associated identification as part of the closeout package.
- .10 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.
- .11 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .12 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**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

1.1 RELATED REQUIREMENTS**1.2 REFERENCE STANDARDS**

- .1 British Columbia Ministry of Transportation
 - .1 Traffic Control Manual for Work on Roadways 99.
- .2 U.S. Department of Transportation
 - .1 Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD).

1.1 MEASUREMENT AND PAYMENT

- .1 Traffic Control for all work will be paid under Lump Sum Price Item – Traffic Control – prorated by the portion of overall Contract Work completed.
- .2 Additional hours of Traffic Control Personnel requested by the Departmental Representative beyond those specified will be paid for separately.

1.2 GENERAL

- .1 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .2 All speed limits, traffic control, and warning signs shall have an "NPC" adhesive sticker added to bottom right-hand corner. These stickers will be supplied by Parks Canada following the acceptance by the Departmental Representative of the Contractor's management plan.
- .3 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

1.3 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to Traffic Control Manual for Work on Roadways.

- .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
- .5 A minimum of one lane in each of the eastbound and westbound directions shall be maintained on the Trans-Canada Highway at all times. The minimum Clear Roadway for each lane of normal traffic shall be 4.0 m when lanes are separated by the construction work zone, and 3.9 m when lanes are adjacent, unless otherwise approved in writing from the Departmental Representative.
- .6 Clear roadway shall be measured by extending straight lines parallel to the roadway at the narrowest constriction point in the work zone from inside the faces of construction barriers, or from the faces of other constrictions, on each side of the clear roadway and measuring the perpendicular distance between the lines.
- .7 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.
- .8 Clear snow and ice from the roadway within the work zone.

1.4 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to Traffic Control Manual for Work on Roadways.
- .3 Signs must be pictorial or in both official languages. Use the approved translation list for signage.
- .4 Place signs and other devices in locations recommended in Traffic Control Manual for Work on Roadways.
- .5 Supply, install, maintain and remove two (2) changeable message signs (CMS) to inform the traffic of construction delays.
 - .1 Location of CMS will be agreed with the Departmental Representative.
 - .2 Text for CMS will be directed by the Departmental Representative.
 - .3 Removal of CMS will only be permitted upon completion of work.
 - .4 Payment for CMS will be incidental to the Lump Sum Price for Traffic Control.
- .6 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval Departmental Representative.
- .7 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to Traffic Control Manual for Work on Roadways for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 At each end of restricted sections where pilot cars are required.
 - .8 Delays to public traffic due to contractor's operators: 20 minutes maximum. Traffic shall be controlled by flag personnel to reduce delays to 20 minutes maximum. Emergency vehicles (i.e. ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic. Delay is defined as the total additional time required to pass through a work zone minus the time that would be required at the posted speed. Delay time shall be the maximum time elapsed as measured from the back of the approach queue to the resume speed sign.
- .2 During hours of darkness, if permitted under these specifications, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
- .3 No stoppage of traffic or additional reduction in lane capacity is permitted during the periods following:
 - .1 From 22:00 April 13 to 06:00 April 18
 - .2 From 22:00 May 18 to 06:00 May 23
 - .3 From 22:00 June 29 to 06:00 July 4
 - .4 From 22:00 August 3 to 06:00 August 8
 - .5 From 22:00 August 31 to 06:00 September 5
 - .6 From 22:00 October 6 to 06:00 October 10
- .4 Requests for lanes closures must be submitted for approval a minimum of 1 week in advance.

1.6 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted to a reduced speed limit of 30 km/hr.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of British Columbia
 - .1 Workers Compensation Act, RSBC 1996 - Updated 2012.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and 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 MSDS - Material Safety Data Sheets.
- .7 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 Departmental Representative within 7 days after receipt of comments from Departmental Representative.
- .8 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 Departmental Representative.

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 GENERAL REQUIREMENTS

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

1.7 RESPONSIBILITY

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

1.8 COMPLIANCE REQUIREMENTS

- .1 Comply with Workers Compensation Act, B.C.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 UNFORSEEN HAZARDS

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

1.10 POSTING OF DOCUMENTS

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

1.11 CORRECTION OF NON-COMPLIANCE

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

Parks Canada

1.12 BLASTING

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

1.13 POWDER ACTUATED DEVICES

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

1.14 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Sections.

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 Costs for handling, modification and repair of existing bird netting during the completion of the Work shall not be measured but considered incidental to the Work.
 - .2 Costs for removal of existing bird netting at project completion shall not be measured but considered incidental to the Work.

1.3 GENERAL

- .1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter any waterway, ditches, or wetlands within Yoho 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.
- .3 The Contractor shall refer to and implement the Best Management Practices (BMP) 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 Parks Canada Administration Office in Lake Louise, 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 at Parks Administration Office in Lake Louise.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2012 and subsequent amendments.
- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP) before commencing construction activities or delivery of materials to site, which will include topics in the following sub sections.

Parks Canada

- .3 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.
- .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonable 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 tables, 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 Bird nesting shall be prevented on the existing bridge in accordance with the BMP.

All personnel will be instructed by Parks Canada's ESO in procedures to follow in the event of wildlife appearance near or intrusion onto 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 LLYK Warden Service 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 firefighting equipment – e.g. three shovels, two pulaski's, 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 wild fire events during the "environmental briefing".
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that accidental ignition of any flammable material is prevented.
- .4 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .5 Fires or burning of waste materials is 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 off/on the Trans-Canada Highway in the vicinity of the project – see specifications and drawings; access 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. The access plan shall describe worker transportation to and from the construction site, and parking of worker's private vehicles.
- .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 on the construction right-of-way, 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, the Departmental Representative, and ESO trailer and toilets. Special measures are required to ensure that conflict with bears that are known to frequent the whole construction area does not arise. These include, but may not be limited to:
 - .1 Food, products, lunches, waste food products, or any other materials attractive to bears brought to this office location or to the bridge sites shall be secured within the trailers or by other specified means. Waste shall be secured in the trailers and removed daily from the office location.

- .2 In the event of quick or persistent attraction of bears to the office location, the site may require electric fencing, or removal to an alternate location, at the direction of the Departmental Representative.
- .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.
- .7 Materials lay-down shall be on the construction right-of-way, or in unusual circumstances – e.g. over-size components, at an alternate location to be determined by the Departmental Representative in consultation with ESO.

1.11 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 facilities 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 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.

1.12 WORK AROUND AND OVER WATER

- .1 The construction project shall take place outside of the wetted perimeter of any waterways. Some of the construction may require working over waterways. In these instances, the Contractor is to describe the measures in the EPP, to be employed to ensure fugitive materials, and especially deleterious substances do not enter any waterway – e.g. material produced by concrete curing.
- .2 Sediment control measures shall be to the satisfaction of the ESO.
- .3 Fuel management requirements are explained in the Equipment Fuelling and Maintenance, and Spill Containment Plan sub sections.

Parks Canada

- .4 Do not operate construction equipment in waterways.
- .5 Waterways to be kept free of excavated fill, waste material and debris.
- .6 Do not skit logs or construction materials across waterways.

1.13 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 extraneous materials from contaminating air and waterways 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.

1.14 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 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.

1.15 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 waterproofing agents, grout, concrete finishing agents, hot poured rubber membrane materials, blasting agents, 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.

1.16 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:

Parks Canada

- .1 Spill response kit capable of dealing with the largest possible spill 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.

1.17 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 metres from any watercourse.
 - .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. Any fuelling closer than 100 m to any watercourse will require the authorization and oversight of the ESO or the Departmental Representative.
 - .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 Yoho 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.

1.18 WASTE MATERIAL STORAGE AND REMOVAL

- .1 The Contractor shall prepare a Construction and Waste management plan as 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:

Parks Canada

- .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 of at a certified construction waste landfill outside Yoho National Park. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Yoho National Park.
 - .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 handles 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 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 to disperse waste or volatile materials such as mineral spirits, oil and paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.
 - .9 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

1.19 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 in the bridge contract for permanent works. Any vegetation wilfully or negligently removed shall be replaced in size and kind two fold. Top soil shall be supplied and placed as approved by the ESO, including the provision of erosion control blankets.

1.20 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**2.1 NOT USED**

- .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 address concrete 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, cooling fluids shall be contained, collected, and disposed of at an approved disposal facility.
 - .2 Concrete mixer truck 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 placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
- .2 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 Removal and storage of snow shall be described, and a plan shall be approved by the ESO and the Departmental Representative.
- .2 Within the EPP a contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need.
- .3 It may be desirable or necessary to maintain security services at the construction site during quiet times. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals.

- .4 Develop a response plan for, and be suitably equipped for, fires on and immediately adjacent to the work area.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 DEFINITIONS

- .1 Quality Control (QC): The process of checking specific products 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.

1.3 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 Manger witnesses the test;
 - .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 fabrications.
- .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 being 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 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.

1.4 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, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;
 - .2 All testing specified in the Contract Documents; and
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .2 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
- .1 Wherever these standards refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
 - .2 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 inspection, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.
- .7 The Contractor shall be responsible for third part 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.

1.5 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, 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 cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.6 INDEPENDENT INSPECTION AGENCIES

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

1.7 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.

1.8 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.

1.9 REPORTS

- .1 Submit one (1) electronic copy of inspection and test reports to Departmental Representative.
- .2 Submit to the Departmental Representative one (1) paper copy and one (1) electronic copy of all Non-Conformance Reports.

1.10 MILL TESTS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 31 – Special Procedures for Traffic Control.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.
 - .2 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.5 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms.

1.6 HOISTING

- .1 Provide, operate and maintain cranes required for moving of workers, materials and equipment.
- .2 Cranes to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

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

1.8 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.9 SECURITY

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

1.10 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Departmental Representative's Site office.
 - .1 Provide temporary office for Departmental Representative.
 - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 2 50% opening windows and one lockable door.
 - .3 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
 - .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
 - .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
 - .6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
 - .7 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
 - .8 Maintain in clean condition.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.12 SANITARY FACILITIES

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

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.

- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Section 01 52 00 – Construction Facilities.
- .3 Section 01 35 00.06 – Special Procedures for Traffic Control

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-O121, Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

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

1.4 HOARDING

- .1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors, roofs, and bridge decks or girders.
- .2 Provide as required by governing authorities.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.8 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

1.2 REFERENCE STANDARDS

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

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 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 structure.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 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 fabricated metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

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

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 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.

1.9 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.

1.10 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.

1.11 PROTECTION OF WORK IN PROGRESS

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

1.12 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.

Parks Canada

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Efficiency, maintenance, or safety of operational elements.
 - .3 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.

- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .7 Restore work with new products in accordance with requirements of Contract Documents.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 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 Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from work areas.
- .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 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.2 FINAL CLEANING

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

.12 Remove snow and ice from access to structure.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection:
 - .1 Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .3 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
 - .2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 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 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 Departmental Representative.

1.3 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: 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 on original Contract Drawings.
- .5 Referenced Standards to related shop drawings and modifications.
- .4 Specifications: 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 field test records, inspection certifications, and manufacturer's certifications, 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 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 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

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Measurement Procedures.
 - .1 Measure milling of asphaltic concrete pavement in approaches (minimum 50 mm thick) in square meters.
 - .1 Full depth removal of asphalt required for abutment modification will not be measured but considered incidental to removal and replacement of materials required for the abutment modification.
 - .2 Measure removal of bridge railing, concrete pylons, and curb in meters.
 - .1 Removal of existing scupper drains in curbs will not be measured but considered incidental to the work.
 - .3 Measure top portion of deck removal (including removal of asphalt overlay and cold milling of concrete deck) in square meters.
 - .1 Removal of deck concrete to below top mat where indicated on drawings will not be measured but considered incidental to the work.
 - .4 Measure partial depth deck repairs in square metres.
 - .5 Measure partial depth concrete patch pier repairs in square metres.
 - .6 Measure full depth deck overhang removal and partial depth deck removal at joints in cubic meters.
 - .1 Removal of existing deck joint will not be measured but considered incidental to the work.
 - .7 Measure removal of concrete at abutment back walls in cubic meters.
 - .1 Removal of existing deck joint will not be measured but considered incidental to the work.
 - .8 Measure bearing removals in units.
 - .1 Unit price shall include work required to remove bearing assemblies (i.e. jacking of girders) and including removal of bearings, shim plates and trimming of existing anchor rods.
- .2 Payment for stockpiling and disposal will be included in above removal items.

1.2 REFERENCE STANDARDS

- .1 CSA International
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.3 U.S. Environmental Protection Agency (EPA)

- .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
- .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
- .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

- .1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-demolition Meetings:
 - .1 Convene pre-demolition meeting prior to beginning work of this Section, as requested by Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work.
 - .3 Co-ordination with other construction subtrades.
 - .2 Hold project meetings every two weeks.
 - .3 Ensure key personnel attend.
 - .1 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
- .3 Shop Drawings:
 - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
 - .2 Submit for review procedure and drawings for jacking girders to allow bearing replacement.
 - .1 Submit girder jacking procedure and drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.

- .4 Deck Surveys:
 - .1 Submit deck surveys completed prior to scarification/milling.
 - .2 Submit deck surveys completed after deck scarification/milling.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with CEAA, and applicable Provincial/Territorial and Municipal regulations.

1.7 SITE CONDITIONS

- .1 Environmental protection:
 - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Do not bury rubbish waste materials.
 - .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout project.
 - .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
 - .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.
 - .8 Protect trees, plants and foliage on site and adjacent properties where indicated.
 - .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
 - .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
 - .11 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

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 properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:
 - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, adjacent grades, and parts of existing structure to remain.
 - .1 Provide bracing, and shoring as required.
 - .2 Repair damage caused by demolition as directed by Departmental Representative.
 - .3 Support affected structures and, if safety of structure being demolished, adjacent structures or services, appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
 - .4 Prevent debris from blocking surface drainage system.
- .3 Surface Preparation:
 - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
 - .2 Do not disrupt active or energized utilities traversing premises.

3.2 CONCRETE OVERLAY PREPARATION AND PARTIAL DEPTH DECK REPAIRS

- .1 Survey and reference profile the existing deck prior to removals:
 - .1 Maximum 3m stations.
 - .2 Include 25m of approach roadways on either end of bridge.
 - .3 Additional shots at joint locations.
 - .4 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Hinge point of crown
 - .5 Elevations are to be taken perpendicular to centreline.
 - .6 Layout points such that they can be re-established within 25mm of their original locations.
- .2 Remove entire thickness of asphalt from the bridge deck.

- .3 Remove the existing concrete surface by use of scarification (roto-milling), hydro-demolition or alternate methods acceptable to the Departmental Representative, over the full length and width of the bridge deck.
 - .1 Submit proposed alternate methods to Departmental Representative at least two weeks prior to Work.
- .4 Scarification equipment to be capable of concrete removal to an accuracy of +/- 5 mm with a milled surface that does not exceed 10 mm in amplitude for roughness.
 - .1 Maximum cut within 10 mm of the reinforcing steel.
- .5 Monitor the total depth of concrete cover to the top mat of reinforcing using a pachometer or alternate methods acceptable to the Departmental Representative.
 - .1 Readings shall be taken at regular intervals ahead of the scarification.
 - .2 Adjust the rate and depth of concrete removal to ensure that the reinforcing steel is not damaged and the desired scarified profile is achieved.
- .6 Following scarification/milling of the existing deck, survey deck:
 - .1 Maximum 3 m stations
 - .2 Additional shots at joint locations
 - .3 Profiles to include at minimum:
 - .1 500 mm from curb or barrier faces
 - .2 300 mm from construction/staging joints
 - .3 Hinge point of crown
 - .4 Elevations are to be taken perpendicular to centreline
 - .5 Layout points such that they can be re-established within 25mm of their original locations
- .7 Following scarification/milling of the existing deck, carry out a detailed visual inspection of the scarified deck surface.
- .8 Perform a chain drag delamination survey of the entire deck surface in the presence of the Departmental Representative to jointly
 - .1 Mark all areas of delamination or deterioration requiring further concrete removal with paint.
 - .2 Supply necessary materials to mark out repair areas.
- .9 Keep partial depth repair boundaries square or rectangular and avoid abrupt changes in width of a given repair area.
- .10 Edge of the repair area to be vertical.
- .11 Remove deteriorated, delaminated and all patch concrete to sound concrete.
 - .1 Remove all concrete to allow a 25 mm minimum space around all exposed reinforcing bar with partial depth repair.
 - .2 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.

- .12 Use pneumatic hammers less than nominal 14 kg class and "Chipping Hammer" less than nominal 7 kg within 150 mm of any existing concrete which is to remain in place. Maximum jackhammer weight used on the deck shall be 18 kg.
- .13 Do not damage existing reinforcing steel during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
- .14 Supply and placement of deck concrete shall be in accordance with Section 03 30 00 Cast-in-Place Concrete and Section 03 30 51 Concrete for Bridge Decks.
- .15 Existing Exposed Reinforcement to be retained:
 - .1 High pressure clean all reinforcement to be retained, as identified on the drawings, to remove all loose and laitance materials.
 - .2 Remove and replace any existing reinforcement with damage resulting in net section loss of 20% or greater at any location with a new bar of matching diameter.
 - .1 Use mechanical couplers acceptable to the Departmental Representative or lap spliced in accordance with CAN/CSA-S6-14 Clause 8.15.9.
 - .2 Mechanical couplers shall develop at least 125% of the specified yield strength of the bar.
- .16 Full depth repairs will only apply when soffit concrete is removed, as instructed by the Departmental Representative.
 - .1 Finished soffit repair concrete to be flush with surrounding soffit concrete.
 - .2 Patch areas for full depth repair exceeding 1 m² prior to overlay placement.
- .17 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) clean the surfaces of sub deck prior to the placement of the partial depth to remove all bruised and fractured concrete and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.
- .18 High pressure water blast the surface of the entire concrete sub-deck no earlier than 2 days before placing the overlay concrete.
 - .1 Minimum 110 MPa/15000 psi using a rotating head.
 - .2 Roughness amplitude shall be at least 6 mm.
- .19 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .20 Saturate existing concrete with water, with free standing water removed.
- .21 Prevent detritus from falling onto the adjacent travel lane or falling into the river below during roughening and cleaning process.
- .22 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 – Environmental Procedures.
- .23 Perform a final inspection of the prepared deck with the Departmental Representative immediately prior to placement of new concrete overlay.

3.3 REMOVALS FOR PARTIAL DEPTH CONCRETE PATCH REPAIRS AT PIERS

- .1 Provide access scaffolding or other means suitable for close proximity inspection of all above ground/water substructure elements and arrange for inspection with the Departmental Representative to mark out all areas for repair.
- .2 Thoroughly clean all substructure surfaces above ground/water prior to close proximity inspection with Departmental Representative.
 - .1 Surfaces to be free of all debris, dirt and laitance material.
- .3 Remove concrete in partial depth patch areas identified by the Departmental Representative.
- .4 Do not damage existing reinforcing during the removal process.
 - .1 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
- .5 Remove, contain, collect, and dispose of all concrete and other materials identified for removal to prevent debris from falling into any waterway in accordance with Section 01 35 43 – Environmental Procedures.
- .6 Prepare and submit written procedure for the pier repairs prior to commencement of work to the Departmental Representative for review.
 - .1 Procedure to include descriptions of removal sequences, methods, equipment, tools and containment measures.
- .7 Use pneumatic hammers less than nominal 14 kg class and "Chipping Hammer" less than nominal 7 kg within within 150 mm of any existing concrete which is to remain in place.
- .8 All saw cuts shall be in accordance with the drawings or as directed by the Departmental Representative.
 - .1 All patch areas to have straight edges only, preferably rectangular in shape.
- .9 Cut into existing concrete to a minimum depth of 25 mm.
- .10 Remove concrete a minimum of one bar diameter behind existing reinforcement.
- .11 Supply and placement of patch material shall be in accordance with Section 03 30 00 Cast-in-Place Concrete

3.4 DEMOLITION

- .1 Do demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 Prior to start of Work remove contaminated or hazardous materials as defined by authorities having jurisdiction and as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements.

- .5 Demolish parts of structures to permit construction of modifications as indicated on the Contract Drawings.
- .6 Asphalt milling in approaches:
 - .1 Mill minimum 50 mm asphalt over length of approach of 9 m from the ends of asphalt removal.
 - .1 Cold milling asphalt pavement shall be performed in a manner which prevents the tearing and breaking of underlying and adjacent pavement and the contamination of the reclaimed asphalt pavement with granular, subgrade or deleterious materials.
- .7 Other Concrete Removal:
 - .1 Outline limits of concrete removal by 25 mm deep sawcuts.
 - .2 Leave existing reinforcement intact as indicated.
 - .3 Trim reinforcement as indicated to satisfy cover requirements.
 - .4 Fully expose partially exposed rebar by removal of concrete to a depth of 25 mm behind the bar.
 - .5 Use pneumatic hammers less than nominal 14 kg class and "Chipping Hammer" less than nominal 7 kg within within 150 mm of any existing concrete which is to remain in place.
- .8 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
- .9 At end of each day's work, leave Work in safe and stable condition.
- .10 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .11 Remove and dispose of demolished materials, except where noted otherwise, and in accordance with authorities having jurisdiction.
- .12 Use natural lighting to do Work where possible.

3.5 CLEANING

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
- .3 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 30 00 – Cast-in-Place Concrete.
- .3 Section 03 30 51 – Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 No measurement will be made under this Section.
- .2 Include formwork costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153, Poplar Plywood.
 - .6 CAN/CSA-O325.0, Construction Sheathing.
 - .7 CSA S269.1, Falsework for Construction Purposes.
 - .8 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 British Columbia, Canada.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets.
- .4 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.
- .5 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

1.5 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products**2.1 MATERIALS**

- .1 Formwork materials:
 - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
 - .2 Forms for exposed surfaces, including the barriers and deck soffit, shall be new materials, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
 - .3 All form material for exposed surfaces shall be full-sized sheets, as practical. The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities 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, uniform in colour.
- .7 Form release agent shall be non-toxic, biodegradable, and low VOC.
- .8 Falsework material shall conform to CSA S269. 1.

Part 3 Execution**3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.

- .3 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 CSA-A23.1/A23.2.
- .4 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .5 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .6 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .7 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .8 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. If formwork is removed prior to the end of the curing period specified, the exposed concrete surfaces shall be protected by other accepted method of curing as provided in CSA-A23.1/A23.2.
 - .1 Seven (7) days for deck overhangs and cast in place barriers.
 - .2 Three (3) days for abutments and return walls.
 - .3 Three (3) days for concrete patch repairs at piers.
- .2 Remove formwork when concrete has reached 50 % of its design strength or minimum period noted above, whichever comes later.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2 and approval of Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 30 00 – Cast-In-Place Concrete.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure reinforcing steel in kilograms of steel incorporated into Work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Departmental Representative.
 - .1 Dowelling and anchoring reinforcing as indicated will not be measured but considered incidental to work.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A82/A82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - .4 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 CSA International
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3, Design of Concrete Structures.
 - .3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

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 Indicate placing of reinforcement and:

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

1.5 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in Part 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: provide Departmental Representative with certified copy of mill test report of reinforcing steel.
 - .2 Submit in writing to 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.
- .4 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: Grade 400W, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .5 Mechanical splices: subject to approval of Departmental Representative.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

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

Part 3 Execution**3.1 FIELD BENDING**

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

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 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

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 51 – Concrete for Bridge Decks.
- .4 Section 05 12 33 – Structural Steel for Bridges

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Measure cast-in-place concrete in cubic metres calculated from neat dimensions as indicated.
 - .2 Concrete placed beyond dimensions indicated will not be measured.
 - .3 No deductions will be made for volume of concrete displaced by reinforcing steel or structural steel.
 - .4 No deductions will be made for volume of concrete less than 0.1 m² in cross sectional area displaced by individual drainage openings.
 - .5 Supply and installation of grout, anchor rods, joint fillers, joint sealers, and conduits and junction boxes will not be measured but be considered incidental to work.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .5 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - .6 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - .7 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- .2 CSA International

- .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
- .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 ABBREVIATIONS AND ACRONYMS

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

1.5 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 (1) week prior to beginning concrete works.
 - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor - finishing, forming, concrete producer and testing laboratories attend.
 - .1 Verify project requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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 copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements and Section 01 35 43 – Environmental Procedures.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

- .2 Provide Departmental Representative, minimum four (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 four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .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.

1.8 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.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Alternative 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.

- .2 Blended hydraulic cement: Type GUb to CSA A3001.
- .3 Supplementary cementing materials: with maximum 25% fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
 - .1 Compressive strength: 20 MPa at 48 hours, 45 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0.01 %.
- .8 Curing compound: to CSA A23.1/A23.2.
- .9 Epoxy Grout: as indicated.
- .10 Patch material for abutments and piers: High strength shrinkage compensating cementitious repair material suitable for vertical and overhead applications, such as Sikacrete-08 SCC or Master Emaco S440 MC, or other approved equivalent.
- .11 Anchor Rods: as indicated.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-XL.
 - .2 Compressive strength at 28 days age: 45 Mpa minimum.
 - .3 Intended application: Barriers, abutment and return wall modifications, and abutment chamfer
 - .4 Aggregate size 20 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 by Departmental Representative.
- .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.
- .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 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.

- .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor rods at railings:
 - .1 Set anchor rods to templates in co-ordination with appropriate trade prior to placing concrete.
- .4 Anchor rods at bearings:
 - .1 Grout anchor rods in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 Drilled holes: to manufacturers' recommendations 25 minimum diameter larger than bolts used.
 - .2 Protect anchor rod holes from water accumulations, snow and ice build-ups.
 - .3 Set anchor rods and fill holes with shrinkage compensating grout.
 - .4 Locate anchor rods used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .5 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2 unless noted otherwise.
 - .1 Schedule:
 - .1 Deck – transverse tined.
 - .1 The tining shall create transverse grooves 3 mm wide by 1.5 mm to 3 mm deep at 20 mm centre-to-centre spacing.
 - .2 Underside of deck – smooth form finish
 - .3 Top and inner surface of barriers – sack rubbed finish.
 - .4 Abutments and return walls – smooth form 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.
- .6 Partial depth concrete repairs:
 - .1 Patch repairs to ensure minimum cover of 50 mm to existing reinforcement.
 - .2 Repair areas shall be thoroughly cleaned and free of foreign material to provide a sound bonding surface and to remove corrosion products.
 - .1 Use compressed air to remove all dust, grit, and concrete debris, or as recommended by the patch repair product manufacturer.
 - .3 Repair areas shall be "saturated-surface-dry" or as recommended by the patch repair product manufacturer.
 - .4 Patch material to be a high strength shrinkage compensating cementitious repair material suitable for vertical and overhead applications.
 - .5 Patch material to be placed by forming and pouring, not trowel applied.
 - .6 Curing to meet manufacturer requirements.
 - .7 Finish: Smooth form finish.
- .7 Joint fillers:

- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
- .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .3 Locate and form construction and expansion joints as indicated.
- .4 Install joint filler.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1 to tolerance schedule as indicated.
 - .1 Deck, barriers, abutment and return walls: less than 3mm gap 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 Contractor to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .6 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

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

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – Structure Demolition.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete

1.2 PRICE AND PAYMENT PROCEDURES

- .1 No measurement will be made under this section.
 - .1 Include costs of items in Section 03 30 00 - Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C1116/C1116M – 10a, Standard Specification for Fiber-Reinforced Concrete.
 - .2 ASTM C1399/C1399M – 10, Standard Test Method for Obtaining Average Residual-Strength of Fiber Reinforced Concrete.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Fibres: provide test data in accordance with ASTM C1018 and ASTM C1399 to show the fibre complies with the specification requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused plasticizers, water-reducing agents and air-entraining agents materials from landfill to official hazardous material collections site as reviewed by the Departmental Representative.
- .4 Unused plasticizers, water-reducing agents and air-entraining agents materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products**2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcement.
- .3 Synthetic Fibres: 100% virgin polypropylene to ASTM C1116, Type III.
 - .1 Fibres shall have a minimum length of 50 mm.
 - .2 Fibres shall have a minimum tensile strength of 350 MPa and a minimum modulus of elasticity of 4.2 GPa.

2.2 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: as required by CSA A23.1/A23.2.
 - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-XL.
 - .2 Minimum Post-Cracking Residual Strength Index: 0.15
 - .3 Compressive strength at 28 days age: 45 Mpa minimum.
 - .4 Intended application: Bridge deck.
 - .5 Aggregate size 10 mm maximum.
 - .6 Special Requirements: Synthetic Fibres.

Part 3 Execution**3.1 PREPARATION**

- .1 Deck Overlay Preparation:
 - .1 Removal of existing top of deck in accordance with Section 02 41 16 Structure Demolition.
- .2 Support rail elevation for mechanical bridge deck finisher:
 - .1 Submit for review by Departmental Representative survey of deck surface after removal in accordance with Section 01 33 00 – Submittal Procedures and 02 41 16 – Structure Demolition. Departmental Representative will provide input on setting elevations for rails or headers.

3.2 CONSTRUCTION

- .1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Fibre reinforced concrete (FRC):
 - .1 Add fibres early in the mixing process following manufacturers' recommendations to ensure evenly distributed fibres.
- .3 Place concrete at temperatures limits to CSA-A23.1/A23.2.
- .4 Do not place concrete:
 - .1 When air temperature is above 22 degrees C.
 - .2 During rain or excessive wind or dust.
 - .3 When conditions, as reviewed by Departmental Representative seem detrimental to concrete.
- .5 When air temperature falls below 5 degrees C, comply with cold weather requirements
- .6 Place deck concrete between hours of 6:00 p.m. and 10:00 a.m. as reviewed by Departmental Representative.
 - .1 Provide proper lighting for night pours as reviewed by Departmental Representative.
- .7 Maintain temperature of concrete during discharge between 10 degrees C and 18 degrees C unless permitted otherwise by Departmental Representative.
 - .1 Maintain temperature of mix below maximum temperature of 18 degrees C by adding ice to mix which does not alter design water-cement ratio.
- .8 Immediately prior to placing concrete, thoroughly wet down substrates with clean water.
- .9 Consolidate deck concrete with mechanical vibration even when vibratory drum type finishing machines are used.
- .10 Cast and finish deck with mechanical bridge deck finisher, approved by Departmental Representative.
- .11 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.
- .12 Ensure that experienced finishing machine operators and concrete finishers are provided to finish deck.
- .13 Do not place concrete until rails for support and operation of finishing machines and headers for hand operated strike-off devices are in place and firmly secured.
 - .1 Rails or headers to be of type, and so installed, that no springing or deflection will occur due to weight of finishing equipment and so located that finishing equipment can operate without interruption over entire bridge roadway deck being finished.
 - .2 Extend rails for finishing machines beyond both ends of scheduled length of concrete placement sufficient distance to permit float of finishing machine to fully clear concrete to be placed.

- .3 Set rails or headers to elevations, with allowance for anticipated settlement, camber, and deflection of falsework, as required to produce bridge roadway deck true to required grade and cross section.
- .14 Immediately prior to placing, check falsework and wedges and make necessary adjustments.
 - .1 Provide suitable means, such as telltales, to readily permit measurement by Departmental Representative.
- .15 Place concrete in uniform heading approximately normal to structure centreline, or in case of screed supported on transverse headers, parallel to centreline.
 - .1 Limit rate of placing to that which can be finished before beginning of initial set.
- .16 Immediately after concrete has been placed and consolidated, strike off surface.
 - .1 Correct immediately improper adjustment and operation which results in unsatisfactory consolidation and smoothness.
 - .2 Unsatisfactory performance may be cause for rejection of equipment and removal of concrete in place.
- .17 Following completion of strike off by hand methods, float roadway slab surface longitudinally to smooth uniform surface with hand-operated wood float boards 3.5 to 5 m long, minimum 25 mm thick, minimum 200 mm wide, ribbed and trussed as necessary to provide rigid float, and equipped with adjustable handles at each end.
 - .1 Provide adjusting screws spaced at maximum 600 mm centres between float board and rib.
 - .2 Maintain float board true to line and free of twist.
- .18 Use floats to remove roughness and minor irregularities left by strike board or finishing machine and to seal concrete surface to approval of Departmental Representative.
- .19 Adjust rails or headers as necessary to correct for settlement or deflection, which occurs during finishing operations.
 - .1 Operate finishing floats from transverse bridges that span area being floated: provide sufficient number and type of bridges, as reviewed by Departmental Representative, to permit operation of floats without undue delay.
 - .2 Provide minimum of two bridges when hand operated float boards are used.
 - .3 When finishing machine is used for longitudinal floating, supply one bridge for use by Departmental Representative.
- .20 Finishing bridge deck slab: when concrete has hardened sufficiently to prevent dislodgement of coarse aggregate particles, give surface uniform broom finish free from porous spots, irregularities, depressions, small pockets or rough spots.

3.3 PROTECTION

- .1 Protection and curing shall comply with CSA-A23.1/A23.2, including Annex I.
- .2 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA-A23.1/A23.2.

- .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
 - .2 Do not let walls of shelter touch formwork.
 - .3 Provide sufficient space for removal of formwork for finishing.
 - .4 Use heating equipment approved by Departmental Representative.
 - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
 - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
 - .2 For superstructure: maintain concrete at 10 degrees C for additional 14 days.
 - .6 Keep concrete surfaces continually moist while protected.
 - .7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.
- .3 Unformed surfaces: cure with burlap and water.
- .1 Burlap must be presoaked by immersing it in water for a period of at least 24 h immediately prior to placing.
 - .2 Place two layers of damp burlap on surface of concrete.
 - .3 Overlap each strip by minimum 150 mm and secure against displacement by wind.
 - .4 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .4 Formed surfaces:
- .1 No additional curing will be required if formwork is left in place for seven days or more.
 - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .5 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures

1.2 MEASUREMENT PROCEDURES

- .1 No measurement for payment will be made in this section.
 - .1 Include costs for pier cap post-tensioning assembly (including steel plates, high strength bars and drainage troughs complete with expansion anchors, nuts, bolts and washers) in Section 05 12 33 – Structural Steel.
 - .1 End plate bearing surface preparation for pier cap post-tensioning assembly will not be measured but considered incidental to the work.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A722/A722M, Standard Specification for High-Strength Steel Bars for Prestressed Concrete.
 - .2 ASTM A143/A143M-[07], Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A-153/A153M, Standard Specifications for Zing Coating (Hot-Dip) on Iron and Steel Hardware.
 - .4 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA S6, Canadian Highway Bridge Design Code.
 - .3 CSA S16, Design of Steel Structures.
 - .4 CSA S269.1, Falsework for Construction Purposes.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit list to Departmental Representative of proposed source of following material to be supplied.
 - .1 Post-tensioning high strength bars.
 - .2 Anchorage assemblies: two anchorage assemblies complete with anchor bearing plate and nut.

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- .2 Submit manufacturer's instructions, printed product literature and data sheets for steel (including mill certificates) and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Provide Departmental Representative with a copy of the following field records in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Date of tensioning.
 - .2 Identification and number of elements.
 - .3 Identification of jacking equipment.
 - .1 Submit jack calibration records.
 - .4 Required total load per bar.
 - .5 Initial tension.
 - .6 Anticipated and actual gauge pressure for each bar.
 - .7 Anticipated and actual elongation.
 - .8 Problems encountered.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection so as not to damage materials.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
- .3 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
- .4 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .5 Provide Departmental Representative with delivery schedules minimum seven (7) days prior to shipping.

1.6 QUALITY ASSURANCE

- .1 Provide Departmental Representative with following items, minimum of 3 weeks prior to beginning post-tensioning work for review in accordance with Section 01 45 00 - Quality Control.
 - .1 Load-strain curves certifying physical properties for each mill heat of bar steel physical properties and chemical composition to conform to minimum specification requirements indicated for bar steel.
 - .2 Mill certificates.

Part 2 Products**2.1 MATERIALS**

- .1 High-Strength post-tensioning bars: as indicated.
 - .1 Complete with bearing plate and hex nut.
 - .2 Galvanized to ASTM A-153.
 - .3 Bars shall be mechanically cleaned (never acid washed) to avoid problems associated with hydrogen embrittlement.
- .2 Grout: as indicated.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verify conditions of high strength bars and anchorages are acceptable for installation and post-tensioning in accordance with manufacturer's written instructions.
 - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Install post-tensioning bars only after pier cap concrete repairs have been completed, and patch repair material has reached 50% of its minimum specified design strength.
- .2 Obtain Departmental Representative's written approval before post-tensioning bars.
 - .1 Provide 24 hours minimum notice prior to post-tensioning of bars.
- .3 Prepare pier cap concrete bearing surface at high strength post-tension bar end plates.
 - .1 Bearing surface tolerance under high strength post-tension bar end plates: less than 1mm gap under a 1m straight edge.
 - .2 Achieve bearing surface tolerance by re-profiling existing surface or by using suitable grout material.
 - .1 Grout material: Non-shrink grout with minimum compressive strength of 45 MPa at 28 days, suitable for vertical surface application.

3.3 CONSTRUCTION

- .1 Do post-tensioning of high strength bars as per manufacturers' instructions, to jacking force as indicated.
 - .1 High Strength post-tension bar installation:
 - .1 Position pier cap post-tensioning assembly then make high strength bars snug tight.
 - .2 With calibrated equipment:

- .1 Stress first high strength bar to 50% of jacking force indicated.
- .2 Stress second high strength bar to 100 % of jacking force indicated.
- .3 Stress first high strength bar to 100% of jacking force indicated.
- .3 The target installation tension for each high strength bar is 450 kN. In the event of an indication of a possible drop of tension force in the high strength bar, the bars shall be re-tensioned.

3.4 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

Part 1 General**1.1 STEEL WORK INCLUDES**

- .1 Bridge railing and connecting brackets.
- .2 Deck drains.
- .3 Pier cap post-tensioning assemblies.
- .4 Bearing assemblies.
- .5 Deck joint assemblies.

1.2 RELATED REQUIREMENTS

- .1 Section 03 50 00 – Concrete Post-Tensioning.

1.3 PRICE AND PAYMENT PROCEDURES

- .1 Measure steel for bridge railing in metres of rail fabricated, delivered and installed, including nuts, bolts, washers, posts, and neoprene pads.
- .2 Measure new deck drains as individual units fabricated, delivered and installed.
- .3 Measure pier cap post-tensioning assemblies (including steel plates, high strength bars and drainage troughs complete with expansion anchors, nuts, bolts and washers) as individual units per pier location, including fabrication, delivery and installation.
 - .1 End plate bearing surface preparation for pier cap post-tensioning assembly will not be measured but considered incidental to the work.
- .4 Measure fabrication, delivery and installation of new bearing assemblies at girders in individual units including laminated elastomeric bearing, steel bearing plate, shim plates, and HSS sections.
 - .1 Metallizing of existing girder shoe plates as indicated will not be measured but considered incidental to the work.
- .5 Measure fabrication, delivery and installation of new deck joints in linear meters, including neoprene seal and galvanized barrier joint cover plates, complete with studs and inserts.

1.4 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
 - .2 ASTM A325M, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength.
 - .3 ASTM A490M, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.

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- .4 ASTM A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- .5 ASTM F1554, Standard Specification for Anchor Bolts, Steel 36, 55, and 105-ksi Yield Strength.
- .6 ASTM A240, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .7 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .8 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.
- .9 ASTM B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- .10 ASTM A563 Standard Specification for Carbon and Alloy Steel Nuts
- .11 ASTM F844 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
- .12 ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .2 CSA International
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA S6, Canadian Highway Bridge Design Code.
 - .3 CSA S16, Design of Steel Structures.
 - .4 CSA S269.1, Falsework for Construction Purposes.
 - .5 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
 - .6 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- .3 The Society for Protective Coatings (SSPC)
 - .1 SSPC-CS23.00/AWS C2.23M/NACE No. 12, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum Zinc, and Their Alloy and Composites for the Corrosion Protection of Steel.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
- .2 Hold project meetings every two weeks.
- .3 Ensure key personnel attend.
- .4 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .5 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

1.6 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 steel (including mill certificates) 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.
- .3 Shop Drawings:
 - .1 Submit shop drawings.
 - .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
 - .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection so as not to damage fabricated members.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
- .3 Mark mass on members weighing more than 3 tonnes.
- .4 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
- .5 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .6 Provide Departmental Representative with delivery schedules minimum seven (7) days prior to shipping.

1.8 QUALITY ASSURANCE

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

Part 2 Products**2.1 MATERIALS**

- .1 Structural steel: to CSA G40.20/G40.21, grade and types as indicated.
- .2 High strength bolts, nuts and washers: to ASTM A325M. Bolts to ASTM A490M shall be approved by Departmental Representative.
- .3 Expansion Anchors: as indicated.
- .4 Welding electrodes: to CSA W48 series.
- .5 Stud shear connectors: to CSA W59, Clause 5.5.6 and Appendix H.
- .6 Hot dip galvanizing: to ASTM A123.
- .7 Elastomer: as indicated.
- .8 Steel Laminae: as indicated.
- .9 Deck joint assemblies: as indicated

2.2 SOURCE QUALITY CONTROL

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

Part 3 Execution**3.1 EXAMINATION**

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

3.2 PREPARATION

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .1 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
 - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
 - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .2 Fabricate and install bearings as indicated.

- .3 Place anchor rods at elevations and locations indicated.
 - .1 Protect holes against entry of water and foreign material.
 - .2 Provide heating and protection as directed by Departmental Representative and completely fill space around anchor rods with grout.

3.3 INSTALLATION

- .1 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges.
- .2 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 Do welding in shop unless indicated or otherwise permitted by Departmental Representative.
 - .2 Weld only at locations indicated.
 - .3 Welding of galvanized steel not permitted. Fabricate prior to galvanizing or remove galvanizing where welding will occur. Repair areas damaged by welding by metallizing per ASTM A780, method A3.
- .3 Do metalizing in accordance with SSPC CS 23.00/AWS C2.23/NACE No. 12
 - .1 Welding of metallized steel not permitted. Complete field weld of bearing plate and shim plate assembly to girder shoe plate prior to metallizing.
- .4 High Strength bolting: in accordance with CAN/CSA S6. Use 'turn-of-nut' tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners, and sharp edges.
- .6 Expansion Anchors: Install per manufacturers recommendations and to the satisfaction of the Departmental Representative.
- .7 Deck Joint Installation: Install per manufacturers recommendations and to the satisfaction of the Departmental Representative.
- .8 Mark members in accordance with CSA G40.20/G40.21.
 - .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.

3.4 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.

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

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 00 – Cast-in-Place Concrete

1.2 MEASUREMENT PROCEDURES

- .1 Removal and replacement of embankment granular materials required for the abutment modifications will be paid as a lump sum item.
 - .1 Ensure lump sum includes full depth removal of asphalt.
- .2 Shoring, bracing, and de-watering of excavation will not be measured separately for payment.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordination: arrange with authority having jurisdiction for relocation of buried services that interfere with execution of work.
 - .1 Pay costs of relocating services.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Site Quality Control Submittals: submit in accordance with Section 01 45 00- Quality Control.
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.
 - .2 Submit inspection and testing results and report as described in PART 3 - FIELD QUALITY CONTROL.

Part 2 Products**2.1 MATERIALS**

- .1 Use material excavated for the return wall / backwall modifications for backfill unless Department Representative deems it unsuitable.

Part 3 Execution**3.1 EXAMINATION**

- .1 Evaluation and Assessment:
 - .1 Before commencing work establish locations of buried services on and adjacent to site.

3.2 PREPARATION

- .1 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 buried services that are required to remain undisturbed.

3.3 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial/Territorial and Municipal regulations whichever is more stringent.
 - .1 Excavate as required to carry out work.
 - .2 Notify Departmental Representative when excavations are complete.
 - .3 Excavation taken below depths shown without Departmental Representative's written authorization to be filled with approved material at Contractor's expense.

3.4 FIELD QUALITY CONTROL

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

3.5 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 Compaction of subgrade: compact existing subgrade to same compaction as fill.
 - .1 Fill excavated areas with approved backfill material compacted as specified for fill.
- .4 Placing:
 - .1 Place backfill, fill and base course material in 150 mm lifts: add water as required to achieve specified density.
- .5 Compaction: compact each layer of material to 95% density for material to ASTM D698:

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- 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 in accordance with Section 01 74 11- Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 16 – Asphalt Paving

1.2 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this Section.
 - .1 Include asphalt tack costs in items of Asphalt Pavement work in Section 32 12 16 – Asphalt Concrete Pavement.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D140/D140M Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

1.6 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 indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect asphalt tack coats from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Deliver, store and handle materials in accordance with ASTM D140.
- .5 Provide, maintain and restore asphalt storage area.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.
- .2 Cut-back asphalt: to AASHTO M081-92-UL, grade RC-70 or RC-250.
- .3 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

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

- .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
- .8 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 EXAMINATION

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

3.2 APPLICATION

- .1 Apply asphalt tack coat only on clean and dry surface.
- .2 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method approved by Departmental Representative.
- .3 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, of 0.5 L/m² plus or minus 0.2 L/m².
- .4 Apply asphalt tack coat only when air temperature greater than 10 degrees C and when rain is not forecast within 2 hours minimum of application.
- .5 Apply asphalt tack coat only on unfrozen surface.
- .6 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .7 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
 - .1 Control traffic in accordance with Section 01 35 00.06 - Special procedures for Traffic control.
- .8 Keep traffic off tacked areas until asphalt tack coat has set.
- .9 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .10 Permit asphalt tack coat to set before placing asphalt pavement.
- .11 Submit summary report within seven (7) days minimum of date of application and include information as follows:
 - .1 Total area tack coated.
 - .2 Quantity of tack coat used.
 - .3 Mean application rate.
 - .4 Actual product quantity used when using equipment on pressure distributors.

- .5 Dipstick measurements or electronic printouts are acceptable.
- .12 Carry out measurements in presence of Departmental Representative upon request.
- .13 Inspect tack coat application to ensure uniformity.
 - .1 Re-spray areas of insufficient or non-uniform tack coat coverage as directed by Departmental Representative.
 - .2 Ensure tack coating performed using hand held devices is consistent in appearance with adjacent areas of machine applied material.

3.3

CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 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.
- .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 13.16 – Asphalt Tack Coat.
- .2 Section 32 17 23 – Pavement Marking.

1.2 WORK DESCRIPTIONS

- .1 Work shall consist of supplying, loading, hauling and placing BC MoTI Medium Mix Class 1 Asphalt Concrete Pavement as shown on the Contract Drawings, or as directed by the Departmental Representative
- .2 For the Class 1 mix, asphalt aggregate used shall consist of a 19 mm Medium Mix Asphalt Aggregate in accordance with BC MoTI – 2016 Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS).
- .3 The use of Reclaimed Asphalt Pavement (RAP) in the asphalt mix designs is not permitted.
- .4 Perform mix designs for BC MoTI Class 1 Asphalt Concrete Pavement using Asphalt Cement 150-200A penetration grade and 19mm Asphalt Aggregate. Mix design is subject to acceptance by the Departmental Representative.

1.3 MEASUREMENT PROCEDURES AND UNIT PRICE ADJUSTMENTS

- .1 Accepted asphalt concrete pavement will be measured in tonnes and will be paid for at the unit price for “Asphalt Concrete Pavement”. Payment shall be compensation in full for supply of asphalt concrete mix including all materials, supply and application of tack coat, processing, plant mixing, loading, hauling, paver laying, compacting, finishing surface, raking, interim and final lane marking, quality control testing, safety, and maintenance. Payments will be made accordingly under "Unit Price Item - Asphalt Concrete Pavement (EPS)"
- .2 Applicable payment adjustments (additions or subtractions as applicable) shall be applied to top lift only in accordance with BC MoTI – 2016 Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS). Payments shall be under "Lump Sum Price Item - Prime Cost Sum".
- .3 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor shall be considered incidental to "Unit Price Item - Asphalt Concrete Pavement (EPS)" and no additional payment will be measured for payment. A scale person will be provided if required.
- .4 Preparing asphalt mix designs (including anti-stripping test), by a qualified test laboratory licensed to practice in British Columbia shall be considered incidental to "Unit Price Item - Asphalt Concrete Pavement (EPS)" and no additional payment will be measured for payment.
- .5 The movement of equipment and crew, shall be considered incidental to "Unit Price Item - Asphalt Concrete Pavement (EPS)" for the type of asphalt placed. A move is defined as the Contractor moving equipment and crew to the next section to pave after having completed, in its totality, the previous section.

- .6 No overhaul will be considered for payment under this contract.
- .7 Supply and delivery of asphalt cement, and anti-stripping agent(s), if required and accepted by the Departmental Representative, shall be paid under "Lump Sum Price Item – Prime Cost Sum".
- .8 Traffic Control required for this Work shall be incidental to "Lump Sum Price Item - Traffic Control" and no separate payment will be made to the Contractor.
- .9 Mobilization and demobilization required for this Work shall be incidental to "Lump Sum Price Item – Mobilization / Demobilization" and no additional payment will be made.
- .10 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

Part 2 Products

2.1 MATERIALS

- .1 Materials used shall be in accordance with BC MoTI – 2016 Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS).
- .2 Use penetration grade 150-200A Asphalt Cement and BC MoTI Class 1 – 19 mm Medium Asphalt Aggregate.

Part 3 Execution

3.1 Methodology

- .1 ACP placement:
 - .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when the weather is rainy.
 - .2 Asphalt concrete mix shall be placed only on clean, dry, and unfrozen surfaces.
 - .3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:
 - .1 in a single lift when the design compacted total thickness is 75 mm or less.
 - .2 in two or more lifts when the design compacted total thickness is greater than 75 mm. The lift thickness selection shall be determined by the Contractor except that:
 - .1 the maximum thickness of any lift shall be 75 mm.
 - .2 the minimum thickness of a final lift shall be 50 mm.
 - .3 On widenings, the thickness of asphalt concrete mix up to 75 mm may be placed in one lift. Over 75 mm thickness, the asphalt concrete shall be placed in two lifts.

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

3.2 Equipment, Plant and Mixing Requirements

- .1 Execution of the Work shall be in accordance with BC MoTI - 2016 Standard Specifications for Highway Construction Section 502 – Asphalt Pavement Construction (EPS) and Section 504 – Pavement Drainage.
- .2 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling ponds or drainage system will not be permitted. In addition Asphalt plant must comply with all environmental pollution control regulations applicable in the asphalt plant area. The plant operator must make daily inspections of the emission control components, to ensure proper working order and provide the most recent stack monitoring results for viewing by the Departmental Representative or his designate.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 16 – Asphalt Paving

1.2 MEASUREMENT FOR PAYMENT

- .1 Pavement marking including reflective glass beads will not be measured for payment and is considered incidental to the work.

1.3 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.5, Low Flash Petroleum Spirits Thinner.
 - .2 CAN/CGSB 1.74, Alkyd Traffic Paint.
 - .3 CGSB1-GP-12C-83 Standard Paint Colours.
 - .4 CGSB1-GP-71-83 Method of Testing Paints and Pigments.
- .2 United States Federal Standard
 - .1 FED-STD-595b – Colours used in Government Procurement
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Samples:
 - .1 Upon request submit to Departmental Representative the following material sample quantities at least four (4) weeks prior to commencing work.
 - .1 Two (2) - 1 L samples of each type of paint.
 - .2 One (1) sample of glass beads.
 - .3 Sampling to CGSB1-GP-71-83.
 - .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB1 specification number and formulation number and batch number.

1.5 CLOSEOUT SUBMITTALS

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

1.6 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products**2.1 MATERIALS**

- .1 Paint:
 - .1 CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint.
 - .2 Colour: to FED-STD-595B, yellow 33538 and white 37925.
 - .3 Upon request, Departmental Representative will supply a qualified product list of paints applicable to work. Qualified paints may be used, but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to CAN/CGSB-1.4-2000.
- .3 Glass reflective beads:
 - .1 To AASHTO M247, Type 1 glass beads.
 - .2 Glass reflective beads shall have a minimum of 70% round spheres with no more than 3% irregular particles present, no more than 10% air inclusions in the glass beads, and shall be clear.
 - .3 Glass reflective beads shall be applied under pressure to achieve the target embedment of 60-70% the bead diameter into the paint using a distributor, aka a bead gun.
 - .4 A moisture-proofing agent, adherence coating, and flotation coating shall be added to the beads per the manufacturer requirements.
- .4 Overlay type: to CGSB1-GP-74M

Part 3 Execution**3.1 EXAMINATION**

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

for product installation in accordance with MPI instructions prior to pavement markings installation.

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

3.2 EQUIPMENT REQUIREMENTS

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

3.3 TRAFFIC CONTROL

- .1 Traffic control shall be in accordance with Section 01 35 00 06.

3.4 APPLICATION

- .1 Pavement markings: Lay out pavement markings.
- .2 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m²/L.
- .4 Do not thin paint.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 200g/m² of painted area immediately after application of paint.

3.5 TOLERANCE

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

3.6 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.

3.7 PROTECTION

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

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Measure supply and installation of precast concrete barriers in units.
- .2 Measure supply and installation of drainage spillways as individual units as installed per location.

1.2 REFERENCE STANDARDS

- .1 British Columbia MoT – 2016 Standard Specifications for Highway Construction

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's written procedure for manufacturing precast reinforced concrete barriers including materials, placing, curing, and finishing of concrete, and quality control testing.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products**2.1 MATERIALS**

- .1 Precast Reinforced Concrete Barriers
 - .1 Precast reinforced concrete barrier types indicated.
 - .2 All precast reinforced concrete transition barriers shall be in accordance with British Columbia MoT – 2016 Standard Specifications for Highway Construction Section 941 – Precast Reinforced Concrete Barriers – Standard Bridge Parapet 810 mm High Transition. The precast reinforced concrete barriers shall be modified as follows:
 - .1 All end faces shall have 25 mm chamfered edges.
 - .2 Welded wire mesh reinforcement shall not be used.
 - .3 Synthetic fibre reinforcement shall be added to all precast concrete barriers. The fibres shall be added to wet concrete prior to placement at the rate recommended by the fibre manufacturer. Synthetic fibres shall conform to ASTM C1116 "Specifications for Fibre Reinforced Concrete" Type III and shall be 50 mm fibrillated polypropylene fibres added at a rate of 0.9 kg/m³.

- .3 All precast reinforced concrete drainage barriers shall be in accordance with British Columbia MoT – 2016 Standard Specifications for Highway Construction Section 941 – Precast Reinforced Concrete Barriers – Precast Concrete Median Drainage Barrier 810 mm – CMD-B-E Details. The precast reinforced drainage concrete barriers shall be modified as follows:
 - .1 Spillway side of barrier shall be modified as indicated.
 - .2 All end faces shall have 25 mm chamfered edges.
 - .3 Welded wire mesh reinforcement shall not be used.
 - .4 Synthetic fibre reinforcement shall be added to all precast concrete barriers. The fibres shall be added to wet concrete prior to placement at the rate recommended by the fibre manufacturer. Synthetic fibres shall conform to ASTM C1116 "Specifications for Fibre Reinforced Concrete" Type III and shall be 50 mm fibrillated polypropylene fibres added at a rate of 0.9 kg/m³.

Part 3 Execution

3.1 PRODUCTION

- .1 Precast reinforced concrete barriers shall be manufactured between May 01 and October 31.
- .2 The Contractor shall notify the Departmental Representative at least one week in advance of the date when manufacturing starts, so that inspections can be carried out. All processes shall be open for inspection by the Departmental Representative.

3.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle the finished products in accordance with manufacturer's written instructions. Concrete and connecting devices shall not be damaged or distorted.
- .2 Any defective or damaged products shall be replaced at Contractor's cost.

3.3 INSTALLATION

- .1 Precast concrete barriers shall be installed permanently on the approach roadways as shown on the drawings or as indicated by the Departmental Representative and in accordance with these Specifications.

END OF SECTION