



Public Works and Government Services Canada

Requisition No. EZ899-150534/A

SPECIFICATIONS
For
*North Testa River Bridge Culvert No.5, Culvert
Replacement Km597.2, Alaska Highway ,B.C.*

Project No. R.017173.607 June 26, 2014

APPROVED BY:

 _____	<u>June 27 2014</u>
Alaska Hwy Program Manager, EASS	Date
 _____	<u>2014-06-27</u>
Construction Safety Coordinator	Date
 TENDER:	
 _____	<u>June 27 / 2014</u>
Project Manager	Date

PWGSC

North Testa River Bridge Culvert No.5
Culvert Replacement
Alaska Highway Km597.2
British Columbia

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STANDARD DRAWINGS

Standard Embankment Structure Template; Select Granular Subgrade Fill Material	Sheet 03A
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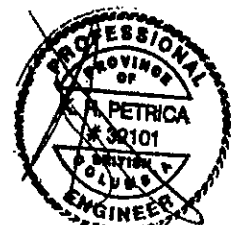
REFERENCE DOCUMENTS

1. DFO Bridge Maintenance Standard Operating Procedures
2. MOE Standards and Best Practices for In-stream work

APPENDIX

1. Environmental Protection Plan (EPP) - Checklist
2. Responsibility Checklist For Authorizations/Approvals/Notifications/Permitting

END OF SECTION



June 26/2014.

PART 1 - GENERAL

- 1.1 Codes, Bylaws, Standards .1 Perform work to current Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.
- .2 Perform work in accordance with the National Building Code of Canada (NBC) 2005, the Canadian Highway Bridge Design Code CAN/CSA S6-06, and other indicated Codes, Construction Standards, and/or any other Code or Bylaw of local application.
- .3 Must comply with all applicable local, provincial and federal laws, rules and regulations.
- .4 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .5 In any case of conflict or discrepancy, the most stringent requirements shall apply.
- 1.2 Contract Documents .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the Work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.
- 1.3 Other Contracts .1 It is recommended that the Bidder visit the site prior to submission of tender to satisfy himself/herself of the nature of the site conditions and the extent of the work required.
- .2 The Contractor shall confirm onsite all dimensions required for fabrication and dimensions shown on the Contract Drawings prior to any fabrication.
- .3 Cooperate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.
- .4 Coordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of this Work.
- 1.4 Division of Specifications .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
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- .2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
 - .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.
 - 1.5 Time of Completion .1 Complete the Work by **September 15, 2014**.
 - 1.6 Summary of Work .1 The work should be represented as:
North Tetsa River Bridge Culvert No. 5 Culvert Replacement,
Alaska Highway km 597.2, British Columbia
 - .2 Work under this contract consists of:
 - .1 Mobilization & Demobilization,
 - .2 Traffic Accommodation (Onsite Gravel Detour),
 - .3 Excavation,
 - .4 Removal of Bridge Structures
 - .5 Culvert Supply,
 - .6 Culvert Assembly,
 - .7 Backfill,
 - .8 Concrete End Treatment,
 - .9 Heavy Rock Riprap – Haul and Place
 - .3 Other requirements:
 - .1 A single wire overhead power line and underground fibre optic line is situated in the vicinity of the site. It is the Contractor's responsibility to confirm the presence and locations of all utilities through BC One Call.
 - .2 Right-of-Way limits should be confirmed prior to construction.
 - .3 Conduct all survey and measurements necessary to ensure the work is completed in accordance with the drawings. Any changes to the layout shall be discussed and approved by a Departmental Representative.
 - .4 Conduct work such that disturbance to the channel banks and vegetation are minimized.
 - .5 Coordination and communication with other Contractors and agencies involved with Project, if applicable.
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- .6 Management of Environment.
 - .7 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.
 - .8 Environmental permits and clearances to be supplied by the Department. It is the Contractor's responsibility to confirm that the required permits are in place prior to commencement of Work.
 - .9 The reduced risk-timing window within the North Tetsa River for spawning fish is between July 15 and August 15. No in-stream work shall be conducted outside of this period.
 - .10 Unless specifically stated otherwise, the Work is to include the furnishing of all labour, materials, equipment, and services necessary to complete the Work. The intent is that the Contractor provides a complete Job.
- 1.7 Contractor's Responsibility .1 Give all required Notices and comply with all local, provincial, and federal laws, bylaws, ordinances, rules, regulations, codes, and orders relating to the Work which are or become in force during the Performance of the Work.
- .2 Coordinate all the Work and provide all labour, materials, equipment, and services necessary for delivery, storage, handling, protection, installation, removal, inspection, and replacement or maintenance as required to provide a complete Project.
- 1.8 Hours of Work .1 Restrictive as follows:
- .1 Notify Departmental Representative of all after hours work, including weekends and holidays.
- 1.9 Work Schedule .1 All works are to be completed by **September 15, 2014**
- .2 Carry out work as follows:
- .1 Within 7 working days after Contract award, provide a "phasing bar chart" and a schedule showing anticipated progress stages and final completion of the Work within the time period required by the Contract. Indicate the following:
- .1 Submission of shop drawings, product data, MSDS sheets, and samples.
-

- .2 Commencement and completion of Work of each section of the specifications or drawings as outlined.
 - .3 Final completion date within the time period required by the Contract documents.
 - .3 Do not change approved Schedule without notifying Departmental Representative.
 - .4 Interim reviews of work progress based on work schedule will be conducted and schedule updated by Contractor in conjunction with and approval of Departmental Representative.
 - 1.10 Cost Breakdown
 - .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregate Contract price.
 - 1.11 Documents Required
 - .1 Maintain 1 copy each of the following at the job site:
 - .1 Contract drawings.
 - .2 Contract specifications.
 - .3 Addenda to Contract documents.
 - .4 Copy of approved work schedule.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Reviewed/approved samples.
 - .9 Manufacturers' installation and application instructions.
 - .10 One set of record drawings and specifications for "as-built" purposes.
 - .11 Project Safety Plan / Traffic Control Plan.
 - .12 Environmental Control of Operations (ECO) Plan
 - .13 Copies of Environmental Permits.
 - .14 Copy of approved Work schedule.
 - 1.12 Regulatory Requirements
 - .1 Conduct all work in accordance with applicable environmental approvals and regulations.
 - .2 Obtain and pay for any additional permits required by regulatory municipal, provincial or federal authorities to complete the work.
 - .3 Provide inspection authorities with plans and information required for issue of acceptance certificates.
 - .4 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.
 - 1.13 Contractor's Use of Site
 - .1 Use of site:

- .1 Assume responsibility for assigned premises for performance of this work.
 - .2 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.
 - .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
 - .3 Do not unreasonably encumber site with material or equipment
 - 1.14 Examination
 - .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
 - .2 Provide photographs of surrounding properties, objects and structures liable to be damaged/the subject of subsequent claims.
 - 1.15 Location of Equipment and Fixtures
 - .1 Location of equipment, fixtures, and outlets indicated or specified are to be considered as approximate.
 - .2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.
 - .3 Inform Departmental Representative of impending installation and obtain his approval for actual location.
 - .4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.
 - 1.16 Cutting and Patching
 - .1 Cut existing structures only as required to accommodate new work and as directed by the Departmental Representative.
 - .2 Remove items so shown or specified.
 - 1.17 Setting Out Work
 - .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
 - .2 Assume full responsibility for dimensions, spacings, overall fit with field components, and exact locations/spacings of bolt holes.
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- .3 Provide devices needed to lay out and construct work.
 - .4 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.
 - 1.18 Quality of Work
 - .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
 - .2 The workmanship, erection methods, and procedures to meet minimum standards set out in the applicable codes and standards.
 - .3 In cases of dispute, decisions as to standard or quality of work rest solely with Departmental Representative, whose decision is final.
 - 1.19 Works Coordination
 - .1 Coordinate work of subtrades:
 - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
 - .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
 - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
 - .1 On coordination drawings, indicate structural elements, services lines, rough-in points, and indicate location of services entrance to site.
 - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .4 Publish minutes of each meeting.
 - .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
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- .7 Coordinate and plan for all necessary road/lane closures ahead of time.
 - .3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
 - .4 Work cooperation:
 - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching, and removal or replacement of completed work.
 - .3 Ensure disputes between subcontractors are resolved.
 - .5 Departmental Representative is not responsible or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
 - .6 Maintain efficient and continuous supervision.
 - 1.20 Approval of Product Data and Samples
 - .1 In accordance with Section 01 33 00 – Submittal Procedures, submit the requested product data, MSDS sheets, and samples indicated in each of the technical Sections.
 - .2 Allow 2 weeks for the following:
 - .1 Review of product data.
 - .2 Review of re-submission.
 - .3 Ordering of approved material and/or products.
 - 1.22 Project Meetings
 - .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
 - 1.23 Testing and Inspections
 - .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified in Section 01 45 00 – Quality Control.
 - .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the
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following:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Tests specified to be carried out by Contractor under the Departmental Representative's supervision.
 - .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.
 - .4 Contractor shall notify Departmental Representative in advance of planned testing.
 - .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
 - .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
 - .7 The Departmental Representative may require and pay for additional inspection and testing services not included here.
 - .8 Provide Departmental Representative with 2 copies of testing laboratory reports and mill tests and certificates of compliance as soon as they are available.
- 1.24 As-Built Documents
- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for "as-built" purposes.
 - .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings, and shop drawings as changes occur.
- 1.25 Cleaning
- .1 Conduct daily cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
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- .2 Ensure cleanup of the work areas each day after completion of work.
- .3 In preparation for inspections:
 - .1 Examine all sight-exposed interior and exterior surfaced and concealed spaces.
 - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces.
- .4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.
- 1.26 Environmental Procedures
 - .1 Refer to section 01 35 43 – Environmental Procedures.
 - .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
 - .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.
- 1.27 Additional Drawings
 - .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
 - .2 Upon request, Departmental Representative may furnish up to a maximum of 6 sets of Contract documents for use by the Contractor at no additional cost. Additional sets of documents can be provided at additional cost.
- 1.28 System of Measurement
 - .1 The metric system of measurement (SI) will be employed on this Contract.
- 1.29 Familiarization with Site
 - .1 Before submitting tender, visit the site to become familiar with all conditions likely to affect the cost of the Work.
- 1.30 Submission of Tender
 - .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site and is fully conversant with all conditions.

END OF SECTION

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North Tetsa River Bridge Culvert No.5
Culvert Replacement
Alaska Highway km 597.2
British Columbia

01 25 20

MOBILIZATION & DEMOBILIZATION

Page 1 of 1

PART 1 - GENERAL

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|-----|------------------------|----|---|
| 1.1 | Section Includes | .1 | Mobilization and Demobilization |
| 1.2 | Related Sections | .1 | Construction Facilities – Section 01 52 00 |
| 1.3 | Description | .1 | Consists of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, camp, buildings, shops, offices, supplies and incidentals to and from the project site. |
| 1.4 | Measurement Procedures | .1 | 50 percent of Lump Sum Contract Price for Mobilization and Demobilization, to be paid when mobilization to site is complete. |
| | | .2 | Remainder of Lump Sum Contract Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other agencies having jurisdiction. |
| | | .3 | Payment of only 10% of the total tender price shall be scheduled as outlined above, if the amount bid for mobilization and demobilization is greater than 10%. Payment of the remainder of the amount shall be authorized when the site is cleaned up. |

PART 2 - PRODUCTS

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|-----|----------|----|-----------|
| 2.1 | Not Used | .1 | Not used. |
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PART 3 - EXECUTION

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|-----|----------|----|-----------|
| 3.1 | Not Used | .1 | Not used. |
|-----|----------|----|-----------|

END OF SECTION

- Section Includes .1 This section provides the descriptions of scope of work for each item included in this tender and outlined on the “Quantities and Costs”, and their methods of measurement and payment. The bidder shall be aware of the conditions and constraints of the site and the price quoted for each bid item shall include all works as described to complete the item of work regardless of the site conditions. All costs associated to complete the project including insurance & bonding, mobilization of equipment, project management, reporting, plans, materials, & labour, any temporary facilities, environmental work, safety and any other regulatory requirements as per the contract shall be incidental to the bid items in the tender and shall not be paid separately.

PART 1 - GENERAL

- 1.1 Mobilization and Demobilization .1 Tendered unit price for “Mobilization and Demobilization” shall be full compensation for the contractor’s forces and the equipment necessary for performing the work required under the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.
- .2 Mobilization shall include all activities and costs for transportation of personnel, equipment and supplies/ material to the site, establishment of office if required and other facilities for the contractor’s operations at site.
- .3 Demobilization shall include all activities and costs for transportation of personnel, equipment and supplies/ materials not used in the contract, including the disassembly, removal and site clean up of any offices if constructed or other facilities assembled on the site for the contract.
- .4 Tendered Price shall include temporary barriers and enclosures as described in Section 01 56 00 – Temporary Barriers and Enclosures.

Measurement: In accordance with Section 01 25 20 – Mobilization and Demobilization.

Payment: In accordance with Section 01 25 20 – Mobilization and Demobilization.

PART 2 – NORTH TETSA RIVER BRIDGE CULVERT NO. 5 AT ALASKA HIGHWAY KM 597.2

- 2.1 Traffic Accommodation .1 Tendered price for the “Traffic Accommodation” shall include full compensation for the cost of furnishing all all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
- .2 Tendered Price shall include the on-site detouring of traffic during construction operations in accordance with the drawings and Section 01 35 00 – Special Procedures for Traffic Control.
- .3 Tendered Price shall include all preparation work necessary to prepare the site for on-site detouring of traffic.

Measurement: This item is paid on a lump sum basis, no measurements or calculations required.

Payment: 60 percent of Lump Sum Contract Price for Traffic Accommodation, to be paid once the detour is in place and operational. The remaining 40% of the lump sum price bid will be paid once the detour and all temporary traffic control measures have been removed to the satisfaction of the Department.

- 2.2 Excavation .1 Tendered price for “Excavation” shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
- .2 Tendered Price shall include the removal of all material, of whatever nature, necessary for the construction of the foundations, substructures, channel alignment and other works in accordance with drawings and Section 31 00 00 – Earthworks.
- .3 Tendered Price shall include all preparation work necessary for the removal of the existing bridge culvert.

Measurement: This item is paid on a lump sum basis, no measurements or calculations required.

Payment: Payment will be made at the Lump Sum price bid for “Excavation” paid upon completion of the excavation works.

- 2.3 Removal of Bridge Structures
- .1 Tendered price for the “Removal of Bridge Structures” shall include full compensation for the cost of furnishing all all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
- .2 Tendered Price shall include the demolition, removal and salvage of the existing culvert structure in accordance with Sections 02 41 99 – Demolition for Minor Works.
- .3 Tendered Price shall include all preparation work necessary to prepare the site for the removal of the existing bridge culvert.
- Measurement: This item is paid on a lump sum basis, no measurements or calculations required.
- Payment: One time Lump Sum payment. To be paid upon the Departments receipt of written confirmation of disposal of the removed materials at an appropriate disposal facility.
- 2.4 Culvert Supply
- .1 Tendered price for “Culvert Supply” shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
- .2 Tendered Price shall include the supply of the culvert barrel in accordance with the drawings, Section 33 42 13 – Pipe Culverts, Section 05 12 33 – Structural Steel for Bridges and Section 05 50 00 – Metal Fabrication.
- .3 Tendered Price shall include all preparation work required for the supply and delivery of culvert material.
- Measurement: This item is paid on a lump sum basis, no measurements or calculations required.
- Payment: One time Lump Sum payment. To be paid upon delivery to site.
- 2.5 Culvert Assembly
- .1 Tendered price for “Culvert Assembly” shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
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.2 Tendered Price shall include the assembly of the culvert barrel in accordance with the drawings and Section 33 42 13 – Pipe Culverts.

.3 Tendered Price shall include all preparation work required for the assembly of culvert material.

Measurement: This item is paid on a lump sum basis, no measurements or calculations required.

Payment: One time Lump Sum payment. To be paid upon satisfactory completion of assembly in place.

2.6 Backfill

.1 Tendered price for “Backfill” shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.

.2 Tendered Price shall include the material supply and construction of all materials required to fill excavations adjacent to various bridge culvert installations, including but not limited, to structural backfill, approach fills, roadway embankments, Select Subgrade Fill, Sub-base Course, Crushed Base Gravel, slopes, channel banks and berms in accordance with the drawings and Section 31 00 00 – Earthworks and Section 33 42 13 – Pipe Culverts.

Measurement: This item is paid on a lump sum basis, no measurements or calculations required.

Payment: One time Lump Sum payment. To be paid upon satisfactory completion of backfill.

2.7 Concrete End Treatment

.1 Tendered price for “Concrete End Treatment” shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.

.2 Tendered Price shall include the material supply and installation of Concrete End Treatment in accordance with the drawings, Section 03 10 00 – Concrete Forming and Accessories; Section 03 20 00-Concrete Reinforcing and 03 30 00-Cast-in-place concrete.

Measurement: This item is paid on a lump sum basis, no measurements or calculations needed.

Payment: One time lump sum payment to be made upon acceptance of the work.

- 2.8 Heavy Rock Riprap .1 Tendered price for "Heavy Rock Riprap – Haul and Place" shall include full compensation for the cost of furnishing all labour, material, equipment, tools and incidentals necessary to complete the work as described in the drawings and specifications.
- .2 Tendered Price shall include the loading, haul and placement of Heavy Rock Riprap in accordance with the instructions of the Departmental Representative, drawings and Section 31 37 00 – Rip-Rap. The rock is supplied by the Department and is located at Wood Creek Quarry, km 649 of the Alaska Highway.

Measurement: Measurements will be made, in cubic metres, of the Heavy Rock Riprap placed.

Payment: Payment will be made at the unit price bid for "Heavy Rock Riprap – Haul and Place".

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | Coordination of Work with others under Departmental Representative administration. |
| | | .2 | Scheduled preconstruction and progress meetings. |
| 1.2 | Description | .1 | Coordination of progress schedules, submittals, use of sites, temporary utilities, construction facilities, and construction Work, with progress of work by others under instructions of Departmental Representative. |
| 1.3 | Construction Progress Meetings and Project Meetings | .1 | The Departmental Representative will schedule and administer project meetings as deemed necessary throughout progress of the Work. |
| | | .2 | Agenda to include, but not limited to, the following: <ul style="list-style-type: none">.1 Review and approval of minutes of previous meeting..2 Review of Work progress since previous meeting..3 Field observations, problems, conflicts..4 Problems that impede construction schedule..5 Review of off-site fabrication delivery schedules..6 Corrective measures to regain projected schedule..7 Revisions to the construction schedule..8 Progress 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. |
| | | .3 | If required, the Contractor shall provide physical space and make arrangements for meetings. |
| | | .4 | The Departmental Representative will record minutes, including significant proceedings and decisions, identify action by parties, and set time and date for next progress meeting. |
| | | .5 | The Departmental Representative will reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, affected parties not in attendance, and Contractor. |
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- 1.4 Construction Organization and Start-up .1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representatives and senior representatives of the Contractor, major Subcontractors (if applicable), 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 Agenda to include, but not limited to, the following:
- .1 Site specific health and safety requirements
 - .2 Appointing official representatives of participants in Work.
 - .3 Schedule of Work, progress scheduling in accordance with Section 01 32 17 - Construction Progress and Reporting.
 - .4 Schedule of submission in accordance with Section 01 33 00 - Submittal Procedures.
 - .5 Requirements for temporary facilities, storage sheds, utilities, etc. in accordance with Section 01 51 00 - Temporary Utilities.
 - .6 Delivery schedule of specified equipment in accordance with Section 01 32 17 - Construction Progress and Reporting.
 - .7 Site security in accordance with Section 01 52 00 - Construction Facilities.
 - .8 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .9 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures.
 - .10 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .11 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.
 - .12 Insurances and transcript of policies.
- .5 Comply with Departmental Representative's allocation of mobilization areas of sites; for field offices and sheds, construction camp(s) and camp utilities, access, traffic, and parking facilities.
- .6 During construction, coordinate use of sites and facilities with Departmental Representative.
- .7 Comply with instructions of Departmental Representative for use of
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- temporary utilities and construction facilities.
- 1.6 Submittals
- .1 Submit requests for payment for review, and for transmittal to Departmental Representative.
 - .2 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
 - .3 Process substitutions through Departmental Representative.
 - .4 Process change orders through Departmental Representative.
 - .5 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.
- 1.7 Closeout Procedures
- .1 Notify Departmental Representative when Work is considered ready for Substantial Performance, in accordance with Section 01 77 00 – Closeout Procedures.
 - .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
 - .3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
 - .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

END OF SECTION

PART 1 - GENERAL

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|-----|------------------|-----|---|
| 1.1 | Section Includes | .1 | Schedule, form, and content. |
| | | .2 | Scheduled revisions. |
| | | .3 | Critical path scheduling. |
| | | | |
| 1.2 | Definitions | .1 | Activity: element of Work performed during course of Project. Activity normally has expected duration, cost and resource requirements. Activities can be subdivided into tasks. |
| | | .2 | Actual Finish Date (AF): time that Work actually ended on activity. |
| | | .3 | Actual Start Date (AS): time that Work actually started on activity. |
| | | .4 | 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. |
| | | .5 | Baseline: original approved plan (for Project, work package, or activity), plus or minus approved scope changes. |
| | | .6 | Completion Milestones: they are firstly Substantial Completion and secondly Final Certificate. |
| | | .7 | Constraint: applicable restriction that will affect performance of Project. Factors that affect activities can be scheduled. |
| | | .8 | Control: process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed. |
| | | .9 | Critical Activity: any activity on a critical path. Most commonly determined by using critical path method. |
| | | .10 | Critical Path: series of activities that determines duration of Project. In deterministic model, critical path is usually defined as those activities with float less than or equal to specified value, often zero. It is longest path through Project. |
| | | .11 | Critical Path Method (CPM): network analysis technique used to predict Project duration by analyzing which sequence of activities (which path) has least amount of scheduling flexibility (least amount of float). |
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- .12 Data Date (DD): date at which, or up to which, Project's reporting system has provided actual status and accomplishments.
 - .13 Duration (DU): number of work periods (not including holidays or other non-working periods) required to complete activity or other Project element. Usually expressed as workdays or work weeks.
 - .14 Early Finish Date (EF): in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can finish, based on network logic and schedule constraints. Early finish dates can change as Project progresses and changes are made to Project plan.
 - .15 Early Start Date (ES): in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can start, based on network logic and schedule constraints. Early start dates can change as Project progresses and changes are made to Project Plan.
 - .16 Finish Date: point in time associated with activity's completion. Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.
 - .17 Float: amount of time that activity may be delayed from its early start without delaying Project finish date. Float is mathematical calculation, and can change as Project progresses and changes are made to Project plan. This resource is available to both PWGSC and Contractor.
 - .18 Lag: modification of logical relationship that directs delay in successor task.
 - .19 Late Finish Date (LF): in critical path method, latest possible point in time that activity may be completed without delaying specified milestone (usually Project finish date).
 - .20 Late Start Date (LS): in critical path method, latest possible point in time that activity may begin without delaying specified milestone (usually Project finish date).
 - .21 Lead: modification of logical relationship that allows acceleration of successor task.
 - .22 Logic Diagram: see Project network diagram.
-

- .23 Master Plan: summary-level schedule that identifies major activities and key milestones.
 - .24 Milestone: significant event in Project, usually completion of major deliverable.
 - .25 Monitoring: capture, analysis, and reporting of Project performance, usually as compared to plan.
 - .26 Near-Critical Activity: activity that has low total float.
 - .27 Non-Critical Activities: activities which when delayed, do not affect specified Contract duration.
 - .28 Project Control System: fully computerized system utilizing commercially available software packages.
 - .29 Project Network Diagram: schematic display of logical relationships of Project activities. Always drawn from left to right to reflect Project chronology.
 - .30 Project Plan: formal, approved document used to guide both Project execution and Project control. Primary uses of Project plan are to document planning assumptions and decisions, facilitate stakeholder communication, and document approved scope, cost, and schedule baselines. Project plan may be summary or detailed.
 - .31 Project Planning: development and maintenance of Project Plan.
 - .32 Project Planning, Monitoring, and Control System: overall system operated by Departmental Representative to enable monitoring of Project Work in relation to established milestones.
 - .33 Project Schedule: planned dates for performing activities and 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.
 - .34 Quantified Days Duration: working days based on 5 day work week, discounting statutory holidays.
 - .35 Risk: uncertain event or condition that, if it occurs, has positive or negative effect on Project's objectives.
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- .36 Scheduled Finish Date (SF): point in time that Work was scheduled to finish on activity. Scheduled finish date is normally within range of dates delimited by early finish date and late finish date.
 - .37 Scheduled Start Date (SS): point in time that Work was scheduled to start on activity. Scheduled start date is normally within range of dates delimited by early start date and late start date.
 - .38 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.
 - .39 Work Breakdown Structure (WBS): deliverable-oriented grouping of project elements that organizes and defines total Work scope of Project. Each descending level represents increasingly detailed definition of Project Work.
- 1.3 System Description
- .1 Construction Progress Schedule (Project Time Management): describes processes required to ensure timely completion of Project. These processes ensure that various elements of Project are properly coordinated. It consists of planning, time estimating, scheduling, progress monitoring, and control.
 - .1 It integrates forward thinking with analysis. Implicit assumptions are made in an objective consideration of the future to determine courses of action.
 - .2 Planning and scheduling facilitates accomplishment of objectives and should be considered as a continuous and interactive process involving planning, review, scheduling, analysis, monitoring and reporting.
 - .2 Planning: this is most basic function of management, that of determining presentation of action, and is essential.
 - .3 Ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made. This implies progressive reliability of scheduling data. Detail Project schedule is used for analysis and progress monitoring.
 - .4 Ensure project schedule efficiencies through monitoring.
 - .1 When activities begin on time and are performed according to estimated durations without interruptions, original
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Critical Path will remain accurate. Changes and delays will however, create an essential need for continual monitoring of Project activities.

- .2 Monitor progress of Project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.
 - .3 Monitoring should be done sufficiently often so that causes of delays are immediately identified and removed if possible.
 - .5 Project monitoring and reporting: as Project progresses, keep team aware of changes to schedule, and possible consequences. In addition to Bar Charts and CPM networks, use narrative reports to provide advice on seriousness of difficulties and measures to overcome them.
 - .6 Narrative reporting begins with statement on general status of Project followed by summarization of delays, potential problems, corrective measures and Project status criticality.
- 1.4 CPM Requirements
- .1 Ensure Master Plan and Detail Schedule are practical and remain within specified Contract duration.
 - .2 Master Plan and Detail Schedule deemed impractical by Departmental Representative are revised and resubmitted for approval.
 - .3 Acceptance of Master Plan and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract. Duration of Contract may only be changed through bilateral Agreement.
 - .4 Consider Master Plan and Detail Schedule deemed practical by Departmental Representative, showing Work completed in less than specified Contract duration, to have float.
 - .5 First Milestone on Master Plan and Detail Schedule will identify start Milestone with an "ES" constraint date equal to Award of Contract date.
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- .6 Calculate dates for completion milestones from Plan and Schedule using specified time periods for Contract.
 - .7 Substantial Completion with "LF" constraint equal to calculated date.
 - .8 Calculations on updates to be such that if early finish of Interim Certificate falls later than specified Contract duration then float calculation to reflect negative float.
 - .9 Delays to non-critical activities may not be basis for time extension.
 - .10 Do not use float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates other than required by Contract.
 - .11 Allow for and show Master Plan and Detail Schedule adverse weather conditions normally anticipated. Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.
 - .12 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration. Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.
 - .13 Arrange participation on and off site of subcontractors and suppliers, as required by Departmental Representative, for purpose of network planning, scheduling, updating and progress monitoring. Approvals by Departmental Representative of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.
 - .14 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.
- 1.5 Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit Project Control System to Departmental Representative for planning, scheduling, monitoring, and reporting of project progress.
 - .3 Submit Project Control System to Departmental Representative for approval; failure to comply with each required submission, may result in progress payment being withheld.
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- .4 Include costs for execution, preparation, and reproduction of schedule submittals in bid documents.
- .5 Submit letter ensuring that schedule has been prepared in coordination with major Subcontractors, if applicable.
- .6 Submit Project planning, monitoring, and control system data as required by Departmental Representative in following form:
 - .1 CD files in original scheduling software and PDF formats containing schedule and cash flow information, labelled with data date, specific update, and person responsible for update.
 - .2 Master Plan Bar Chart.
 - .3 Construction Detail schedule Bar Chart.
 - .4 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number with descriptions. List early and late start and finish dates together with durations, codes and float.
 - .5 Criticality report listing activities and milestones with up to 5 days total float used as first sort for ready identification of critical or near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
 - .6 Progress report in early start sequence, listing for each trade, activities due to start, underway, or finished. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks on action required.
 - .7 Within ten working days after each March 31 and September 30 occurring between commencement of Work and final completion, and within ten working days after final completion, provide to Departmental Representative:
 - .1 Statement of total person days of labour used on site in performance of Contract, including labour provided under subcontracts.

- .2 Estimate of total value in dollars of material delivered to site and installed, including material provided and installed under sub-contracts.

- 1.6 Quality Assurance .1 Use experienced personnel, fully qualified in planning and scheduling, to provide services from start of construction to Final Certificate, including Commissioning.

- 1.7 Project Meeting .1 Meet with Departmental Representative within 15 working days of Award of Contract date, to establish Work requirements and approach to project construction operations.

- 1.8 Work Breakdown Structure .1 Prepare construction WBS within 15 working days of Award of Contract date. Develop WBS through at least five levels: project, stage, element, sub-element and work package.

- 1.9 Project Milestones .1 Project milestones form targets for both Master Plan and Detail Schedule of CPM construction network system. Include:
 - .1 Set-up of sites.
 - .2 Completion of work on each site.
 - .3 Final Certificate of completion.

- 1.10 Master Plan .1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.
 - .2 Within 15 work days of finalizing Agreement, prepare comprehensive construction Master Plan (CPM logic diagram) and dependent Cash Flow Projection to confirm valid or identify alternate milestones.
 - .1 Master Plan will be used as baseline.
 - .1 Revise baseline as conditions dictate and as required by Departmental Representative.
 - .2 Departmental Representative will review and return revised baseline within 10 work days.
 - .3 Reconcile revisions to Master Plan and Cash Flow Projections with previous baseline to provide continuous audit trail.
 - .4 Initial and subsequent Master Plans will include:

- .1 CD with schedule and cash flow information. Clearly label data date, specific update, and person responsible for update.
 - .2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
 - .3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
 - .4 Actual/projected monthly cash flow: expressed monthly and shown in both graphical and numerical form.
- 1.11 Detail Schedule
- .1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.
 - .2 Within 15 work days of finalizing Agreement, prepare comprehensive construction Master Plan (CPM logic diagram) and dependent Cash Flow Projection to confirm valid or identify alternate milestones.
 - .1 Master Plan will be used as baseline.
 - .1 Revise baseline as conditions dictate and as required by Departmental Representative.
 - .2 Departmental Representative will review and return revised baseline within 10 work days.
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 - .4 Initial and subsequent Master Plans will include:
 - .1 CD with schedule and cash flow information. Clearly label data date, specific update, and person responsible for update.
 - .2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
 - .3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
 - .4 Actual/projected cash flow: expressed monthly and shown in both graphical and numerical form.
-

- .5 Provide detailed project schedule (CPM logic diagram) within 15 work days of Award of Contract date showing interdependencies, activity sequencing and duration estimates. Include listed activities as follows:
 - .1 Shop drawings
 - .2 Samples
 - .3 Approvals
 - .4 Procurement
 - .5 Construction
 - .6 Installation
 - .7 Site works
 - .8 Testing
 - .9 Shutdown or closure activity
 - .10 Commissioning and acceptance

 - .6 Detail CPM schedule to cover, in detail, a minimum period of 6 months beginning from the Award of Contract date. Each activity duration should span approximately 3 to 15 days.
 - .1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.
 - .2 Detail activities completely and comprehensively throughout duration of project.

 - .7 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Plan.

 - .8 Clearly show sequence and interdependence of construction activities and indicate:
 - .1 Start and completion of all items of Work, their major components, and interim milestone completion dates.
 - .2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
 - .1 Time for submittals, resubmittals and review.
 - .2 Time for fabrication and delivery of manufactured products for Work.
 - .3 Procurement/construction activity interdependencies.
-

- .3 Include sufficient detail to assure adequate planning and execution of Work. Activities should generally range in duration from 3 to 15 workdays each.
 - .9 Provide level of detail for project activities demonstrating sequence and interdependency of Contract tasks and allow co-ordination and control of said activities. Show continuous flow from left to right.
 - .10 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form "Critical Path". Increased number of critical activities is seen as indication of increased risk.
 - .11 Insert Change Orders appropriately and logically in Detail Schedule. Clearly review, analyze and report to Departmental Representative any effects created by the insertion of any new Change Orders.
 - 1.12 Review of the Construction Detail Schedule
 - .1 Allow 10 work days for review by Departmental Representative of proposed construction Detail Schedule.
 - .2 Make necessary revisions to reviewed Detail Schedule and resubmit to Departmental Representative for review within 5 work days.
 - .3 Promptly provide additional information to validate practicability of Detail Schedule as required by Departmental Representative.
 - .4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.
 - 1.13 Compliance with Detail Schedule
 - .1 Comply with reviewed Detail Schedule.
 - .2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay only after receipt of approval by Departmental Representative.
 - .3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.
 - .1 Corrective measures may include:
 - .1 Increase of personnel on site.
 - .2 Increase in materials and equipment.
 - .3 Overtime work and additional work shifts.
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- .4 Submit to Departmental Representative, justification, project schedule data, and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. Include as part of supporting evidence:
 - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved contract schedule.
 - .2 Prepared schedule indicating how change will be incorporated into the overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
 - .3 Other evidence requested by Departmental Representative.
 - .4 Do not assume approval of Contract extension prior to receipt of written approval from Departmental Representative.
 - .5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.
 - .1 Departmental Representative will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.
 - .2 Construction delays affecting project schedule are not justification for extension of contract completion date.
 - 1.14 Process Monitoring and Reporting
 - .1 Detail Schedule on job site must show "Progress to Date" on ongoing basis. Arrange participation on and off site of subcontractors and suppliers as and when necessary, for purpose of network planning, scheduling, updating, and progress monitoring. Inspect Work with Departmental Representative at least once per Project to establish progress on each current activity shown on applicable networks.
 - .2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.
 - .3 Perform Detail Schedule update at least once per Project with status dated (Data Date). Update to reflect activities completed to date, activities in progress, logic and duration changes.
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- .4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.
 - .5 Submit updated Detail Schedule to Departmental Representative.
 - .6 Requirements for progress monitoring and reporting are basis for progress payment request.
 - .7 Submit written report at least once per Project based on Detail Schedule. Show Work to date, comparison to planned Work and current forecasts. Report must summarize progress, define problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate any potential delay. Include in report:
 - .1 Description of progress made.
 - .2 Pending items and status of permits, shop drawings, Change Orders and possible time extensions.
 - .3 Status of Contract completion date and milestones.
 - .4 Current/anticipated problems, delays and corrective measures.
 - .5 Review of progress and status of Critical Path activities.
- 1.15 Progress Photographs
- .1 Provide digital photographs with dates and descriptions on CD disk with progress reports. Relate dates and descriptions to photo file names in a separate text file on disk.
 - .2 Number of photographs: minimum of 20 photos per milestone reached in schedule of work.
 - .3 Viewpoints: determined by Departmental Representative.
 - .4 Frequency: with progress statement, at completion of each construction stage, and as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

- 1.1 Submittals .1 This section includes, but is not limited to, the following:
- .1 Environmental Control of Operations Plan
 - .2 Responsibility Checklist For Authorizations
 - .3 Environmental Protection Plan (EPP) – Checklist
 - .4 Traffic Accommodation Strategy
 - .5 Product data
 - .6 Samples
 - .7 Health and Safety Plan
 - .8 Waste Management Workplan
 - .9 Certificates and transcripts
 - .10 Quality Testing Reports
 - .11 Quality Control Plan
- 1.2 Administrative .1 The submittals listed for review to be submitted to Departmental Representative. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 All submissions, unless otherwise specified, to be made via cloud project software OPROMA unless otherwise specified or requested by Departmental Representative. CDs and copies only to be required for closeout submittals.
- .3 Work affected by submittal shall not proceed until review is complete.
- .4 Present product data, samples, and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated, and identified to the specific project will be returned without being examined and shall be considered rejected.
- .7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
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- .8 Verify field measurements and affected adjacent Work are coordinated. Contractor to become familiar with all conditions likely to affect the cost of the Work before submission of their Tender documents.
 - .9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .11 Keep one reviewed copy of each submission on site.
 - .12 Certificates and transcripts, testing and inspection reports to be submitted within 2 days of activity.
- 1.3 Product Data
- .1 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.
 - .2 Delete information not applicable to project.
 - .3 Supplement standard information to provide details applicable to project.
 - .4 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 product data sheets are rejected, the noted copy will be returned and resubmission of corrected data sheets, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
 - .5 The review of product data sheets by Departmental Representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Departmental Representative approves detail design inherent in product data sheets, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in product data sheets or of responsibility for meeting all requirements of construction and Contract Documents.
 - .6 Without restricting generality of foregoing, Contractor is
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responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of Work of all sub-trades.

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| 1.4 | Progress Photographs | .1 | Submit progress photographs in accordance with Section 01 32 17 - Construction Progress and Reporting. |
| 1.5 | Survey and Quality Testing Reports | .1 | Submit certified survey and quality testing reports with progress reports. |
| 1.6 | Quality Control Plan | .1 | Prepare and submit to Departmental Representative for review and approval a Quality Control Plan including, but not limited to: <ul style="list-style-type: none">.1 Quality control processes and procedures..2 Quality control reporting and frequency..3 Testing agencies employed to provide materials testing..4 Frequency and types of testing..5 Verification of materials and installation procedures, including, but not limited to, reinforcing steel bars, bolts, concrete and aggregate..6 Dimension checks of pre-fabricated and site-fabricated elements. |

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1
.2
.3 | Informational and Warning Devices.
Protection and Control of Public Traffic.
Operational Requirements. |
| 1.2 | Basis of Payment | .1 | Work is considered incidental to the Contract and no separate or additional payment will be made. |
| 1.3 | References | .1 | “Traffic Control Manual for Work on Roadways” (most recent edition distributed by Province of British Columbia, Ministry of Transportation and Highways). |
| 1.4 | Traffic Accommodation Strategy | .1

.2

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.5 | The Contractor shall prepare a Traffic Accommodation Strategy detailing his proposed methods for accommodating traffic throughout the work zone.

The Traffic Accommodation Strategy shall consist of drawings detailing the configuration of temporary construction signs and other traffic control devices in the work area.

.1 Specific traffic safety related or situations at the work zone should also be addressed with written confirmation of the methods or procedures being used.

Unless otherwise specified, the Contractor shall submit the Traffic Accommodation Strategy to the Departmental Representative within 10 working days of award.

The Contractor shall have no claim resulting from the Department Representative’s failure to accept the Contractor’s Traffic Accommodation Strategy submission, nor any costs incurred by the Contractor to address concerns raised by either the Departmental Representative during the review of the Contractor’s Traffic Accommodation Strategy submission.

Public traffic shall be accommodated, without interruption, on a 24 hour per day basis. The contractor shall designate competent personnel to monitor traffic accommodation on a continuous 24 hour basis when work is affecting traffic. |
| 1.5 | Protection of Public Traffic | .1 | Comply with current requirements of Acts, Regulations, and By-Laws for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment. |
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- .2 When working on traveled way:
 - .1 Position equipment to present minimum of interference and hazard to traveling public.
 - .2 Keep equipment units as close together as working conditions permit, preferably on same side of traveled way.
 - .3 Do not leave equipment on traveled way overnight.
 - .3 Do not close any lanes of road or highway without consulting Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in "Traffic Control Manual for Work on Roadways".
 - .4 Keep traveled way graded, free of pot-holes, and of sufficient width for required number of lanes of traffic.
 - .5 Provide well-graded, signed and maintained detours/temporary roads to facilitate passage of traffic around restricted construction areas.
 - .6 Provide and maintain reasonable access to property in vicinity of Work and in other areas as indicated.
 - 1.6 Informational and Warning Devices
 - .1 Provide, erect, and maintain signs, flashing warning lights, and other devices required to alert motorists to construction activities and temporary/ unusual conditions resulting from Project Work specified in "Traffic Control Manual for Work on Roadways".
 - .2 Supply signs, delineators, barricades, traffic cones, and miscellaneous warning devices, except those shown on plans as supplied by others, as specified in "Traffic Control Manual for Work on Roadways".
 - .3 Place signs and other devices in locations recommended in "Traffic Control Manual for Work on Roadways".
 - .4 Meet with Departmental Representative prior to start of Work to prepare list of signs and other devices required. If situation on site changes, revise list and review with Departmental Representative.
 - .5 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability, and location. Clean, repair, or replace as needed to ensure clarity and reflectance.
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- .2 Removing or covering signs which do not apply to conditions existing from day to day.
- .6 Provide Type D traffic cones as specified in "Traffic Control Manual for Work on Roadways". Provide minimum of 100 cones for use on site.
- .7 Ensure that necessary traffic cones and signs are in place prior to interference with traffic on existing roadways.
- 1.7 Control of Public Traffic
 - .1 Provide traffic control in accordance with "Traffic Control Manual for Work on Roadways". Ensure that current copy of manual is available on site at all times.
 - .2 Flagpersons:
 - .1 Provide trained, competent flagpersons with proof of certification from recognized training program on traffic control procedures through construction zones.
 - .2 Provide flagpersons with proper equipment and clothing as specified in "Traffic Control Manual for Work on Roadways".
 - .3 Flagpersons are required in the following situations:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of traveled 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 traveled way over brow of hills, around sharp curves, or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 When temporary protection is required while other traffic control devices are 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 When construction traffic is crossing a roadway.
- .4 Maximum delays to public traffic due to Contractor's operators: 15 minutes at any one time.
- .5 Provide temporary lane control system where roadway carrying two-way traffic is to be restricted to one lane for 24 hours per day. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of "Traffic Control Manual for Work on Roadways".
- .6 Changes to traffic control operation are to be reviewed by Departmental Representative.
- .7 Safely control traffic through unique or varied construction situations.
- 1.8 Operational Requirements
 - .1 Maintain existing conditions for traffic throughout period of contract except when required for construction under contract and when measures have been taken as specified herein and reviewed by Departmental Representative to protect and control public traffic.
 - .2 Maintain existing conditions for traffic using access roads within the Highway right-of-way.

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 Government of Canada:
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
 - .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
 - .3 Canadian Standards Association (CSA):
 - .1 CSA Z797-2009, Code of Practice for Access Scaffold.
 - .2 CSA S269.1-1975 (2003), Falsework for Construction Purposes.
 - .3 CSA-S350-M1980(2003), Code of Practice for Safety in Demolition of Structures.
 - .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
 - .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
 - .6 Province of British Columbia:
 - .1 Workers Compensation Act, Part 3, Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.
- 1.2 Related Sections
- .1 Refer to the following current Specification sections as required:
 - .1 Project Management: Section 01 31 19
 - .2 Construction Progress and Reporting: Section 01 32 17
 - .3 Submittal Procedures: Section 01 33 00
 - .4 Special Procedures for Traffic Control: Section 01 35 00
 - .5 Temporary Utilities: Section 01 51 00
 - .6 Construction Facilities: Section 01 52 00
 - .7 Temporary Barriers and Enclosures: Section 01 56 00
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PWGSC

North Tetsa River Bridge Culvert No. 5
Culvert Replacement
Alaska Highway km 597.2
British Columbia

01 35 33

HEALTH AND SAFETY REQUIREMENTS

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| 1.3 | WorkSafe BC | .1 | Comply fully with the Workers' Compensation Act, regulations, coverage and orders made pursuant thereto, and any amendments up to the completion of the work. |
| | | .2 | Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued. |
| 1.4 | Compliance with Regulations | .1 | PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| | | .2 | It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| 1.5 | Submittals | .1 | Submit to Departmental Representative for review all submittals listed. |
| | | .2 | Work affected by submittals shall not proceed until review(s) by Departmental representative is/are complete. |
| | | .3 | Submit the following: |
| | | .1 | Site Specific Health and Safety Plan within 10 working days after award and prior to commencement of Work. |
| | | .2 | Copies of reports or directions issued by federal and provincial health and safety inspectors. |
| | | .3 | Copies of incident and accident reports. |
| | | .4 | Complete set of Material Safety Data Sheets (MSDS) and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements. |
| | | .5 | On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations. |
| | | .4 | The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 7 days after receipt |
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- of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review upon request.
- .5 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.
 - .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate, and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.
- 1.6 Responsibility
- .1 Assume responsibility as the Prime Contractor for Work under this contract.
 - .2 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.
 - .3 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.
- 1.7 Health and Safety Coordinator
- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. The Health and Safety Coordinator must:
 - .1 Have site-related working experience.
 - .2 Have working knowledge of occupational health and safety regulations.
 - .3 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully
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- complete the required training are not permitted to enter the site to perform Work.
- .4 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - .5 Be on site during execution of work.
- 1.8 General Conditions
- .1 Provide safety barricades and lights around Work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
 - .2 Secure Work site before leaving each day as deemed necessary to protect site against entry from non-authorized persons / entry by animals overnight.
 - .3 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the Work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
- 1.9 Project/Site Conditions
- .1 Potential work hazards onsite include: working over water, working in remote locations, highway traffic, bears, and extreme weather.
- 1.10 Regulatory Requirements
- .1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.
 - .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.
- 1.11 Work Permits
- .1 Obtain building permit(s) related to project before start of work.
- 1.12 Filing of Notice
- .1 The Contractor is to file Notice of Project with Provincial authorities prior to beginning of Work.
 - .2 Provide copies of all notices to the Department Representative.
- 1.13 Site Specific Health and Safety Plan
- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
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- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .11 Confined space policy and procedures
 - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
 - .3 Develop the plan in collaboration with all Subcontractors. Ensure that work/activities of Subcontractors are included in the hazard assessment and are reflected in the plan.
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- .4 Revise and update Site Specific Health and Safety Plan as required, and re-submit to the Departmental Representative.
 - .5 Departmental Representative's review: the review of Site Specific Health and Safety Plan by PWGSC shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.
 - 1.14 Confined Space Entry Program
 - .1 Carry out work in confined spaces in accordance with provincial regulations.
 - .2 Prepare and comply with a site-specific Confined Space Entry Program based on the methods and materials contractor will use for the construction and to enter the confined space. The Confined Space Entry Program must include, but is not limited to, the following:
 - .1 An assignment of responsibilities.
 - .2 A list of each confined space or group of similar spaces, and a written hazard assessment of those spaces prepared by a qualified person.
 - .3 Written safe program procedures for entry into and work in each of the confined space. Each procedure must be written specifically for each hazard in each space for each entry.
 - .4 Provide necessary equipment for each entry, including testing devices and personal protective equipment.
 - .5 A signed permit where required.
 - .6 Training of employees.
 - .7 A Rescue Plan.
 - .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to Work.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
 - 1.15 Emergency Procedures
 - .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
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- .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative.
 - .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under, and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
 - .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
 - .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.
 - 1.16 Hazardous Products
 - .1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and provision of MSDSs acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
 - .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00 – Submittal Procedures.
 - 1.17 Overloading
 - .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.
 - 1.18 Falsework
 - .1 Design and construct falsework in accordance with CSA-S269.1.-1975 (2003) false work for construction purposes.
 - 1.29 Scaffolding
 - .1 Design, construct, and maintain scaffolding in a rigid, secure, and safe manner, in accordance with CSA-Z797-2009 Code of Practice for Access Scaffold and the British Columbia Occupational Health and Safety Regulations.
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- 1.20 Blasting .1 Blasting or other use of explosives is not permitted.
 - 1.21 Powder Actuated Devices .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.
 - 1.22 Fire Safety and Hot Work .1 Obtain Departmental Representative's authorization before any welding, cutting, straightening, or any other hot work operations can be carried out onsite.
 - .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.
 - 1.23 Fire Safety Requirements .1 Store oily/paint-soaked rags, waste products, empty containers, and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .2 Handle, store, use, and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
 - 1.24 Unforeseen Hazards .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.
 - 1.25 Posted Documents .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing:
 - .1 Project layout,
 - .2 Locations of first-aid stations,
 - .3 Evacuation routes and marshalling stations, and
 - .4 Emergency transportation provisions.
 - .5 Notice of Project
 - .6 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers
 - .7 WHMIS documents
 - .8 MSDSs
 - .9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
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- .2 Post all MSDSs onsite, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.
- 1.26 Meetings
 - .1 Schedule and administer a Health and Safety meeting with Departmental Representative prior to commencement of Work.
 - .2 Attend the health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.
- 1.27 Correction of Non-Compliance
 - .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
 - .3 The Departmental Representative may issue a "stop work order" if non-compliance with health and safety regulations is not corrected immediately or within posted time. The General Contractor/Subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

PART 1 - GENERAL

- 1.1 Definitions
- .1 **Environmental Pollution and Damage:** presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.
 - .2 **Environmental Protection:** prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
 - .3 **Wetted Perimeter:** area of stream where water is currently running or pooled.
 - .4 **In-stream Work:** any work performed below the high water mark, either within or above the Wetted Perimeter of any Fisheries Sensitive Zone.
 - .5 **Fisheries Sensitive Zone:** in-stream aquatic habitats and out of stream habitat features such as side channels, wetlands, and riparian areas.
 - .6 **Invasive plants:** are any alien plant species that have the potential to pose undesirable or detrimental impacts on humans, animals or ecosystems. Invasive plants have the capacity to establish quickly and easily on both disturbed and un-disturbed sites, and can cause widespread negative economic, social and environmental impacts
 - .7 **Noxious weeds:** are invasive plants that have been designated under the BC Weed Control Act. This legislation imposes a duty on all land occupiers to control a set list of identified invasive plants.
www.agf.gov.bc.ca/cropprot/noxious.htm
- 1.2 Measurement Procedures
- .1 Preparation and implementation of the Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures will not be measured separately for payment and will be considered incidental to work.
- 1.3 Regulatory Overview
- .1 Comply with all applicable environmental laws, regulations and requirements of Federal, Provincial, and other regional authorities, and acquire and comply with such permits, approvals and authorizations as may be required.
 - .2 Comply with and be subject to those permits and approvals obtained from the Departmental Representative to conduct the Work.
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- .3 Pay specific attention to the provincial BC Land Use Permit, Water License and Quarry Permit.
 - .4 Pay specific attention to the Migratory Birds Convention Act, as amended in 1994.
 - .5 Pay specific attention to the provincial BC guidelines under Peace Region Least Risk Timing Windows: Biological Rational (2009)
 - .6 Pay specific attention to provincial BC MOE guidelines in Standards and Best Practices for Instream Works (2004).
- 1.4 Submittals
- .1 The Contractor is required to prepare an Environmental Protection Plan (EPP) in accordance with Section 01 33 00 – Submittal Procedures. The EPP should include all relevant environmental impacts/issues at the site as indicated by the completion of the EPP Checklist. Review of the PWGSC Environmental Effects Evaluation (EEE) will assist in completing this document. Prior to commencing construction activities or delivery of materials to site, submit the EPP (See Appendix C for Checklist) for review and approval by the Departmental Representative. The EPP will require the Contractor to carefully think through the entire project, including identifying what activities as works will be occurring, both generally and at specific sites, and by what methods. The Environmental Protection Plan shall be completed by a P.Biol or RPBio, or other qualified professional, and shall, at a minimum include the following:
 - .1 The specifics of a detailed monitoring program. This includes details and rational concerning sampling locations, timing, duration, and methods, and identification of the person(s) who will be carrying out the monitoring program.
 - .2 The process and protocol for ensuring that supervisors and individual staff employed by the Contractor are very clear on which environmental standards need to be achieved, how they will be achieved, and establishing how the Contractor will ensure that this is successfully occurring.
 - .3 Erosion, drainage, and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with the requirements of the applicable MOE Approval or Notification for instream work or under MOE guidelines, and all other applicable regulations including the requirements of these specifications.
 - .4 Drawings should show locations of proposed temporary
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excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of any excess or spoil materials including methods to control runoff and to contain materials on-site.

.5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.6 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.8 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.9 Outline the avoidance and mitigate measures which the Contractor will undertake and implement to ensure compliance with the environmental regulations applicable to the project (which may include requirements provided in MOE Approval or Notifications for Instream Work, NWPA Approval for Instream Work, DFO Fisheries Act requirements etc.) and these contract specifications.

.10 The procedures for stopping the work and implementing changes to the construction methods should the Contractor not be achieving the environmental requirements as outlined in these specifications.

.11 The procedures for stopping work should the Contractor encounter archaeological anomalies or human remains.

.2 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.5 Environmental Effects
Evaluation

.1 Execution of the work is subject to the provisions within the Environmental Effects Evaluation (EEE) completed by a PWGSC

- Environmental Services Representative for the project. See appendices for a copy of the EEE (NOTE: some projects will not require an EEE).
- .2 Pursuant to the expectations of the EEE, EPPs are the next step to achieve the desired results of minimal adverse environmental effect, as the project is constructed.
 - .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.
- 1.6 Site Access and Parking
- .1 The Contractor shall review both short and long access requirements with the Departmental Representative, both at the start-up and on an on-going basis. In consultation with the Departmental Representative, the contractor shall formulate an agreement for worker transportation to and from the work site and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.
 - .2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.
- 1.7 Protection of Work Limits
- .1 The Contractor shall include in the Environmental Protection Plan (EPP) details on the work limits, how these shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative.
- 1.8 Erosion Control
- .1 Erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor.
 - .2 If necessary, on-site sediment control measures shall be constructed and functional prior to initiating activities associated with the construction activities. The Contractor shall prepare an Erosion Control Plan, to be part of the EPP, to the satisfaction of the Departmental Representative.
 - .3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative will monitor the Contractor's erosion control performance.
 - .4 Erosion control measures must be in compliance with both Federal and Provincial legislation where required. Contractors should be referencing the provincial MOE Standards and Best Practices for
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Instream Works (2004).

- 1.9 Pollution Control
- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres to any surface water.
 - .2 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative, and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
 - .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from any surface water.
 - .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double lined fuel tanks can prevent spills into the environment.
 - .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work such as rock drilling and blasting by methods that are approved by the Departmental Representative.
 - .6 The Contractor shall provide spill kits, to the satisfaction of the Departmental Representative, at re-fuelling, lubrication and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
 - .7 Timely and effective actions shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative shall be notified immediately of any spill as well as the provincial authorities. Basic instructions and
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- phone numbers shall be part of the Contractor's EPP.
- .8 In the event of a major spill, the Contractor shall prioritize the clean up and all other work shall be stopped, where appropriate, and personnel devoted to spill containment and clean up.
- .9 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative.
- 1.10 Equipment Maintenance, Fuelling and Operation
- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor to the satisfaction of the Departmental Representative. Except for chain saws, any fuelling closer than 100 metres to any surface water (streams, wetlands, water bodies or watercourses) shall require discussion with the Departmental Representative.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any surface water. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain a presence during refuelling with immediate attention to the fuelling operations.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in 1.9.4 of Pollution Control.
- .5 Equipment use on the project shall be fuelled with E10, and low sulphur diesel fuels where available, and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of the vehicles is avoided.
- .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations satisfactory to the Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in sill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc. or anywhere within the work area.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working condition.
- .8 Fuel containers and lubricant products shall be stored only in secure locations to the satisfaction of the Departmental Representative. Fuel tanks or other potential deleterious substance containers shall
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be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight. Alternatively, the Contractor may hire a security person employed to prevent vandalism.

- 1.11 Operation of Equipment .1 Equipment movements shall be restricted to the “footprint” of the construction area. The work limits shall be identified by stake and ribbon or other methods to the satisfaction of the Departmental Representative. No machinery will enter, work in or cross over streams, rivers, wetlands, waterbodies or watercourse, nor damage aquatic and riparian habitat or trees and plant communities. Where construction activities require working close to surface water, the Contractor is required to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) does not enter any surface water areas.
- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or top soils) in the trees bordering the right-of-way or into surface water.
- .3 When, in the opinion of PWGSC, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative.
- .4 Restrict vehicle movements to the work limits.
- .5 Workers vehicles are to remain within the construction footprint.
- 1.12 Managing Invasive Plant Vegetation .1 Keep equipment clean and avoid parking, turning around or staging equipment in known invasive species infested areas, or mow prior to use.
- .2 Wash equipment prior to mobilization to site.
- .3 Minimize unnecessary disturbance of roadside aggregates or soil, and retain desirable roadside vegetation whenever possible.
- .4 Where possible, begin mowing or brushing in “invasive plant free” areas and end in infested areas.
- .5 Where possible, use only clean fill material from an “invasive plant free” source.
- .6 Whenever possible, re-seed with grass mixtures that are free of weeds, locally adapted, non-invasive, and quick to establish. Spread seed in the early spring or late fall to ensure successful establishment.
- 1.13 Fire Prevention and Control .1 A fire extinguisher shall be carried and available for use on each
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machine and at locations within the quarry in the event of fire. Basic fire fighting equipment is recommended (e.g. a water truck; minimum 500 imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two Pulaski's, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all Contractors' staff. Contactor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".

- .2 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that the 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 Departmental Representative shall be notified of any fire immediately as well as the applicable Provincial Authorities. Basic instruction and phone numbers will be provided on-site by the Contractor and will be discussed in the project start-up meeting.
- .5 Fires or burning of waste materials is not permitted.
- .6 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged Work.
- .7 Provide supervision, attendance and fire protection measures as directed.
- .8 Obtain all required permits from the province.

1.14 Wildlife

- .1 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, elk or moose that display aggressive behavior or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- .2 Notify the Departmental Representative immediately about dens, litters, nests. Carcasses (road kills), bear activity or encounters on or around the site or crew accommodations. Other wildlife related encounters are to be reported within 24 hours.

1.15 Relics and Antiquities

- .1 Artifacts, relics, antiquities, and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and any objects found on the work site that may be considered artifacts shall be reported to the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.
 - .2 All historical or archaeological objects found in the rock quarry are
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- protected under federal and provincial Acts and regulations. The Contractor and workers shall protect any articles found and request direction from the Departmental Representative.
- .3 Human remains must be reported immediately to the local RCMP.
- 1.16 Waste Materials Storage and Removal
- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the applicable federal and provincial regulations and should be part of the EPP.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried, or discarded at the construction site. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the work area.
- .4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials where possible.
- .5 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition.
- 1.17 Wastewater Discharge Criteria
- .1 Wash water, meltwater collection, rinse water resulting from the cleaning of fuel tanks and pipelines, contaminated groundwater, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters, and will conform to the discharge requirements set out in the provincial Water Act Permit:
- .2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.
- 1.18 Camp Wastewater Discharge Criteria
- .1 Camp wastewater will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters and conform to the discharge requirements set out in the provincial Water Act Permit.
- .2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.
- .3 Treat all camp wastewater to conform to the discharge requirements set out in the Water Act Permit.
- .4 No direct discharge is allowed to wetland or surface waters.
- .5 Contractor must obtain approval from the Water Act Officer prior to discharging treated wastewater.
- 1.19 Drainage
- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water. Drainage should be part of the EPP.
- .2 Do not pump water containing suspended materials into waterways,
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- sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements such as the provincial Water Act.
 - .4 Provide an erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
 - .5 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative for review and approval prior to commencing Work in fisheries sensitive areas or in areas that may affect fisheries sensitive areas and specifically address the protection of water bodies, water courses, and the following:
 - .1 Details of grading Work to prevent surface drainage into or out of Work areas.
 - .2 Details of erosion control works and materials to be used, including the deployment of silt fencing, floating silt curtains and containment booms during construction and excavation activities.
 - .3 Work Schedule including the sequence and duration of all related Work activities.
 - .4 The treatment of site runoff to prevent siltation of watercourses.
 - .5 Dewatering procedures for excavated materials including silt removal procedures prior to discharge.
 - .6 Stabilizing procedures during excavation.
 - .7 Maintenance of filters and sedimentation traps.
 - .6 Any dewatering activities will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters.
 - .7 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.
- 1.20 Site Clearing, Plant Protection, and Nesting Bird Protection
- .1 Any clearing done during nesting season must have a bird survey completed first and approved by the Departmental Representative. Information on nesting seasons can be found in the Peace Region Least Risk Timing Windows: Biological Rational (2009) produced by the BC provincial government.
 - .2 Protect trees and plants on site and adjacent properties where indicated.
 - .3 Wrap in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood
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- framework from grade level to height of [2] m.
- .4 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .5 Minimize stripping of topsoil and vegetation.
- .6 Restrict tree removal to areas indicated or designated by Departmental Representative
- 1.21 Environment Protection Supplies
- .1 Comply with federal and provincial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.
- .2 Provide a minimum of 30 m or more and as required of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. This will be used as necessary to prevent sediment transport into water bodies.
- .3 Provide a minimum of 50 lineal metres or more and as required of 200 mm diameter hydrophobic, sorbent booms. This will be used as necessary to prevent the migration of hydrocarbons.
- 4 Supply, transport, install and maintain erosion, sediment and drainage controls necessary to complete the Work in accordance with the requirements of Departmental Representative.
- .5 At the completion of construction, dispose of used silt fence off-site as non-Hazardous Waste. Dispose of used absorbent boom in accordance with Section 02 61 33 - Hazardous Waste Material.
- .6 Unused Erosion, Sediment and Drainage Control supplies will remain the property of Departmental Representative until the completion of the Contract.
- .7 Provide inventory of environmental protection supplies prior to mobilization.
- 1.22 Notification
- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.
- .2 Contractor: after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.
- 1.23 Environmental Monitoring
- .1 At a minimum the environmental monitoring shall be completed by P.Biol, RPBio, or Qualified Environmental Professional (QEP). If a QEP completes the monitoring, the QEP must work under the
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- direction of the P.Biol or RPBio who completes the Environmental Protection Plan.
- .2 The monitoring program must be anticipatory and responsive to construction practices or environmental changes, reflecting the site specific conditions, level of sensitivity of the receiving environment, potential adverse effects, and level of environmental risk. Submitted documents regarding the proposed monitoring program should clearly identify how monitoring will adhere to this approach.
 - .3 The monitoring program shall satisfy all regulatory requirements and terms of these specifications. The onus is on the Contractor to monitor and ensure compliance, to identify arising problems, and to subsequently take responsibility and all necessary measures in response.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Quality Control Plan | .1 | Prepare and submit to Departmental Representative for review and approval a Quality Control Plan in accordance with Section 01 33 00 – Submittal Procedures, within 10 working days of contract award. |
| 1.2 | Basis of Payment | .1 | No separate payment will be made for quality assurance and testing. Include quality assurance and testing in all work as part of total contract amount. |
| 1.3 | 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, 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. |
| 1.4 | Independent Inspection Agencies | .1 | Appoint and pay for services of third-party Independent Quality Assurance testing laboratory and field staff including as follows:

.1 Where specified in the text of these specifications,

.2 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities.

.3 Inspection and testing performed exclusively for Contractor's convenience.

.4 Tests specified to be carried out by Contractor under the supervision of Departmental Representative. |
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- .5 Additional tests specified in the following paragraph.
 - .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.
 - .3 Provide equipment required for executing inspection and testing by appointed agencies.
 - .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
 - .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.
- 1.5 Access to Work
- .1 Allow inspection/testing agencies access to Work and off-site manufacturing and fabrication plants.
 - .2 Cooperate to provide reasonable facilities for such access.
- 1.6 Procedures
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials onsite. Provide sufficient space to store test samples.
- 1.7 Rejected Work
- .1 Remove defective Work, whether result of poor workmanship, use of defective products, or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
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- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.
- 1.8 Reports
- .1 Submit 4 copies of inspection and test reports to Departmental Representative with all progress reports or, generally, as reports become available.
- .2 Provide copies of report for tested / inspected Work to Subcontractor and copies for tested / inspected material to manufacturer or fabricator.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | Temporary utilities. |
| 1.2 | Installation and Removal | .1 | Provide temporary utilities in order to execute Work expeditiously. |
| | | .2 | Remove from site all such work after use. |
| 1.3 | Water Supply | .1 | Provide continuous temporary supply of potable water for construction use, if applicable. |
| | | .2 | Remove or decommission temporary water supply facilities upon completion of project. |
| 1.4 | Sanitary Facilities | .1 | Provide sanitary facilities for construction use. |
| | | .2 | Remove or decommission temporary sanitary facilities upon completion of project. |
| 1.5 | Temporary Heating and Ventilation of Work | .1 | Provide temporary heating required during construction period, including attendance, maintenance, and fuel. |
| | | .2 | Construction heaters used inside buildings must be vented to outside or be flameless type. Solid fuel salamanders are not permitted. |
| | | .3 | Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.
.2 Protect Work and products against dampness and cold.
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage and installation of materials.
.5 Provide adequate ventilation to meet health regulations for safe working environments. |
| | | .4 | Ventilation:

.1 Prevent accumulations of dust, fumes, mists, vapours, or gases in areas occupied during construction. |
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- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied area.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons or the environment.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful contaminants.
- 1.6 Temporary Power and Light
- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools and for construction use.
 - .2 Arrange for connection with appropriate utility company. Pay all costs for installation maintenance and removal.
 - .3 Provide and maintain temporary lighting throughout project, if applicable.
- 1.7 Temporary Communication Facilities
- .1 Provide and pay for temporary telephone necessary for own use.
- 1.8 Fire Protection
- .1 Provide and maintain temporary fire protection equipment required by governing codes, regulations and bylaws during performance of Work.
 - .2 Burning rubbish and construction waste is not permitted onsite.

END OF SECTION

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CONSTRUCTION
FACILITIES

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PART 1 - GENERAL

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|-----|--------------------------|----|--|
| 1.1 | Section Includes | .1 | Construction aids |
| | | .2 | Office and sheds |
| | | .3 | Parking |
| | | .4 | Construction Signing |
| 1.2 | 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, staging areas, lay down areas, and other site details. Plan to be submitted to Departmental Representative for review and approval within 10 working days of contract award |
| | | .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. |
| 1.3 | Scaffolding | .1 | Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary to carry out Work. |
| 1.4 | Hoisting | .1 | Provide, operate, and maintain hoists and cranes required for moving of workers, materials, and equipment. Make financial arrangements with Subcontractors for use thereof. |
| | | .2 | Hoists and cranes shall be operated by qualified operators. |
| 1.5 | Site Storage/Loading | .1 | Confine Work and operations of employees to only that which is required by the Contract Documents. |
| | | .2 | Do not unreasonably encumber premises with materials. |
| | | .3 | Do not load or permit to load any part of Work with a weight or force that will endanger the Work. |
| 1.6 | Construction Parking | .1 | Parking will be permitted onsite provided it does not disrupt performance of Work. |
| | | .2 | Provide and maintain adequate access to project site. |
| | | .3 | If authorized to use existing roads for access to project sites, maintain such roads for duration of Contract and make good |
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damage resulting from Contractors' use of roads.

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CONSTRUCTION
FACILITIES

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| 1.7 | Sanitary Facilities | .1 | Provide sanitary facilities for work force in accordance with governing regulations and ordinances. |
| | | .2 | Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. |
| 1.8 | Construction Signage | .1 | Direct requests for approval to erect a Consultant/Contractor signboard to Departmental Representative. Wording shall be in both official languages. |
| | | .2 | Signs and notices for health, safety, traffic control, instruction, etc. shall be in both official languages. See Sections 01 35 33- Health and Safety, and 01 35 00 - Special Procedures for Traffic Control, of these Specifications for more information. |
| | | .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 Departmental Representative. |
| 1.9 | Protection and Maintenance of Traffic | .1 | Provide access and temporary relocated roads as necessary to maintain traffic. |
| | | .2 | Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative. |
| | | .3 | Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs. |
| | | .4 | Protect travelling public from damage to person and property. |
| | | .5 | 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 | Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic. |
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CONSTRUCTION
FACILITIES

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|------|----------|----|--|
| 1.10 | Clean-up | .1 | Remove construction debris and waste materials 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. |

END OF SECTION

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TEMPORARY BARRIERS AND ENCLOSURES

Page 1 of 1

PART 1 - GENERAL

- | | | | |
|------|---|----|---|
| 1.1 | Section Includes | .1 | Barriers |
| | | .2 | Environmental Controls |
| | | .3 | Traffic Controls |
| 1.2 | Installation and Removal | .1 | Provide temporary controls in order to execute Work expeditiously. |
| | | .2 | Remove from all sites all such work after use. |
| 1.3 | Protection for Trees | .1 | Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures. |
| | | .2 | Replace any trees designated for saving in kind that are damaged during construction. |
| 1.4 | Guard Rails and Barricades | .1 | Provide as required by governing authorities. |
| 1.5 | Access to Site | .1 | Provide and maintain access roads as may be required for Work. |
| 1.6 | 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 the public. |
| 1.7 | Fire Routes | .1 | Maintain access to property for use by emergency response vehicles. |
| 1.8 | Protection for Off-Site Private and Public Property | .1 | Protect surrounding property from damage during performance of Work. |
| | | .2 | Be responsible for damage incurred. |
| 1.9 | Protection of Structure Finishes | .1 | Provide protection for finished and partially finished structure finishes and equipment during performance of Work. |
| | | .2 | Provide necessary screens, covers, and hoardings. |
| | | .3 | Confirm with Departmental Representative locations and installation schedule 3 days prior to installation. |
| | | .4 | Be responsible for damage incurred due to lack of/improper protection. |
| 1.10 | Protection of Utilities | .1 | Provide visible and physical barriers around utilities to be protected. This includes gas lines, power poles, overhead lines, underground lines, and any other existing facilities. |

END OF SECTION

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CONSTRUCTION
CAMP

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PART 1 - EXECUTION

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| 1.1 Preliminary Requirements | .1 | Camp and service area locations and layout plans to be submitted to Departmental Representative for review within 10 working days of contract award. |
| | .2 | Temporary construction camps to be established and operated in accordance with local regulations. |
| | .3 | Obtain necessary licenses and approvals required by Authorities having Jurisdiction. |
| 1.2 Environment | .1 | Comply with all environmental regulations. |
| 1.3 Camp Installation and Removal | .1 | Mobilize equipment, camps, personnel, and materials. |
| | .2 | Establish approved temporary buildings, shops, offices and facilities required. |
| | .3 | Remove construction camps, clean up, and leave sites in condition satisfactory to Departmental Representative. |
| 1.4 Maintenance | .1 | Maintain construction camps in tidy and sanitary condition. |

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Products/Material and Equipment | .1 | Use NEW products/material and equipment unless otherwise specified. |
| | | .2 | Use products of one manufacturer for material and equipment of the same type or classification unless otherwise specified. |
| | | .3 | Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods. |
| | | .4 | Remove and replace damage caused to any existing product or infrastructure at own expense and to satisfaction of Departmental Representative. |
| | | .5 | Notify Departmental Representative in writing of any conflict between specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed. |
| | | .6 | Metal fastenings: <ul style="list-style-type: none">.1 Prevent electrolytic action between dissimilar metals..2 Use non-corrosive fasteners, anchors, and spacers for securing exterior work. |
| | | .7 | Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in Work. |
| | | .8 | Prevent damage, adulteration, and soiling of products during delivery, handling, and storage. Immediately remove rejected products from site. |
| | | .9 | Store products in accordance with suppliers' instructions. |
| | | .10 | Store products subject to damage from weather in weatherproof enclosures. |
| | | .10 | Remove and replace damaged products during installation at own expense and to satisfaction of Departmental Representative. |
| 1.2 | Quality of Products | .1 | Products, materials, equipment, and articles (referred to as products throughout Specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source, and quality of Products provided. |
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- .2 Defective products will be rejected regardless of previous inspections.
 - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.
 - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .3 Retain purchase orders, invoices, and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.
 - .4 Should any dispute 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 the Specifications, maintain uniformity of manufacture for any particular or like item throughout the site.
 - 1.3 Manufacturer's Instructions
 - .1 Unless otherwise indicated in Specifications, install or erect products in accordance with manufacturer's instructions.
 - .1 Do not rely on labels or enclosures provided with products.
 - .2 Obtain written instructions directly from manufacturers.
 - .2 Notify Departmental Representative in writing, of conflicts between Specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
 - .3 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.
 - 1.4 Contractor's Options for Selection of Products for Tendering
 - .1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.
 - .2 Products specified under "Acceptable Products": select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
 - .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
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- .4 Products specified to meet particular design requirements or to match existing materials: use only products specified. Alternative products may be considered provided full technical data is received in writing by Departmental Representative.
 - .5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements.
- 1.5 Substitution After Contract Award
- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
 - .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
 - .3 Proposals may be considered by the Departmental Representative if:
 - .1 Specified products selected by tenderer are not available,
 - .2 Delivery date of products selected from those specified would unduly delay completion of Contract, or
 - .3 Alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
 - .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the Project. Pay for design or drawing changes required as result of substitution.
 - .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.
- 1.6 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.
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PRODUCT REQUIREMENTS

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- .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 Final decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative
- 1.7 Coordination
 - .1 Ensure cooperation of workers during Work. Maintain efficient and continuous supervision.
- 1.8 Remedial Work
 - .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
 - .2 Perform remedial work, by specialists familiar with materials affected, and in a manner to neither damage nor put at risk any portion of Work.

PART 2 - PRODUCTS

- 2.1 Acceptable Products
 - .1 Submit product data sheets for all manufactured products used in the Work to Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures. Product data and samples to be submitted to Departmental Representative a minimum of 5 days prior to construction startup.
 - .2 Use best quality products.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | Progressive cleaning |
| | | .2 | Final cleaning |
| 1.2 | Project Cleanliness | .1 | Maintain Work in tidy condition, free from accumulation of waste products and debris. |
| | | .2 | Remove waste materials from sites at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials onsite. |
| | | .3 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |
| | | .4 | Provide at least one (1) bear proof container on site for collection of waste materials and debris. |
| | | .5 | Remove waste material and debris from site at end of each working day |
| | | .6 | Dispose of waste materials and debris off site. |
| | | .7 | Store volatile waste in covered metal containers, and remove from premises at end of each working day. |
| | | .8 | Provide adequate ventilation during use of volatile or noxious substances. |
| | | .9 | Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer. |
| 1.3 | 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 all waste products and debris. |
| | | .3 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |
| | | .4 | Prior to final review, remove surplus products, tools, construction machinery and equipment. |
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SITE CLEANING

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- .5 Inspect finishes and ensure specified workmanship.
- .6 Remove dirt and other disfiguration from exterior surfaces.
- .7 Sweep and wash clean paved areas.
- .8 Clean drainage systems.

END OF SECTION

PART 1 - GENERAL

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|-----|----------------------------|----|---|
| 1.1 | Section Includes | .1 | Waste Management Workplan, including Waste Audit and Waste Reduction Workplan. |
| 1.2 | Definitions | .1 | Waste Management Coordinator (WMC): Designate individual who is in attendance onsite full-time. Designate, or have designated individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC. |
| | | .2 | Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors that contribute to waste. |
| | | .3 | Waste Reduction Workplan (WRW): Written report that addresses opportunities for reduction, reuse, or recycling of materials. |
| | | .4 | Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate reusable and recyclable waste materials into material categories from other types of waste at point of generation. |
| 1.3 | Documents | .1 | Maintain at the job site one copy of following documents:

.1 Waste Management Workplan. |
| 1.4 | Use of Site and Facilities | .1 | Locate waste, refuse, recycling, etc. containers in locations to facilitate deposit of materials without hindering daily operations. |
| | | .2 | Locate separated materials in areas which minimize material damage. |
| 1.5 | Submittal | .1 | Submit requested submittals in accordance with Section 01 33 00, Submittal Procedures. |
| | | .2 | Prepare and submit the following submittals within 10 days of the Award of Contract:

.1 Submit 3 copies of completed Waste Management Workplan (WMW). |
| | | .3 | Provide Departmental Representative with receipts indicating quantity of material delivered to landfill. |
| | | .4 | Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling. |
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| 1.6 | Waste Management Workplan | .1 | Structure WMW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle. |
| | | .2 | Describe management of waste. |
| | | .3 | Identify opportunities for reduction, reuse and recycling of materials. |
| | | .4 | Post workplan or summary where workers at site are able to review its content. |
| 1.7 | Processing Sites | .1 | Provide waste processing sites as applicable within the Province of British Columbia to Departmental Representative within 10 days of the Award of Contract. |
| 1.8 | Disposal of Wastes | .1 | Burying of rubbish and waste materials is prohibited unless approved by Departmental Representative at off-site locations obtained by the Contractor. |
| | | .2 | Burning of rubbish and waste materials is prohibited unless permitted by British Columbia Ministry of Forests. Permit to be obtained by the Contractor. |
| | | .3 | Disposal of waste volatile materials, mineral spirits, oil, paint thinner, etc. into waterways or by dumping onsite is prohibited. |
| 1.9 | Storage and Handling | .1 | Store, materials to be reused, recycled, and salvaged in locations obtained by the Contractor and accepted by Departmental Representative. |
| | | .2 | Unless specified otherwise, materials for removal become Contractor's property. |
| 1.10 | Scheduling | .1 | Coordinate work with other activities at site to ensure timely and orderly progress of the Work. |

PART 2 – EXECUTION

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| 2.1 | Application | .1 | Do work in compliance with the WMW. |
| | | .2 | Implement MSSP for waste generated on Project in compliance with approved methods and as approved by Departmental Representative. |
| | | .3 | Materials must be immediately separated into required categories for reuse or recycling. |
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- .4 Materials in separated condition: collect, handle, store onsite, and transport off-site to an approved and authorized recycling facility.
- .5 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- 2.2 Cleaning
 - .1 Remove tools and waste materials on completion of work, and leave work area in clean and orderly condition.
 - .2 Cleanup work area as work progresses.
 - .3 Source separate materials to be reused/recycled into specified sort areas.
- 2.3 Diversion of Materials
 - .1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.
 - .1 Mark containers.
 - .2 Provide instruction on disposal practices.
 - .2 Onsite sale of salvaged, recovered, reusable, recyclable, etc. materials is not permitted.

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Administrative procedures preceding preliminary and final reviews of Work.
- 1.2 Inspection and Declaration .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Review: Departmental Representative and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate indicating:
- .1 Work has been completed and inspected for compliance with Contract Documents.
- .2 Defects and deficiencies have been corrected.
- .3 Work is complete and ready for Final Review.
- .4 Final Review: when items noted above are completed, request final review of Work by Departmental Representative. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request another review.
- .5 Commencement of Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance shall be date of commencement for warranty period.
- .6 Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request final review.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Related Requirements | .1 | Section 01 13 00 – Submittal Procedures |
| | | .2 | Section 01 77 00 – Closeout Procedures |
| 1.2 | Environmental Requirements | .1 | Canadian Environmental Protection Act (CEPA) |
| | | .1 | SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. |
| 1.3 | Administrative Requirements | .1 | Pre-warranty Meeting: |
| | | .1 | Convene meeting one week prior to contract completion with Contractor's Representative and Departmental Representative to verify project requirements and review manufacturer's specifications and warranty requirements. |
| | | .2 | Departmental Representative to establish communication procedures for: |
| | | .1 | Notification regarding construction warranty defects, |
| | | .2 | Prioritization of defect types, and |
| | | .3 | Determination of reasonable response times |
| | | .3 | Provide contact information for authorized, bonded and licensed company for warranty work action, which includes but is not limited to the following: |
| | | .1 | Name, |
| | | .2 | Telephone number, and |
| | | .3 | Address. |
| | | .4 | Ensure said company is located within local service area of warranted construction, is continuously available and is responsive to inquiries for warranty work action. |
| 1.4 | Action and Informational Submittals | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures. |
| | | .2 | Two weeks prior to Date of Substantial Performance, submit to the Departmental Representative four copies of Project Record Documents. |
| | | .3 | Provide evidence for type, source and quality of products supplied if requested. |

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| 1.5 | Format | .1 | Binders: Vinyl, hard cover, 3 'D' ring, loose leaf, 219 x 279 mm with spine and face pockets. |
| | | .2 | When multiple binders are used, correlate data into related consistent groupings. |
| | | .1 | Identify contents of each binder on spine. |
| | | .3 | Cover: Identify each cover with typed or printed title 'Project Record Documents'. List title of project and identify subject matter of contents. |
| | | .4 | Arrange content under Section numbers and sequence of Table of Contents. |
| | | .5 | Provide tabbed fly leaf for each separate product and system with typed description of product and major component parts of equipment. |
| | | .6 | Text: Manufacturer's printed data or typewritten data. |
| | | .7 | Drawings: Provided with reinforced, punched binder tab. |
| | | .1 | Bind in with text; fold larger drawings to size of text pages. |
| | | .8 | Provide 1:1 scaled CAD files to dwg format on CD. |
| 1.6 | Contents – Project Record Documents | .1 | Provide the following in the Table of Contents for each volume: |
| | | .1 | Title of Project, |
| | | .2 | Date of submission, |
| | | .3 | Contact information for Consultant with name of responsible party, |
| | | .4 | Contact information for Contractor with name of responsible party, and |
| | | .5 | Schedule of products and systems, indexed to content of volume. |
| | | .2 | For each product or system, list contact information of subcontractors and suppliers including local source of supplies and replacement parts. |
| | | | Product data: Mark each sheet to identify specific products, component parts and data applicable to installation. Delete inapplicable information. |
| | | | Drawings: Mark each sheet to identify specific products, |

component parts and data applicable to installation. Delete inapplicable information.

Typewritten text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Quality Control.

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| 1.7 | As-built Documents and Samples | .1 | Maintain on site one 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, and |
| | | .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 in Section number listings in List of Contents in Project Manual. |
| | | .1 | Label each document "PROJECT RECORD" in large, neat, printed letters. |
| | | .4 | Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes. |
| | | .5 | Keep record documents and samples available for inspection by Departmental Representative. |
| | | .6 | Copies of as-built documents and samples to be maintained in the PWGSC Fort Nelson Field Office and copies to be provided to the PWGSC office in Vancouver. |
| 1.8 | Recording Information on Project Record Documents | .1 | Record information on set of opaque drawings and in copy of Project Manual as provided by Departmental Representative. |
| | | .2 | Use felt tip marking pens for recording information. Maintain separate colours for each major system. |
| | | .3 | Record information concurrently with construction progress. Do |

- not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: Mark each item to record actual construction, including:
- .1 Measured depths of elements of foundation in relation to streambed datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: Mark each item to record actual construction, including:
- .1 Manufacturer, trade name and catalogue number of each product actually installed, particularly optional and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other documents: Maintain manufacturer's certifications, inspection certifications, field test records and other documents required by individual specification sections.
- .7 Provide digital photos for site records if requested.
- 1.9 Final Survey .1 Submit final site survey certificate showing that elevations and locations of completed Work are in conformance or non-conformance with Contract Documents.
- 1.10 Warranties and Bonds .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan 30 days before planned pre-warranty conference to Departmental Representative for approval.

- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which the Department is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 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.
- .6 Conduct joint warranty inspection 24 months from time of acceptance by Departmental Representative.

Respond in timely manner to oral or written notification of required construction warranty repair work.

Written verification to follow oral instructions.

- .1 Failure to respond shall be cause for the Departmental Representative to proceed with action against Contractor.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | This section specifies methods and procedures for demolishing, salvaging, recycling and removing items designated to be removed in whole or in part. |
| 1.2 | Methods of Measurement and Payment | .1 | In accordance with Section 01 29 01 – Methods of Measurement and Payment. |
| 1.3 | Related Sections | .1 | Section 01 74 11 – Site Cleaning |
| | | .2 | Section 01 35 43 – Environmental Procedures |
| | | .3 | Section 01 29 01 – Methods of Measurement and Payment |
| 1.4 | References | .1 | Canadian Federal Legislation |
| | | .1 | Canadian Environmental Protection Act (CEPA), 1999, c. 33. |
| | | .2 | Canadian Environmental Assessment Act (CEAA), 1995, c. 97. |
| | | .3 | Transportation of Dangerous Goods Act (TDGA), 1992, c. 34. |
| | | .4 | Motor Vehicle Safety Act (MVSA), 1995. |
| | | .5 | CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures. |
| 1.5 | Action and Informational Submittals | .1 | Prior to beginning work on site, submit detailed Waste Reduction Workplan and indicate: |
| | | .1 | Descriptions and anticipated quantities of materials to be salvaged, reused, recycled and landfilled, |
| | | .2 | Schedule of selective demolition, |
| | | .3 | Location of dumpsters. |
| 1.6 | Waste Management and Disposal | .1 | Separate materials for reuse and recycling. |
| 1.7 | Site Conditions | .1 | Review Hazardous Materials management Plan and take precautions to protect environment. |
| | | .2 | Notify Departmental Representative before disrupting site access or services. |
| | | .3 | Site Environmental Requirements: |
| | | .1 | Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution. |
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- .2 Do not dispose of waste volatile materials such as mineral spirits, oil, petroleum based lubricants or toxic cleaning substances into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.
- .3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

PART 2 – EXECUTION**2.1 Preparation**

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities.
- .3 Disconnect, cap, plug or divert, as required, existing utilities within the property where they interfere with the execution of work as directed by departmental representative. Mark the locations of these and previously capped or plugged services on the site and indicate the location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service designated to remain in place.
 - .2 Immediately notify Departmental Representative and utility company should uncharted utility and service be encountered and await instruction in writing regarding remedial action.

2.2 Protection

- .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
 - .2 Prevent movement, settlement or damage to adjacent structure and utilities to remain in place. Provide bracing and shoring as required.
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- .3 Protect site services and equipment.
- .4 Do work in accordance with Section 01 35 33 – Health and Safety Requirements.
- .5 Work shall be in accordance with all applicable Environmental Regulations and Section 01 35 43 Environmental Protection.
- 2.3 Salvage
 - .1 Remove items to be reused, store as directed by Departmental Representative and reinstall where specified.
- 2.4 Site Removals
 - .1 Remove and dispose of concrete, timber, and other debris located in the footprint of the Work.
 - .2 Removal of excavated material:
 - .1 Surfaces of excavated area should be neat, smooth and graded to appropriate construction slopes.
 - .2 Sort excavated materials into appropriate stockpiles.
 - .3 Protect underlying and adjacent granular materials.
- 2.5 Partial Demolition
 - .1 Remove existing damaged gabions as shown on the drawing to allow for installation of new bank erosion protection.
 - .2 Take precautions so that intact gabions and existing structures are not damaged.
- 2.6 Disposal
 - .1 Dispose of removed materials to appropriate recycling or waste facilities, except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999).
 - .1 Export and Import of Hazardous Waste Regulations (ETHW Regulations), SOR/2002-200.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS)
 - .3 National Fire Code of Canada 2005.
 - .4 Transportation of Dangerous Goods Act (TDG Act) 1999, (c.34).
 - .5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).
- 1.2 Definitions
- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and intended for recycling, treatment, or disposal.
- 1.3 Submittals
- .1 Submit product data in accordance with Section 01 33 00, Submittal Procedures.
 - .2 Submit to Departmental Representative current MSDSs for each hazardous material required prior to bringing it/them onsite.
 - .3 Submit a hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.
- 1.4 Measurement Procedures
- .1 No separate payment for work identified under Hazardous Materials.
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- 1.5 Storage and Handling
- .1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labeling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene, and naphtha for ready use. Store all flammable and combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .5 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
 - .6 Flammable liquids having a flash point below 38 degrees Celsius, such as naphtha or gasoline will not be used as solvents or cleaning agents.
 - .7 Store flammable and combustible waste liquids for disposal in approved containers located in a safe, ventilated area. Keep quantities to an absolute minimum.
 - .8 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
 - .9 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .5 Store hazardous materials and wastes in a secure storage area with controlled access.
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- .6 Segregate incompatible materials and wastes.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

 - .10 Ensure personnel are trained in accordance with WHMIS requirements.
 - .11 Report spills or accidents involving toxic wastes immediately to Departmental Representative and to appropriate regulatory authorities within 24 hours of incident. Take all reasonable measures to contain the release while ensuring health and safety is protected.

 - 1.6 Transportation
 - .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
 - .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
 - .3 If hazardous waste is generated onsite:
 - .1 Coordinate transportation/disposal with Departmental Representative.
 - .2 Ensure compliance with applicable municipal, provincial and federal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after
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shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.

- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

PART 2 - PRODUCTS

2.1 Materials

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

PART 3 – EXECUTION

3.1 Disposal

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

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Related Sections | .1 | Concrete Reinforcing – Section 03 20 00 |
| | | .2 | Cast-In-Place Concrete – Section 03 30 00 |
| 1.2 | References | .1 | Canadian Standards Association (CSA International) |
| | | .1 | CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete. |
| | | .2 | CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood. |
| | | .3 | CSA O121-M1978(R2003), Douglas Fir Plywood. |
| | | .4 | CSA O153-M1980(R2003), Poplar Plywood. |
| | | .5 | CAN/CSA-O325.0-92(R2003), Construction Sheathing. |
| | | .6 | CSA O437 Series-93(R2006), Standards for OSB and Waferboard.CSA S269.1-1975(R2003), Falsework for Construction Purposes. |
| | | .7 | CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada. |
| 1.4 | Action and Informational Submittals | .1 | Submit 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 Province of British Columbia, Canada. |
| 1.5 | Delivery, Storage and Handling | .1 | Store and manage hazardous materials in accordance with Section 02 81 01 – Hazardous materials. |
| | | | Waste Management and Disposal: |
| | | .1 | Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal. |
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- .2 Divert wood materials from landfill to an appropriate facility as approved by Departmental Representative.
- .3 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative.
- .4 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

PART 2 – PRODUCTS**2.1 Materials**

- .1 Materials and resources in accordance with Section 01 61 10 – Product Requirements.
 - .2 Formwork materials: use wood and wood product formwork materials to CSA-O121 and CAN/CSA-O86.
 - .3 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
 - .4 Form liner:
 - .1 Plywood: medium density overlay Douglas Fir to CSA O121 with square edges, 20 mm thick.
 - .5 Form release agent: non-toxic, biodegradable, low VOC.
 - .6 Form stripping agent: colourless mineral oil, low VOC, open cup.
 - .7 Falsework materials: to CSA-S269.1.
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PART 3 - EXECUTION

- 3.1 Fabrication and Erection
- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
 - .2 Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.
 - .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
 - .4 Fabricate and erect falsework in accordance with CSA S269.1.
 - .5 Do not place shores and mud sills on frozen ground.
 - .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
 - .7 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.
 - .8 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
 - .9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
 - .10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
 - .11 Construct forms for architectural concrete, and place ties as indicated.
 - .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
 - .12 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.
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- .13 Line forms for following surfaces:
 - .1 Outer face of outside pier caps.
 - .2 Secure lining taut to formwork to prevent folds.
 - .3 Pull down lining over edges of formwork panels.
 - .4 Ensure lining is new and not reused material.
 - .5 Ensure lining is dry and free of oil when concrete is poured.
 - .6 Application of form release agents on formwork surface is prohibited where drainage lining is used.
 - .7 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.
 - .8 Cost of textile lining is included in price of concrete for corresponding portion of Work.
 - .14 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.
- 3.2 Removal and Reshoring
- .1 Leave formwork in place for at least 3 days or upon attainment of 50% of its design strength, whichever comes later, and replace immediately with adequate reshoring.
 - .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

PART 1 - GENERAL

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|-----|------------------------------|----|---|
| 1.1 | Related Sections | .1 | Concrete Forming and Accessories – Section 03 10 00 |
| | | .2 | Cast-In-Place Concrete – Section 03 30 00 |
| 1.2 | Price and Payment Procedures | .1 | Measurement Procedures: in accordance with Section 01 29 01 – Method of 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. |
| 1.3 | References | .1 | American Concrete Institute (ACI) |
| | | .1 | SP-66-04, ACI Detailing Manual 2004. |
| | | .2 | ASTM International |
| | | .1 | ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement. |
| | | .2 | ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars. |
| | | .3 | CSA International |
| | | .1 | CSA-A23.1-04/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete. |
| | | .2 | CAN/CSA-A23.3-04(R2010), Design of Concrete Structures. |
| | | .3 | CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement. |
| | | .4 | CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel. |
| | | .5 | CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles. |
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- .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
 - .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
 - .5 British Columbia Ministry of Transportation Standard Specifications for Highway Construction (SS)
 - .1 SS 412-12, Concrete Reinforcing
 - 1.4 Action and Informational Submittals
 - .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3 unless otherwise indicated.
 - 1.5 Quality Assurance
 - .1 Submit in accordance with Section 01 45 00 – Quality Control.
 - .1 Mill Test Report: Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel.
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- 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 specifications.
 - .2 Upon request, submit in writing to Departmental Representative the proposed source of reinforcing material to be supplied.
 - .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer’s name and address.
- Storage and Handling Requirements:
- .1 Store materials in accordance with manufacturer’s recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective and 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: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
 - .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
 - .4 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.
 - .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
 - .6 Mechanical splices: subject to approval of Departmental Representative.
 - .7 Plain round bars: to CSA-G40.20/G40.21.
- 2.2 Fabrication
- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
 - .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
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- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
 - .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists
 - .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.
 - 2.3 Quality Source Control
 - .1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis 3 weeks prior to commencement of work.
 - .2 Inform Departmental Representative of proposed source of material to be supplied 3 weeks prior to commencement of work.
- PART 3 - EXECUTION**
- 3.1 Preparation
 - .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
 - .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.
 - 3.2 Field Bending
 - .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
 - .2 Where field bending is authorized, bend without heat, applying slow and steady pressure.
 - .3 Replace bars which develop cracks or splits.
 - 3.3 Placing Reinforcement
 - .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
 - .2 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
-

- .3 Prior to placing concrete, obtain Departmental Representative approval regarding reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour. Protect epoxy and paint coated portions of bars with covering during transportation and handling.
- 3.4 Field Touchups
 - .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.
- 3.5 Cleaning
 - .1 Clean in accordance with Section 01 74 11 – Site Cleaning
 - .1 Leave work area clean at the end of each day.
 - .2 Final Cleaning: upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Site Cleaning.
 - .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION

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PART 1 - GENERAL

- | | | | |
|-----|------------------------------|----|--|
| 1.1 | Section Includes | .1 | Cast-in-place Concrete |
| 1.2 | Related Sections | .1 | Concrete Forming and Accessories – Section 03 10 00 |
| | | .2 | Concrete Reinforcing – Section 03 20 00 |
| 1.3 | Price and Payment Procedures | .1 | Measurement Procedures: in accordance with Section 01 29 01 – Method of Measurement and Payment. |
| 1.4 | References | .1 | Abbreviations and Acronyms: |
| | | .1 | Portland Cement: Type GU - General use cement. |
| | | .2 | Fly ash: Type F - with CaO content less than 15%. |
| | | .3 | GGBFS – Ground, granulated blast-furnace slag. |
| | | .2 | Reference Standards |
| | | .1 | British Columbia Ministry of Transportation Standard Specifications for Highway Construction (SS) |
| | | .1 | SS 211-12, Portland Cement Concrete |
| | | .2 | Reference Standards |
| | | .1 | CSA International |
| | | .1 | CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete. |
| | | .2 | CSA A283-06, Qualification Code for Concrete Testing Laboratories. |
| | | .3 | CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005). |
| 1.4 | Administrative Requirements | .1 | Pre-installation Meetings: in accordance with Section 01 32 17 – Construction Progress and Reporting. |
-

- Convene pre-installation meeting one week prior to beginning concrete works.
- .1 Ensure key personnel, site supervisor, Departmental Representative, Consultant, concrete producer and testing laboratories attend.
 - .1 Verify project requirements.
- 1.5 Action and Informational Submittals
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 At least 4 weeks prior to beginning Work, provide Departmental Representative with samples of materials proposed for use as follows:
 - .1 5 L of curing compound.
 - .2 3 kg of each type of supplementary cementing material.
 - .3 5 kg of each admixture.
 - .4 10 kg of each fine and coarse aggregate.

Provide test results and inspection reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
 - .3 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.
 - .4 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.
 - .5
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| 1.6 | Quality Assurance | .1 | Quality Assurance: in accordance with Section 01 45 00 - Quality Control. |
| | | .2 | Provide a valid and recognized certificate from plant delivering concrete to Departmental Representative a minimum of 4 weeks prior to starting concrete work. |
| | | .1 | Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements. |
| | | .3 | Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items: |
| | | .1 | Falsework erection. |
| | | .2 | Hot weather concrete. |
| | | .3 | Cold weather concrete. |
| | | .4 | Curing. |
| | | .5 | Finishes. |
| | | .6 | Formwork removal.Joints. |
| | | .4 | Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS. |
-

- 1.7 Delivery, Storage and Handling .1 Delivery and Acceptance Requirements
- .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

PART 2 - PRODUCTS

- 2.1 Design Criteria .1 Performance : to CSA A23.1/A23.2, and as described in MIXES of PART 2 – PRODUCTS.
- 2.2 Performance Criteria .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.
- .2 Portland Cement: to CSA A3001, Type GU.
 - .3 Water: to CSA A23.1/A23.2
 - .4 Aggregates: to CSA A23.1/A23.2.
 - .5 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.
- 2.3 Mixes .1 Concrete mixes shall be proportioned to provide a workable mix suitable for the complexity of that class of work without segregation or bleeding.
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- .2 Proportion normal density concrete in accordance with CSA A23.1 Alternative 1, for the specified exposure class, to give the properties stipulated in this section for each concrete type.
- .3 Slump shall be measured at time and point of discharge. Slump indicated is without superplasticizer. Concrete shall be placed at the lowest possible slump possible with conditions of placement.
- .4 Preparation of Class B concrete in accordance with CSA A23.1 and SS 211-12:
- .5 .1 28 Day strength: 32 MPa.
Special requirements for concrete:
 - .1 Mix Design and curing for concrete shall comply with CSA A23.1-09, Clause 8.7 for HVSC-2 Concrete.
 - .2 The mix for each Type of Concrete shall be proportioned to minimize drying shrinkage. Measures shall include appropriate aggregate gradation and proportioning, and appropriate use of admixtures, approved by the Departmental Representative, to reduce the water content of the mix.
 - .3 Concrete thermal gradients shall be controlled to prevent cracking in accordance with CSA A23.1-09, Clause 7.4.1.3.

PART 3 - EXECUTION

- 3.1 Preparation
 - .1 Provide Departmental 24 hours minimum notice before each concrete pour.
 - .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
 - .3 Concrete mix design, initial concrete temperature, placing procedure, formwork and insulation shall be employed to ensure that the maximum temperature differential over the cross-section of any reinforced concrete element does not exceed 20°C.
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- .4 During concreting operations:
 - .1 Development of cold joints not allowed unless approved by Departmental Representative.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
 - .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
 - .4 Prior to placing of concrete, obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
 - .5 Protect previous Work from staining, and remove existing stains prior to application of concrete finishes.
 - .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

 - 3.2 Installation/Application
 - .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
 - .2 Cast in sleeves, anchors, reinforcement, bolts, joint fillers and other inserts are required to be built in.
 - .3 Adhesive set anchor rods:
 - .1 Drill holes are to be drilled with percussion drill using a template to guide the alignment and to accurately locate each hole. Hole diameters to match anchor manufacturer's recommendations.
 - .2 Ream holes with a wire brush and blow clean with compressed air immediately before grouting. Ensure that the compressed air is free of oil or other deleterious material detrimental to the bonding of the epoxy. Install anchor dowels in accordance with manufacturer's instructions.
 - .3 Inject adhesive into the prepared holes from a nozzle-mix injection tube. Fill each hole with adhesive before inserting the anchor dowel.
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- .4 Twist the anchor after inserting it into the epoxy and “bottom” it in the hole in accordance with the manufacturer’s instructions.
- .5 Take appropriate measures to prevent excess epoxy material from contaminating adjacent surfaces.

Drainage holes and weep holes:

- .1 Form weep holes and drainage holes in accordance with Section 03 10 00 – Concrete forming and Accessories. If wood forms are used, remove them after concrete has set.
- .2 Install weep hole tubes and drains as indicated.
- .3 Weep holes in existing concrete walls installed as detailed on drawings.

3.3 Finishes

- .1 Formed surfaces exposed to view: smooth form finish in accordance with CSA A23.1/A23.2.
 - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
 - .4 Provide non-slip surface to concrete approach slab using a flat wire texture broom finish. Submit sample of finished surface to the Departmental Representative.
 - .5 Provide broom finish unless otherwise indicated.
 - .6 Provide minimum slope of 2% to approach slab in order to achieve adequate drainage as outlined on the drawings.
 - .7 Supply and apply high performance penetrating sealers on new concrete surface in accordance with manufacturer’s recommendations.
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| 3.4 | Curing | .1 | Leave forms in place for 7 days and cover the top of wall with wet burlap and polyethylene and cure in accordance with CSA A23.1/A23.2. |
| 3.5 | Site Tolerances | .1 | Concrete finishing tolerance in accordance with CSA A23.1/A23.2. |
| 3.4 | Field Quality Control | .1 | Site tests: conduct tests as follows 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 the Contractor and approved by Departmental Representative for review to CSA A23.1/A23.2. |
| | | .3 | .1 Ensure testing laboratory is certified to CSA A283. |
| | | .4 | Contractor will pay for costs of tests. |
| | | .5 | Contractor will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent. |
| | | .6 | Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2. |
| | | .7 | Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility. |
| | | .8 | A Quality Control plan approved by the Departmental Representative shall be implemented throughout the concrete production in accordance with the requirements of CSA A23.1. |
| | | .9 | The Quality Control Plan shall include, but is not limited to, the following:

.1 Based on mix design, determine by lab testing the adiabatic heat generation for concrete mix to be used. |
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- .2 Provide information on temperature sensing and recording equipment to be used. Include details of installation locations of the temperature probes for each planned mass concrete placement.
 - .3 Provide Monitoring Plan to control temperature gradient. Include proposed methods for early identification of trends in concrete properties and for taking corrective actions. This includes identifying internal and external concrete temperatures during the curing process to ensure temperatures are within limits set by CSA A23.1-09.
 - .4 Details of proposed protective systems and procedures for placing and curing concrete, including situations where ambient temperatures are less than 5°C or over 25°C, and the influences of tide levels on the underside of the foundation.
 - .5 Identify how corrective actions will be performed to maintain acceptable differential temperatures in accordance with CSA A23.1-09.
 - .6 Proposed Quality Control Plan to be certified by a qualified Professional Engineer registered in the Province of British Columbia, Canada.
- 3.5 Cleaning
- .1 Clean in accordance with Section 01 74 11 – Site Cleaning.
 - .2 Designate cleaning area for tools to manage water use and runoff in accordance with Section 01 35 43 – Environmental Protection.
 - .3 Coordinate appropriate area on site where concrete trucks can be safely washed with Departmental Representative.
 - .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
 - .2 Divert unused admixtures and additive materials to official hazardous material collection site after receipt of written
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approval from Departmental Representative.

- .5 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose a health or environmental hazard.
- .6 Prevent admixtures and additive materials from entering drinking water supplies or streams.
- .7 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Basis of Payment | .1 | All materials and work required under this Section shall be based on Section 01 29 01 - Method of Measurement and Payment. |
| | | .2 | Supply and installation of anchor bolts, nuts, washers and bolt grout will be considered incidental to work |
| 1.2 | References | .1 | American Association for State Highway and Transportation Officials (AASHTO). |
| | | .1 | AASHTO Standard Specifications for Highway Bridges. |
| | | .2 | American Society for Testing and Materials (ASTM). |
| | | .1 | ASTM A 325M, Specification for Structural Bolts, Steel, Heat Treated 120/105ksi Minimum Tensile Strength. |
| | | .2 | ASTM A490M, Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints. |
| | | .3 | ASTM F959M-02, Standard Specifications for Compressible-Washer-Type Direct Tension Indicators (DTI) for Use With Structural Fasteners. |
| | | .4 | ASTM A370, Standard Methods and Definitions for Mechanical Testing of Steel Products. |
| | | .3 | Canadian Standards Association (CSA). |
| | | .1 | CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel. |
| | | .2 | CAN/CSA-G40.21, Structural Quality Steels. |
| | | .3 | CAN/CSA S6-06, Canadian Highway Bridge Design Code. |
| | | .4 | CAN/CSA-S16.1-04, Limit States Design of Steel Structures. |
| | | .5 | CSA S269.1, Falsework for Construction Purposes. |
| | | .6 | CSA W48, Series, Various Dates, Electrodes. |
| | | .7 | CSA W59, Welded Steel Construction (Metal Arc Welding). |
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- .8 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- 1.3 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate shop and erection details including but not limited to 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.
 - .4 Prepare and submit all drawings and documents necessary to describe the following:
 - .1 Type and capacity of equipment to be used.
 - .2 Sequence of operation: position of cranes, snooper vehicles, and trucks with members.
 - .3 Position of cranes and snooper vehicles with details of load distribution of wheels and outriggers.
 - .4 Lifting devices and lifting points.
 - .5 Details of temporary works: complete falsework and/or shoring plans where required including proposed methods to be used to ensure the required connections and structure shape are maintained prior to bolt torquing, method of providing temporary supports for stability.
 - .6 Details of temporary works: method of providing temporary supports for stability.
 - .7 Bolt torquing sequence and method.
 - .8 Details of release of falsework and/or shoring.
 - .5 Shop Drawings showing partial details or details of some elements but not all will not be reviewed until all details have been submitted to the Departmental Representative.
-

- .6 The Erection Proposal submission or its approval shall not relieve Contractors of responsibility for providing proper methods, equipment, workmanship, and safety precautions.
- 1.4 Qualifications
- .1 Notify the Departmental Representative of all Subcontractors and be responsible for all Subcontractors. All terms of the Contract shall apply to the Subcontractor(s) as well.
- .2 The Fabricator shall operate a recognized steel fabricating shop approved by the Departmental Representative.
- .3 The Fabricator shall be fully approved by the Canadian Welding Bureau (CWB) as per CSA Standard W47.1.
- .4 Only welders, welding operators, and tackers approved by the CWB in their particular category shall be permitted to perform weldments. Their qualifications shall be current and available for examination by the Departmental Representative.
- 1.5 Delivery, Storage, and Handling
- .1 Deliver, store, and handle products in accordance with Section 01 61 10, Product Requirements.
- .2 Provide protective blocking for lifting, transportation, and storing. Exercise care during fabrication, transportation, and erection so as not to damage steel members. Do not notch edges of members. 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 the ground.
- .5 Provide Departmental Representative with delivery schedules a minimum of 7 days prior to shipping.

PART 2 - PRODUCTS

- 2.1 General
- .1 Conform to applicable ASTM standards in the absence of applicable CSA or CGSB standards.
- .2 Integrate in the Works only new permanent materials, except when authorized in writing by the Departmental Representative.
- .3 Do not modify materials or construction details without previous written approval by the Departmental Representative, even if these modifications are deemed necessary or desirable by the Contractor.
-

- 2.2 Materials
- .1 Structural steel: to CAN/CSA-G40.21, grades and types 300W, or as noted on drawings.
 - .2 High strength bolts, nuts, and washers: to ASTM A325M. Bolts to ASTM A490M may be used if approved by Departmental Representative.
 - .3 Welding electrodes: to CSA W48 series.
 - .4 Direct tension indicator washer: to ASTM F959M.
- 2.3 Source Quality Control
- .1 Provide Departmental Representative prior to fabrication, with four copies of steel producer certificates, in accordance with CAN/CSA G40.20. Include in certificates all mill test reports related to chemical analysis and physical tests for each heat from which elements have been fabricated.
 - .2 Make available for inspection all mill samples used for physical tests.
 - .3 When steel elements are obtained from stock, prove quality of materials by providing Departmental Representative with fabricator stamps and certificates stating that steel conforms to prescribed requirements.
 - .4 When steel elements are obtained from stock, Departmental Representative reserves the right to select elements and pieces to test at Contractor's expense.
 - .5 In the absence of mill certificates, for all steel from stock, provide Departmental Representative with a certificate stating that all steel conforms to prescribed requirements.
 - .6 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspections and tests required.
 - .1 Inspection of the coating will be carried out by Departmental Representative. Supply power, scaffolding, weather protection, and access for the required testing procedures. Pay for all costs, including the cost of re-inspection and re-testing, associated with the correction or repair of rejected defects.
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- .2 Give the Departmental Representative not less than 24 hours notice of when work is ready for inspection. Include notice of the type and quantity of work to be inspected. Provide access to the Departmental Representative for all inspection procedures.

PART 3 - EXECUTION

- 3.1 Erection
 - .1 Do not commence steel erection until approval of the Erection Proposal has been obtained from the Departmental Representative.
 - .2 If staining or defacing occurs, clean steel surfaces to Departmental Representative's approval.
 - .3 Do not disturb river banks or embankments without prior written permission of Departmental Representative.
 - .4 The Contractor shall confirm, on site, all dimensions required for fabrication and dimensions shown on the Contract Drawings prior to any fabrication.
 - 3.2 Installation
 - .1 Unless otherwise noted, carry out fabrication and erection of structural steel in accordance with CAN/CSA S6-06, Canadian Highway Bridge Design Code.
 - .2 Allowable tolerances for elements:
 - .1 Conform to Clause 28.9 of CAN/CSA S16.1-04 standard.
 - .2 Conform to prescriptions of CAN/CSA G40.20 standard.
 - .3 Conform to prescriptions of CAN/CSA W59 standard.
 - .3 Do falsework in accordance with CSA S269.1, except where specified otherwise.
 - .4 Welding: do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CAN/CSA G40.21, grade 300W steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
 - .2 Unless indicated otherwise on the drawings, no welding, of whatever nature and extent, is allowed without the written authorization of the Departmental Representative, and then, only in such a way and at locations designated in his/her authorization.
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- .3 Minimal fillet weld size: conform to the requirements prescribed in CAN/CSA S6-06 standard. Detail these in shop drawings.
- .4 Appoint and pay for the services of an independent welding inspector certified to visually inspect all completed welds as per CSA W59-M standard.
- .5 High strength bolting: install bolts in accordance with CAN/CSA S6-06 and CAN/CSA S16.1-04 standards. Tighten as per manufacturer's requirements. Use Direct Tension Indicator (DTI) spacing washers in all cases.
- .6 Finish: members true to line, free from twists, bends, open joints, sharp corners, sharp edges, etc.
- .7 Allowable tolerance for bolt holes:
- .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
- .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.
- .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
- .4 Centre-to-centre distance between any two groups of holes to vary not more than following:
- | Centre-to-Centre Distance (m) | Tolerance Plus or Minus (mm) |
|-------------------------------|------------------------------|
| Less Than 10 | 1 |
| 10 to 20 | 2 |
| 20 to 30 | 3 |
- .5 Correct misspunched or misdrilled members only as directed by Departmental Representative.
- .8 Span length tolerances in accordance with CAN/CSA S6-06 and CAN/CSA S16.1-04 standards.
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- .9 Shop splices:
 - .1 Use complete joint penetration groove welds finished flush. Details of butt joints to CSA W59. Use only as approved by Departmental Representative.
- .10 Field splices: to approval of Departmental Representative.
- .11 Mark members in accordance with CAN/CSA G40.20. Do not use die stamping.
- .12 Match marking: shop mark bearing assemblies and splices.
- .13 Ensure that all participants in construction works comply with the requirements of CAN/CSA-Z94.4 standard regarding the use of respiratory apparatuses when working with paint or as required.

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
 - .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
 - .4 CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-1989(R2001), Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- 1.2 Submittals
- 1. Product Data:
 - 1. Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
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2. Submit three copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 1. For finishes, coatings, primers and paints.
 2. Shop Drawings
 1. Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 2. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- 1.3 Quality Assurance
 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 3. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 45 00 – Quality Control.
- 1.4 Delivery, Storage and Handling
 1. Packing, Shipping, Handling and Unloading:
 1. Deliver, store, handle and protect materials in accordance with Section 01 61 10 - Product Requirements.
 2. Storage and Protection:
 1. Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 2. Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.
- 1.5 Waster Management and Disposal
 1. Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.
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.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material off site for recycling in accordance with Waste Management Plan.

4. Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Steel end protection: fabricated from bent DN200 STD pipe

.3 CSP pipe piece: to ASTM A53/A53M standard weight, galvanized finish.

.4 Welding materials: to CSA W59.

.5 Welding electrodes: to CSA W48 Series.

.6 Bolts and anchor bolts: to ASTM A307.

.7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 Fabrication

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 Isolation Coating

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry. Wood.

2.4 Steel Angles

1. Steel angles: as shown on drawings.

PART 3 - EXECUTION

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|--------------|----|--|
| 3.1 Erection | .1 | Do welding work in accordance with CSA W59 unless specified otherwise. |
| | .2 | Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections. |
| | .3 | Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles. |
| | .4 | Exposed fastening devices to match finish and be compatible with material through which they pass. |
| | .5 | Provide components for building by other sections in accordance with shop drawings and schedule. |
| | .6 | Make field connections with bolts to CAN/CSA-S16.1, or weld. |
| | .7 | Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates. |
| | .8 | Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer. |
| | .9 | Touch-up galvanized surfaces with zinc rich primer where burned by field welding. |
| 3.2 Cleaning | .1 | Perform cleaning after installation to remove construction and accumulated environmental dirt. |
| | .2 | Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers. |

END OF SECTION

PART 1 - GENERAL

1.1	Section Includes	.1	Specifications for excavation.
		.2	Materials and procedures for backfilling and construction of earth structures.
1.2	Measurement Procedures and Payment	.1	In accordance with Section 01 29 01 – Methods of Measurement and Payment.
1.3	Related Sections	.1	Section 01 29 01 – Methods of Measurement and Payment
		.2	Section 01 33 00 – Submittal Procedures
		.3	Section 01 35 33 – Health and Safety Requirements
		.4	Section 01 45 00 – Quality Control
		.5	Section 01 61 00 – Product Requirements
		.6	Section 01 74 19 – Waste Management and Disposal
1.4	References	.1	ASTM International
		.1	ASTM D698-00a ^{e1} , Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m)
		.2	ASTM D2487-00e ¹ , Classification of Soils for Engineering Purposes.
		.2	British Columbia Ministry of Transportation Standard Specifications for Highway Construction (SS)
		.1	SS 201-12, Roadway and Drainage Excavation
		.2	SS 202-12, Granular Surfacing, Bases and Sub-bases
		.3	U.S. Environmental Protection Agency (EPA) / Office of Water
		.1	EPA 832/R-92-05, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Practice Measures.
1.5	Administrative Requirements	.1	Coordination: Arrange with authorities having jurisdiction for relation of buried services that interfere with execution of work.
		.1	Establish location of buried utilities and mark accordingly to prevent disturbance during construction.
1.6	Action and Informational Submittals	.1	Submit in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Samples: Submit to testing agency one 25 kg sample of backfill material proposed for use no later than one week before work.
- .3 Quality Control: In accordance with Section 01 45 00 – Quality Control.
 - .1 Submit condition survey of existing conditions.
 - .2 Submit construction equipment list for major equipment to be used for this Section prior to start of Work.
- .4 Erosion and Sedimentation Control: See PART 3.2 – Temporary Erosion and Sedimentation Control.
- .5 Construction Waste Management: In accordance with authorities having jurisdiction and Section 01 74 19 – Waste Management and Disposal.
- 1.7 Quality Assurance
 - .1 Deliver, store and handle goods in accordance with manufacturer’s specifications and Section 01 61 10 – Product Requirements.
 - .2 Qualification statement: Submit proof of insurance coverage for professional liability.
 - .3 Health and Safety Requirements:
 - .1 Conduct construction occupational health and safety in accordance with Section 01 35 33 – Health and Safety Requirements.

PART 2 - PRODUCTS

- 2.1 Materials
 - .1 In accordance with drawings.
 - .2 It should be noted that the Bituminous Surface Treatment (BST) is not part of the scope of Work, and will be installed by another Contractor.

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 runoff or airborne dust to adjacent property
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- in accordance with authorities having jurisdiction and Section 31 25 05 – Erosion and Sedimentation Control.
- .2 Inspect, repair and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Upon completion of Work, remove temporary erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
- .1 Protect excavations from freezing.
 - .2 Keep excavations clean and free of standing water or loose soil.
 - .3 Where soil is subject to significant change in volume due to changes in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are required to remain undisturbed.
- .3 Removal:
- .1 Remove trees, stumps, logs, brush, shrubs, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
 - .2 Remove stumps and tree roots below footings, slabs and paving, and to 600 mm below finished grade elsewhere.
 - .3 Remove obsolete buried services within 2 m of foundations and cap cut-offs.
- 3.2 Excavation .1 Shore and brace excavations, protect slopes and banks and perform work in accordance in accordance with SS 201-12.
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- .2 Borrow Material: In accordance with SS 201-12.
- .3 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required and so that excavated material may be stockpiled without covering soil.
 - .1 Stockpile topsoil for later use.
- .4 Excavate as required to carry out work.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Departmental Representative at least 1 week prior to commencement of excavation operations.
 - .3 Notify Departmental Representative when excavations are complete.
 - .4 Should soil conditions be unsatisfactory at excavated depth, additional excavation will be authorized in writing and paid for as additional work.
 - .5 Excavation taken below depths without Departmental Representative's written authorization to be filled and compacted to same standards as culvert backfill at Contractor's expense.
- .5 Excavate trenches to provide uniform continuous bearing and support for 200 mm pipe bedding material on solid and undisturbed ground.
- .6 Excavate for paving to subgrade level and remove all encountered topsoil, organic matter, debris and other loose or harmful material.
 - .1 Testing of materials and compaction of backfill to be carried out by testing laboratory designated by Departmental Representative.
 - .2 Not later than 1 week minimum before backfilling or filling, submit to testing agency samples of backfill described in 1.6 – Action and Informational Submittals.
 - .3 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.
 - .4 Not later than 48 hours before backfilling or filling with approved

3.3 Field Quality Control

- 3.4 Backfilling
- .1 material, notify Departmental Representative to allow compaction tests to be carried out by agency.
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 under paving to same compaction as fill.
 - .1 Fill excavated areas with selected subgrade material compacted as specified for fill.
 - .4 Place backfill, fill and base course material in 150 mm lifts and add water as necessary to achieve specified density.
 - .5 Compaction: Compact each layer of material to following densities for material to ASTM D698:
 - .1 To underside of base courses: 95%
 - .2 Base courses: 100%
 - .3 Elsewhere: 90%
 - .6 Paving: In accordance with Section 31 21 16 – Asphalt Paving.
 - .7 In trenches:
 - .1 Up to 300 mm above pipe: OGSB / GSB
 - .2 Over 300 mm above: Common material / Clay.
 - .3 Clay Seals for end of pipe as per Drawings.
 - .8 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
 - .9 Blown rock material, not capable of fine grading, is not acceptable. Imported material must be placed on this type of material.
- 3.5 Grading
- .1 Grade so that water will drain away from paved areas and structures to catch basins and other disposal areas approved by Departmental Representative.
 - .1 Grade to be gradual between finished spot elevations
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shown on drawings.

3.6 Cleaning

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 – Site Cleaning.
 - .1 Leave Work area clean at end of 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 – Site Cleaning.
- .3 Waste Management: Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | Permanent Erosion and Sediment Control Devices |
| 1.2 | Methods of Measurement and Payment | .1 | In accordance with Section 01 29 01 – Methods of Measurement and Payment. |
| 1.3 | Related Sections | .1 | Section 31 32 19 – Geotextiles |
| | | .2 | Section 31 37 10 – Riprap |
| | | .3 | Section 01 35 43 – Environmental Procedures |
| 1.4 | References | .1 | ASTM D1777-96(2011)e1 - Standard Test Method for Thickness of Textile Materials. |
| | | .2 | ASTM D3776/D3776M-09ae2 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric. |
| | | .3 | ASTM D4355-07 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus. |
| | | .4 | ASTM D4632-08 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles. |
| | | .5 | ASTM D4751-12 - Standard Test Method for Determining Apparent Opening Size of a Geotextile. |
| | | .6 | ASTM D6818-02(2009) - Standard Test Method for Ultimate Tensile Properties of Turf Reinforcement Mats. |
| | | .7 | EPA 832/R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, September 1992. |
| | | .8 | Local erosion and sediment control guidelines. |
| 1.5 | Definitions | .1 | Erosion: Deterioration, displacement, or transportation of land surface by wind or water, intensified by land-clearing practices related to construction activities. |
| | | .2 | Rain or Rain Storm: An event defined causing the pooling of water on road or other impervious surfaces. |
| | | .3 | Sediment: Particulate matter transported and deposited as a layer of solid particles within a body of water. |
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- .4 Snow Melt: An event in snow conditions when the temperature is above 0°C or when environmental conditions causing snow on the ground to melt.
- 1.6 Performance Requirements .1 Supply and install sediment and erosion control measures as shown and as directed by the Departmental Representative.
- 1.7 Administrative Requirements .1 Section 01 31 19 – Project Management
.2 Section 01 32 17 – Construction Progress and Reporting
 - .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate with maintenance, monitoring and reporting procedures.
- 1.8 Submittals for Information .1 Section 01 33 00: Submission Procedures
 - .2 Test Reports: Submit substantiating engineering data, test results of tests which purport to meet performance criteria and other supporting data.
 - .3 Installation Data: Manufacturer’s recommended installing procedures.
- 1.9 Quality Assurance .1 Products of this section should be manufactured to ISO 9000 certification requirements.

PART 2 - PRODUCTS

- 2.1 Silt Fencing .1 Geotextile: Woven polypropylene filter fabric resistant to ultraviolet degradation.
 - .1 Physical Properties and Test Methods
 - .1 Tensile Strength: 41 kg (ASTM D4632)
 - .2 Elongation : 50% (ASTM D4632)
 - .3 Apparent Opening Size: 0.60 mm (ASTM D4751)
 - .4 Ultraviolet Stability (retained strength after 500 hours exposure): 70% (ASTM D4355)
 - .2 Posts: Hardwood posts of 1200 mm minimum length and painted fluorescent orange for safety.
 - .3 Stabilization Plates: 115 cm² in size, galvanized.
 - .4 Ties: Heavy duty plastic.
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- .5 Wire reinforcement: Galvanized 14 gauge (1.9 mm) wire with maximum 150 mm mesh spacing
 - 2.2 Erosion Control Blanket
 - .1 Coconut matting: Weed free, 100% coconut fibre sewn to biodegradable netting.
 - .1 Product to be approved by Departmental Representative.
 - .2 Functional Longevity: 12 months minimum as specified by the manufacturer.
- PART 3 - EXECUTION**
- 3.1 Installation
 - .1 According to drawings, and as directed by Departmental Representative.
 - 3.2 Silt Fences
 - .1 Install at the top of the banks where overland flow could carry silt into the watercourse, and as directed by the Departmental Representative.
 - .2 Place silt fences perpendicular to direction of flow.
 - .3 Install parallel fences in succession to achieve required degree of control.
 - .4 Height: Not exceeding 1000 mm above ground surface
 - 3.3 Erosion Control Blanket
 - .5 Posts: Position downstream at maximum 2 m on centre and extending minimum 400 mm into ground. Secure or brace posts to prevent overturning due to sediment overloading.
 - .1 Erosion Control Blankets:
 - .1 Install on disturbed banks adjacent to the rock and gabions and as directed by the Departmental Representative.
 - .2 Install blankets to manufacturer's written instructions, anchor with staples or stakes in recommended pattern for proper load resistance.
 - .3 Duration: 12 months.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Section Includes | .1 | Geotextiles |
| 1.2 | Measurement Procedures and Payment | .1 | Installed geotextile material shall be considered incidental to the supply and installation of rip rap, and no additional payment shall be made. |
| 1.3 | Related Sections | .1 | Section 31 00 00 – Earthworks |
| | | .2 | Section 31 25 05 – Erosion and Sedimentation Control |
| | | .3 | Section 31 37 10 – Riprap |
| 1.4 | References | .1 | American Society for Testing and Materials (ASTM) |
| | | .1 | ASTM D4491-99a(2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity. |
| | | .2 | ASTM D4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.ASTM D4716-08, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head. |
| | | .3 | ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile. |
| | | .2 | Canadian General Standards Board (CGSB) |
| | | .1 | CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989). |
| | | .2 | CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes. |
| | | .1 | No.2-[M85], Methods of Testing Geosynthetics - Mass per Unit Area. |
| | | .2 | No.3-[M85], Methods of Testing Geosynthetics - Thickness of Geotextiles. |
| | | .3 | No.6.1-[93], Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load. |
| | | .4 | No.7.3-[92], Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles. |
| | | .5 | No. 10-[94], Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size |
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- .3 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1860-November 2010, Material Specification for Geotextiles.
 - 1.5 Action and Informational Submittals
 - .1 In accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Product Data: Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Submit to Departmental Representative 2 copies of mill test data and certificate at least 1 weeks prior to start of Work, and in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 If requested by the Departmental Representative, submit to Departmental Representative the following samples at least 1 weeks prior to beginning Work for each type of geotextile used on the project.
 - 1.6 Delivery, Storage and Handling
 - .1 Deliver, store and handle in accordance with Section 01 61 10 – Product requirements and manufacturer’s specifications.
 - .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer’s recommendations in clean, dry and well ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged material with new.
 - .3 Packaging Waste Management: Remove for return or reuse of pallets, crates, padding and packaging materials as specified in Waste Management Plan Section and Section 01 74 19 – Waste Management and Disposal.
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PART 2 - PRODUCTS

- 2.1 Materials
- .1 Geotextile: Woven and nonwoven synthetic fibre fabric supplied in rolls.
 - .1 Should be composed of minimum 85% polypropylene by mass with inhibitors added to base plastic to resist deterioration by UV and heat exposure.
 - .2 Physical properties for woven geotextile:
 - .1 Grab Strength: 1275 N
 - .2 Elongation (Failure): 15%
 - .3 Puncture Strength: 275 N
 - .4 Burst Strength: 3.6 MPa
 - .5 Trapezoidal Tear: 475 N
 - .3 Physical properties for nonwoven geotextile:
 - .1 Grab Strength: 650 N
 - .2 Elongation (Failure): 50%
 - .3 Puncture Strength: 275 N
 - .4 Burst Strength: 2.1 MPa
 - .5 Trapezoidal Tear: 250 N
 - .4 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A123/A123M.
 - .5 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .6 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

PART 3 - EXECUTION

- 3.1 Examination
- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
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- 3.2 Installation
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- .1 Place geotextile free of tension stress, folds, wrinkles and creases.
- .2 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .3 Overlap successive strips of geotextile in the direction of flow.
- .1 Minimum fabric lap:
 - .1 Woven geotextile: 1000 mm.
 - .2 Non-woven geotextile: 300 mm.
- .4 Pin strips of geotextile as indicated by the manufacturer.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.
- 3.3 Cleaning
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Site 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 – Site Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
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3.4 Protection .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

PART 1 - GENERAL

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|-----|------------------------------------|----|--|
| 1.1 | Section Includes | .1 | Riprap |
| 1.2 | Measurement Procedures and Payment | .1 | In accordance with Section 01 29 01 – Methods of Measurement and Payment. |
| 1.3 | Related Sections | .1 | Section 31 00 00 – Earthworks |
| | | .2 | Section 31 32 19 – Geotextiles |
| 1.4 | Waste Management and Disposal | .1 | In accordance with Section 01 74 19 – Waste Management and Disposal. |
| | | .2 | Divert left over geotextiles to local plastic recycling facility as approved by Departmental Representative. |

PART 2 - PRODUCTS

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| 2.1 | Stone | .1 | Rock should meet Class 500 riprap requirements as per the 2012 Standard Specifications for Highway Construction, published by the British Columbia Ministry of Transportation. |
| | | .2 | Stone should be hard with relative density no less than 2.65, free of seam, cracks and structural defects, and meeting the following size distribution for use intended: <ul style="list-style-type: none">.1 Heavy Rock Riprap (Class 500 kg)<ul style="list-style-type: none">.1 Approximate average dimension of angular rock: 565 mm..2 Not more than 15% of rock lighter than 50 kg (approx. 330 mm diameter)..3 Not more than 50% of rock lighter than 500 kg (approx. 715 mm diameter)..4 Not more than 85% of rock lighter than 1500 kg (approx. 1030 mm diameter). |
| | | .3 | Riprap that does not meet the required specification should not be used without the written permission of the Departmental Representative. |
| 2.2 | Geotextile Filter | .1 | In accordance with Section 31 32 19 – Geotextiles. |

PART 3 - EXECUTION

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| 3.1 | Placing | .1 | Where riprap is to be placed on slopes, excavate trench at toe of |
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slope to dimensions as indicated on drawings.

- .2 Fine grade area to be protected with riprap to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface in accordance with Section 31 32 19 – Geotextiles and as indicated on drawings. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
- .4 Place riprap to thickness and details as indicated.
- .5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

END OF SECTION

PART 1 - GENERAL

1.1	Section Includes	.1	This section specifies methods and procedures for the installation of steel pipe culverts.
1.2	Methods of Measurement and Payment	.1	In accordance with Section 01 29 01 – Methods of Measurement and Payment.
1.3	Related Sections	.1	Section 01 74 11 – Site Cleaning
		.2	Section 01 35 43 – Environmental Procedures
		.3	Section 01 29 01 – Methods of Measurement and Payment
1.4	References	.1	ASTM International
		.1	ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
		.2	ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
		.3	ASTM C144-04, Standard Specification for Aggregate for Masonry Mortar.
		.4	ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m).
		.5	ASTM D1248-05, Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
		.6	ASTM F667-[06], Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.
		.2	Canadian General Standards Board (CGSB)
		.1	CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch.
		.2	CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
		.3	CSA International
		.1	CSA A3000-08, Cementitious Materials Compendium.
		.2	CAN/CSA G401-[07], Corrugated Steel Pipe Products.
		.4	U.S. Environmental Protection Agency (EPA) / Office of Water
		.1	EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

- 1.5 Action and Informational Submittals
 - .1 In accordance with Section 01 33 00 – Submittal Procedures
 - .2 Product data:
 - .1 Submit manufacturer’s specifications, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Samples:
 - .1 Inform Departmental Representative of source for bedding materials at least 2 weeks before beginning of work and provide access for sampling.
 - .4 Certification: To be marked on pipe.
 - .5 Test and Evaluation Reports:
 - .1 Submit manufacturer’s test data and certification at least 2 weeks prior to beginning work.
 - .6 Submit erosion and sedimentation control plan in accordance with Section 31 25 05 – Erosion and Sedimentation Control.
 - .7 Submit construction waste management plan in accordance with Section 01 74 19 – Waste Management and Disposal.
 - 1.6 Delivery, Storage and Handling
 - .1 Deliver, store and handle materials in accordance with Section 01 61 10 – Product Requirements.
 - .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging with manufacturer’s name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer’s recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.
 - .4 Packaging Waste Management: Remove pallets, crates, padding and packaging materials for return, reuse or recycle as specified in Construction Waste Management Plan and in accordance with manufacturer’s specifications.
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PART 2 – PRODUCTS

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| 2.1 | Corrugated Steel Pipe | .1 | Corrugated steel pipe: To CAN/CSA-G401. |
| | | .2 | Watertight cutoff collars: As indicated on Drawings. |
| | | .3 | Beveled end sections: As indicated on Drawings. |
| | | .4 | Corrugated fluming: To CAN/CSA-G401. |
| 2.2 | Granular Bedding and Backfill | .1 | Granular bedding, backfill material to Section 31 00 00 – Earthwork or as recommended by SPCSP supplier |
| 2.3 | Concrete | .1 | Concrete mixes and materials to Section 03 30 00 – Cast-in-Place Concrete. |

PART 3 – EXECUTION

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|-----|-------------|----|---|
| 3.1 | Examination | .1 | Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions. |
| | | .1 | Visually inspect substrate in presence of Departmental Representative. |
| | | .2 | Inform Departmental Representative immediately of unacceptable conditions upon discovery. Proceed with installation only after unacceptable conditions have been remedied and upon receipt of approval from Departmental Representative to proceed. |
| 3.2 | 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 Sedimentation and Erosion Control Plan. |
| | | .2 | Inspect, repair and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established. |
| | | .3 | Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal. |
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| 3.3 | Trenching | .1 | Conduct all trenching Work in accordance with Section 31 00 00 – Earthworks |
| | | .2 | Obtain Departmental Representative’s approval of trench line and depth prior to placement of bedding material and/or pipe. |
| 3.4 | Bedding | .1 | Dewater excavation as required to allow placement of culvert bedding in dry condition. |
| | | .2 | Place 200 mm minimum thickness of approved granular material on bottom of excavation and compact to minimum of 95% of maximum dry density to ASTM D698. |
| | | .3 | Shape bedding to fit lower segment of pipe exterior so that pipe bottom is in close contact with bedding and to camber as indicated in Drawings, free from sags or high points. |
| | | .4 | Place bedding in unfrozen condition. |
| 3.5 | Laying Corrugated Steel Pipe Culverts | .1 | Commence pipe placement at downstream end. |
| | | .2 | Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length. |
| | | .3 | Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points. |
| | | .4 | Lay paved invert or partially lined pipe with longitudinal centre line of paved segment coinciding with flow lone. |
| | | .5 | Do not allow water to flow through pipes during construction except as permitted by Departmental Representative. |
| 3.6 | Joints for Structural Plate Corrugated Steel Pipes | .1 | Erect in final position by connecting plates with bolts at longitudinal and circumferential seams. |
| | | .2 | Drift pins may be used to facilitate matching of holes. |
| | | .3 | Place plates in sequence recommended by manufacturer with joints staggered. |
| | | .4 | Draw bolts up tight as indicated in Drawings prior to backfilling. |
| | | .5 | Repair spots where damage has occurred to spelter coating by applying two coats of zinc rich epoxy paint as approved by |
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- Departmental Representative.
- 3.7 Backfilling
- .1 Backfill around and over culverts as indicated on Drawings and as directed by Departmental Representative.
 - .2 Place backfill material, approved in writing by Departmental Representative, in 150 mm layers to full width, alternating between either side of culvert so as to prevent displacement.
 - .3 Compact to at least 95% of maximum dry density. Take special care to obtain required density under haunches.
 - .4 Installed culvert must have minimum of 600 mm cover, compacted fill, for heavy traffic to cross.
 - .1 During construction, width of fill at top must extend at least 1.5 m beyond either side of pipe and slopes must not be steeper than 1:2.
 - .5 Place backfill in unfrozen conditions.
 - .6 Install fluming as indicated on Drawings.
 - .7 Set top edges of fluming flush with side slope.
- 3.8 Cleaning
- .1 Progress Cleaning: In accordance with Section 01 74 11 – Site 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 – Site Cleaning.
 - .3 Waste Management: Separate waste materials reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at an appropriate facility.

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|-------------------------------------|----|--|
| 1.1 | Related Requirements | .1 | Section 01 13 00 – Submittal Procedures |
| 1.2 | Environmental Requirements | .1 | Operation of construction equipment in water is prohibited. |
| | | .2 | Use borrow material from watercourse beds only after receipt of written approval from Departmental Representative and authority having jurisdiction. |
| | | .3 | Design and construct temporary crossings to minimize environmental impact to watercourse. |
| | | .4 | Constructing temporary crossings of watercourses where spawning beds are indicated is prohibited. |
| | | .5 | Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited. |
| 1.3 | References | .1 | U.S. Environmental Protection Agency (EPA) / Office of Water |
| | | .1 | EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices. |
| | | .2 | British Columbia Ministry of Transportation Standard Specifications for Highway Construction (SS) |
| | | .1 | SS 766-12, Irrigation |
| | | .2 | SS 769-12, Protection and Retention of Vegetation |
| 1.4 | Action and Informational Submittals | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures. |
| | | .2 | Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005 and authorities having jurisdiction. |

PART 2 - PRODUCTS

- | | | | |
|-----|----------|----|-----------|
| 2.1 | Not Used | .1 | Not used. |
|-----|----------|----|-----------|

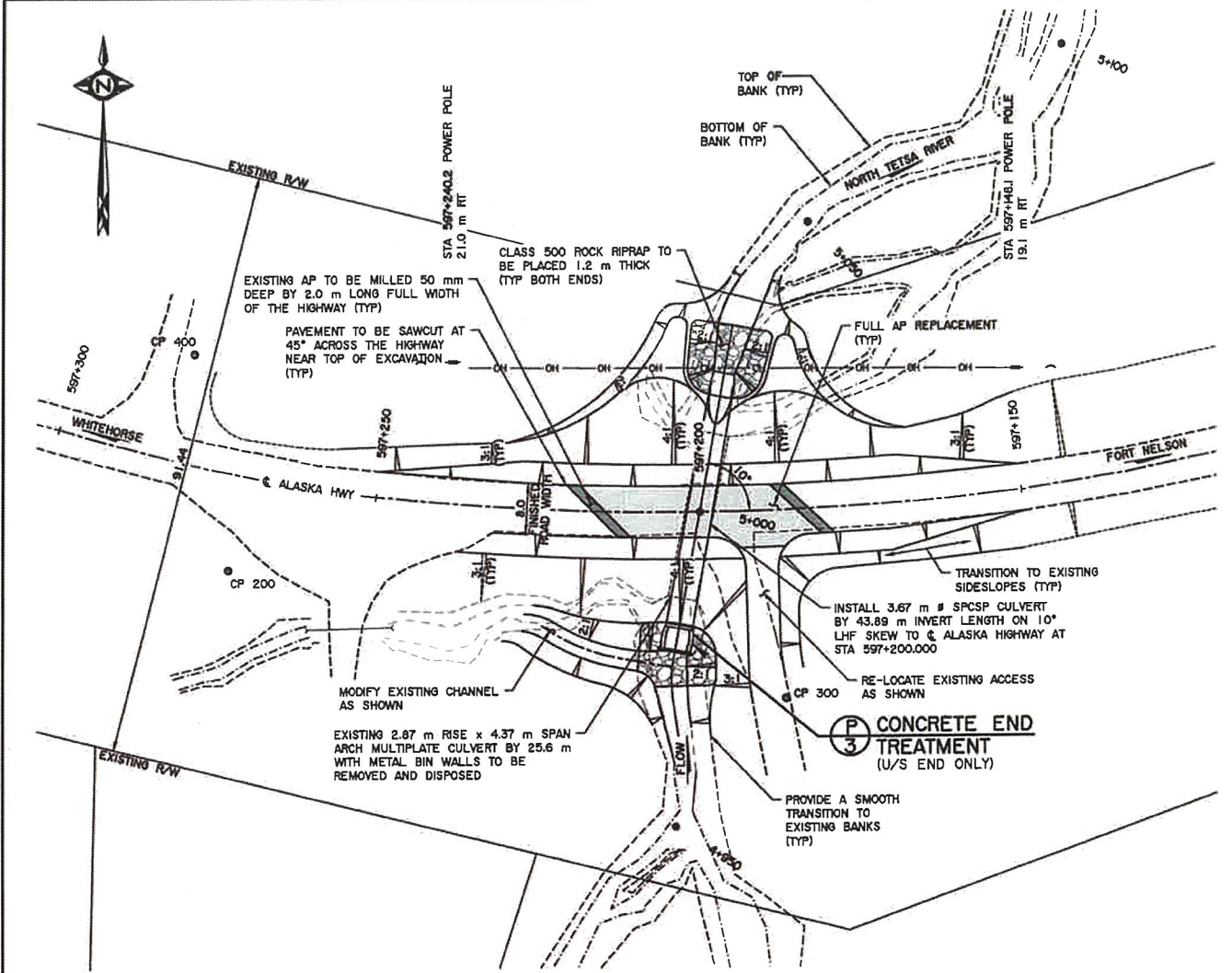
PART 3 - EXECUTION

- | | | | |
|-----|---------------------|----|---|
| 3.1 | Existing Conditions | .1 | Maintain existing flow in natural watercourse systems. |
| | | .2 | In natural systems retain existing riffle pool and step pool systems. |

- .3 In wetland systems, maintain existing hydrological conditions.
- 3.2 Site Clearing and Plant Protection
 - .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings, site-specific sediment and erosion control plan complying with referenced standards.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
 - .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
 - .3 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
 - .4 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
 - .5 Leave cuttings from trees and other vegetation on site as brush piles to allow for natural degradation.
 - .1 Secure large piles with degradable materials to prevent interference with watercourse.
 - .6 Remove only trees that may offer future blockage problems as instructed by Departmental Representative.
 - .7 Leave roots mass and stumps in place.
 - .8 Maintain temporary erosion and pollution control features installed under this contract.

- 3.3 Drainage
- .1 Pumping of water containing suspended materials into watercourse is prohibited.
 - .2 Establish rock chute spillways to accommodate safe surface water entry to watercourse as directed by Departmental Representative.
 - .3 Install drop pipe inlet system as directed by Departmental Representative.
- 3.4 Site Restoration
- .1 Establish vegetated buffer zones with suitable vegetation to minimum 3 m along edge of watercourse banks as determined by Departmental Representative.
 - .2 Plant vegetation natural to area, suitable for application without requirement of fertilizers, pesticides or other chemicals.
 - .3 Control stream bank erosion in lower section of watercourse with irregular shaped riprap underlain with nontoxic filter cloth of size determined by Departmental Representative.
 - .4 Control stream bank erosion in upper section of watercourse by planting suitable vegetation as directed by Departmental Representative.
 - .1 Ensure planting occurs within 14 days after work on watercourse is complete.

END OF SECTION



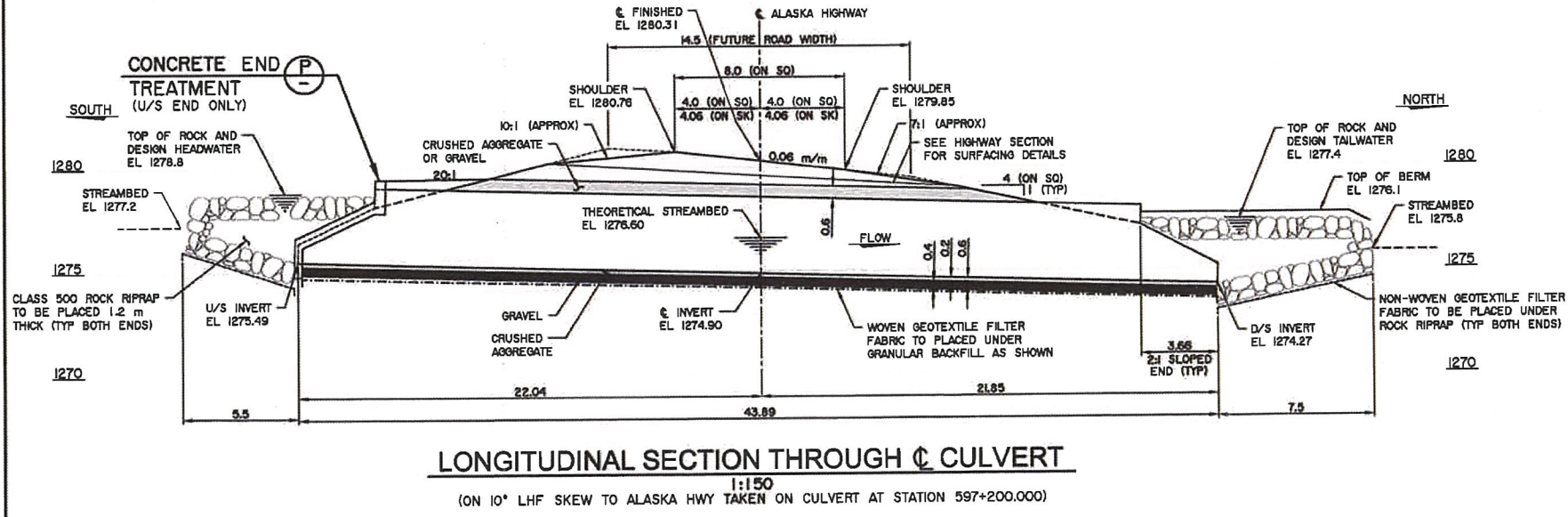
SITE PLAN
1:500

SURVEY

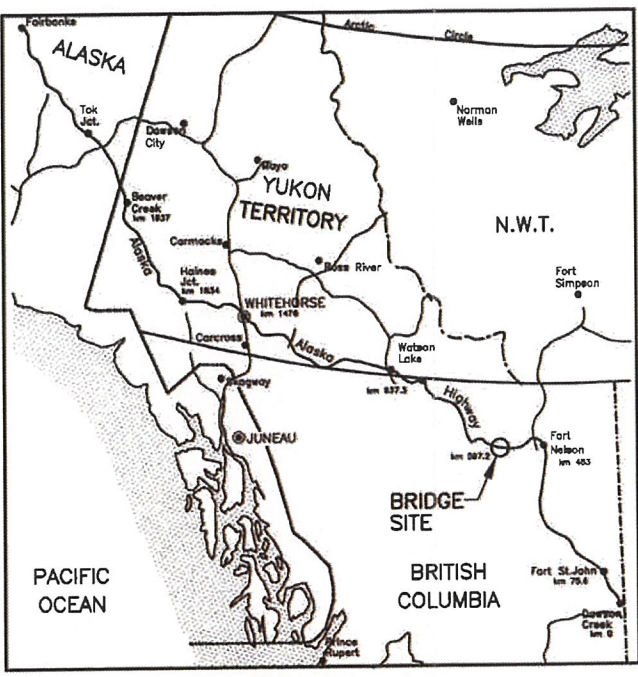
1. SURVEY BY WSP, UNDER THE DIRECTION OF MR. KURT PETRICA, P. ENG., OCTOBER 2013
2. SURVEYED IN UTM NAD 83 ZONE 10

BENCHMARKS

1. CP 300, IRON SPIKE, LOCATED 28.596 m RT OF HIGHWAY ALIGNMENT AT STA 597+187.476, EL 1280.517 - (N=6502394.212 E=404420.827)
2. CP 200, IRON SPIKE, LOCATED 15.301 m RT OF HIGHWAY ALIGNMENT AT STA 597+270.056, EL 1281.222 - (N=6502414.510 E=404334.573)
3. CP 400, IRON SPIKE, LOCATED 16.452 m LT OF HIGHWAY ALIGNMENT AT STA 597+282.252, EL 1281.380 - (N=6502448.117 E=404329.396)



LONGITUDINAL SECTION THROUGH CULVERT
1:150
(ON 10° LHF SKEW TO ALASKA HWY TAKEN ON CULVERT AT STATION 597+200.000)



LOCATION MAP
NTS

GENERAL NOTES

- GENERAL**
1. DIMENSIONS ARE GIVEN IN METRES UNLESS NOTED OTHERWISE
 2. DESIGN SPECIFICATION: CAN/CSA-S6-06
 3. DESIGN SPEED = 100 Km/h
- HYDROTECHNICAL SUMMARY**
1. TOTAL DRAINAGE AREA = 25 km²
 2. Q₁₀₀ DESIGN FLOOD = 25 m³/s
 3. MEAN OUTLET VELOCITY AT PROPOSED CULVERT FOR DESIGN FLOOD = 2.4 m/s
 4. AVERAGE SURVEYED SLOPE OF STREAMBED = 0.035 m/m
- NEW STRUCTURE**
1. 1 - 3.67 DIA SPCSP CULVERT BY 43.89 m INVERT LENGTH ON 10° LHF SKEW TO ALASKA HIGHWAY AT STATION 597+200.000
 2. WALL THICKNESS IS 3.0 mm, 915 g/m² GALVANIZED COATING, CORRUGATION PROFILE 192 mm x 51 mm
- ASSEMBLY**
1. SPCSP SHALL BE ASSEMBLED AS SHOWN ON THE MANUFACTURER'S ASSEMBLY DRAWINGS AND AS OUTLINED BELOW.
 - A) ASSEMBLY, LOOSE BOLTING AND RING CLOSURE SHALL PROGRESS FROM ONE END WITH EACH RING CHECKED AND ADJUSTED TO DESIGN GEOMETRY WITH FULLY NESTED PLATES IMMEDIATELY UPON CLOSURE OF INDIVIDUAL RINGS. WHERE TEMPORARY SUPPORTS OR TIE CABLES ARE USED, ADEQUATE MEANS SHALL BE TAKEN TO DISTRIBUTE LOADS ALONG THE PIPE WALL, TO PREVENT LOCAL DISTORTION AND MAINTAIN DESIGN SHAPE.
 - B) ALL BOLTED SEAMS SHALL BE PROPERLY LAPPED AND PLATES SHALL BE IN CONTACT FOR THE FULL WIDTH AND LENGTH OF THE LAP. THE BOLTS IN THE VALLEY OF EACH LONGITUDINAL SEAM SHALL BE NEAREST TO THE VISIBLE EDGE OF THE PLATE.
 - C) THE VERTICAL AXIS SHALL BE UPRIGHT AND THE LONGITUDINAL SEAMS SHALL BE STRAIGHT. ROTATION OF THE PIPE AND/OR SPIRALING OF THE LONGITUDINAL SEAMS SHALL NOT BE PERMITTED.
 - D) BOLTS SHALL BE TORQUED TO AND MAINTAINED AT NOT LESS THAN 200 N.m. AND NOT MORE THAN 340 N.m.
 - E) DISTORTION OF BOLT HOLES CAUSED BY OVER-TORQUING, OR POOR ASSEMBLY METHODS WILL NOT BE PERMITTED. WHERE ADDITIONAL HOLES ARE REQUIRED, THEY SHALL BE DRILLED. EXTRA HOLES AND MINOR SURFACE DAMAGE SHALL RECEIVE 2 BRUSH APPLIED COATS OF ZINC RICH PAINT.
 2. USE SOFT SLINGS AND HANDLE WITH CARE TO AVOID SCRATCHING, BRUISING, AND DISTORTION OF THE PIPE. DEFORMATION DURING CONSTRUCTION SHALL NOT EXCEED A 2% UPWARD AND DOWNWARD DEFLECTION FROM THE DESIGN RISE. IF STRUTS OR CABLES ARE USED TO MAINTAIN THE PIPE SHAPE, THEY SHALL BE REMOVED BEFORE THEY RESTRICT DOWNWARD MOVEMENT OF THE CROWN
 3. IF ANY DISCREPANCIES EXISTS BETWEEN THE NOTES INDICATED HERE AND THE MANUFACTURERS INSTRUCTIONS, THEN THE MANUFACTURERS INSTRUCTIONS SHALL GOVERN
 4. FOR ADDITIONAL CULVERT INFORMATION SEE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, SECTIONS 303 AND 320

INDEX	
SHEET	DESCRIPTION
1 OF 3	GENERAL LAYOUT
2 OF 3	INFORMATION SHEET
3 OF 3	CONCRETE END TREATMENT DETAILS

Public Works and Government Services / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

WSP

7710 EDGAR INDUSTRIAL COURT
RED DEER (ALBERTA) CANADA T4P 4E3
TEL: 403-542-7660 | FAX: 403-542-7881 | WWW.WSPGROUP.COM

PROFESSIONAL ENGINEER
K. R. PETRICA
#39101
JUNE 26/2014

DESIGN COMPLETION	2014/06/18
DESCRIPTION/DESCRIPTION	DATE/DATE

Client/Client: **PUBLIC WORKS AND GOVERNMENT SERVICES CANADA**

Project Title/Titre du projet: **ALASKA HIGHWAY, km 597.2 BRITISH COLUMBIA**

NORTH TETSA RIVER BRIDGE CULVERT No. 5 CULVERT REPLACEMENT

Approved by/Approuvé par: **ALEX TAMER, P.ENG.**

Designed by/Concept par: **KURT PETRICA, P.ENG. - 20140618**

Drawn by/Dessiné par: **DEVAN KRAHN - 20140618**

Project Manager/Administrateur de Projets/TPSQC: **ALEX TAMER, P.ENG.**

TPSQC, Architectural and Engineering Services Manager/ Ressources Architecturales et de Directeur d'ingénierie, TPSQC

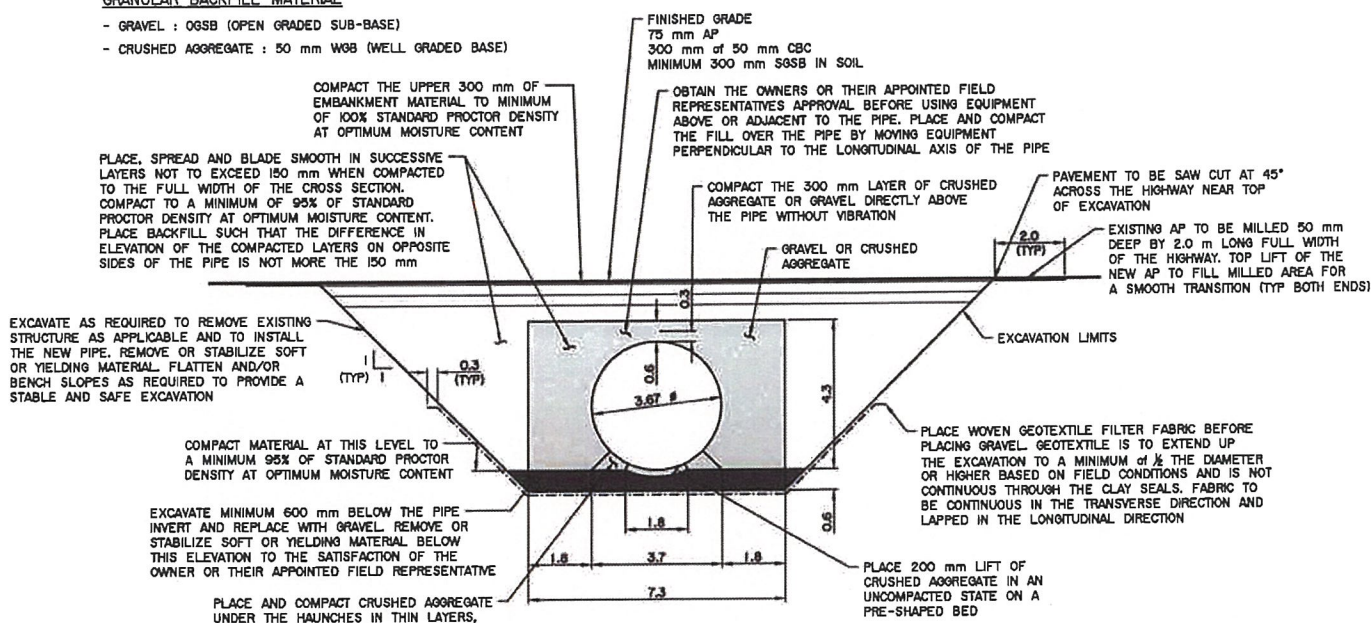
Client/Client: **PUBLIC WORKS AND GOVERNMENT SERVICES CANADA**

Drawing Title/Titre du dessin: **GENERAL LAYOUT**

Project No./No. du projet: R.017173.031	Sheet/Faible: 1	Revision no./No. Révision: 0
	OF 3	

GRANULAR BACKFILL MATERIAL

- GRAVEL : OGSB (OPEN GRADED SUB-BASE)
- CRUSHED AGGREGATE : 50 mm WOB (WELL GRADED BASE)



BACKFILL DETAIL
1:100

GENERAL NOTES (CONT.)

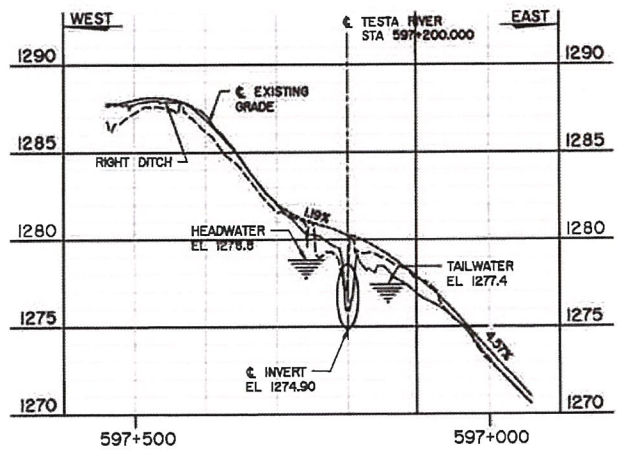
BACKFILLING

1. SHAPE CHECKS SHALL BE PERFORMED DURING AND AFTER CONSTRUCTION TO ENSURE THAT THE DESIGN SHAPE IS MAINTAINED WITHIN ACCEPTABLE TOLERANCES
2. PLACE BACKFILL AND ADJACENT EMBANKMENT BY EQUIPMENT MOVING PARALLEL TO THE LONGITUDINAL AXIS OF THE PIPE. FOR ADDITIONAL INFORMATION ON BACKFILL OVER THE PIPE SEE THE BACKFILL DETAILS
3. BEDDING AND BACKFILL SHALL BE COMPACTED TO A MINIMUM 95% OF THE LABORATORY DENSITY BY FOLLOWING CURRENT ASTM METHOD D698
4. BACKFILL SHALL CONSIST OF APPROVED GRANULAR MATERIAL. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN AN UNFROZEN CONDITIONS, MEET THE SPECIFIED GRADATION AND BE FREE OF LARGE OR FROZEN LUMPS, WOOD OR OTHER UNSUITABLE MATERIAL. BACKFILLING IS NOT ALLOWED ON FROZEN SUBSTRATE OR WHEN AIR TEMPERATURE IS BELOW 0 DEGREES CELSIUS
5. PRE-APPROVED GRANULAR MATERIALS SHALL MEET GRADATION SPECIFICATIONS IN ACCORDANCE WITH B.C. MINISTRY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, SECTION 202 (TABLE 202-C)
6. HEAVY CONSTRUCTION EQUIPMENT AND LARGE COMPACTION EQUIPMENT SHALL NOT BE PERMITTED WITHIN 1.0 M OF THE PIPE SIDEWALLS

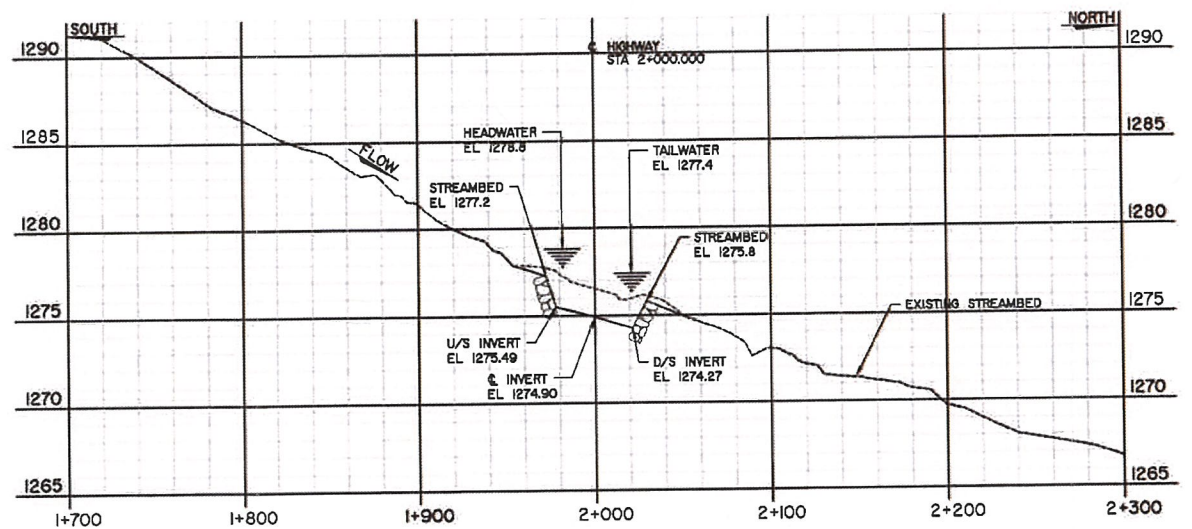
HEAVY ROCK RIPRAP

1. HEAVY ROCK RIPRAP SHALL COVER THE AREAS SHOWN AND BE PLACED AT MINIMUM THICKNESSES IN ACCORDANCE WITH B.C. MINISTRY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, SECTION 205 (TABLE 205-A)
2. PLACE NON-WOVEN GEOTEXTILE FILTER FABRIC UNDER ALL HEAVY ROCK RIPRAP
3. GEOTEXTILE FILTER FABRIC SHALL MEET THE FOLLOWING REQUIREMENTS:

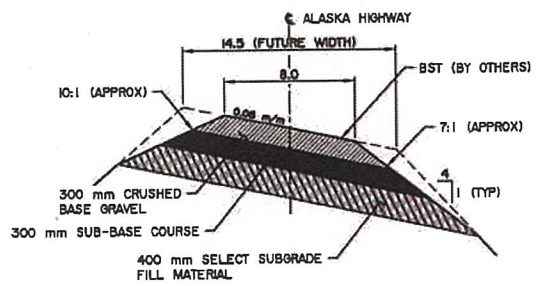
WOVEN GEOTEXTILE FILTER FABRIC		NON-WOVEN GEOTEXTILE FILTER FABRIC	
SPECIFICATIONS AND PHYSICAL PROPERTIES		SPECIFICATIONS AND PHYSICAL PROPERTIES	
GRAB STRENGTH	1275 N	GRAB STRENGTH	650 N
ELONGATION (FAILURE)	15 %	ELONGATION (FAILURE)	50 %
PUNCTURE STRENGTH	275 N	PUNCTURE STRENGTH	275 N
BURST STRENGTH	3.6 MPa	BURST STRENGTH	2.1 MPa
TRAPEZOIDAL TEAR	475 N	TRAPEZOIDAL TEAR	250 N
MINIMUM FABRIC LAP TO BE 1000 mm		MINIMUM FABRIC LAP TO BE 300 mm	



HIGHWAY PROFILE
HOR: 1:5000 VERT: 1:200



STREAMBED PROFILE
HOR: 1:2000 VERT: 1:200



- NOTES:**
1. HIGHWAY CONSTRUCTION TO BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF THE B.C. MINISTRY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND ALASKA HIGHWAY BRITISH COLUMBIA CONSTRUCTION DRAWING STANDARD EMBANKMENT STRUCTURE TEMPLATE SHEET 03A
 2. RE-PAINT LANE TRAFFIC MARKINGS TO MATCH EXISTING
 3. FINISHED TOP OF PAVEMENT TO MATCH EXISTING

TYPICAL HIGHWAY SECTION
HOR: 1:250 VERT: 1:50

QUANTITY ESTIMATE		
ITEM	UNIT	ESTIMATE
EXCAVATION	m ³	2400
BACKFILL - GRANULAR	m ³	700
BACKFILL - NON-GRANULAR (CLAY SEALS)	m ³	750
HEAVY ROCK RIPRAP - CLASS 500 kg	m ³	430
CLASS B CONCRETE (32 MPa)	m ³	6
GALVANIZED MACHINE BOLTS c/w 2 NUTS		58

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES Western Region SERVICES IMMOBILIERS Région de l'ouest

WSP

7710 EDGAR INDUSTRIAL COURT
RED DEER (ALBERTA) CANADA T4P 4B2
TEL: 403-342-7850 | FAX: 403-342-7881 | WWW.WSPGROUP.COM

PROFESSIONAL ENGINEER
K.R. PETRICA #39101
BRITISH COLUMBIA

June 26/2014

Revision/Description	Date/Date
DESIGN COMPLETION	2014/06/18

Client/Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
REAL PROPERTY SERVICES PACIFIC REGION

Project title/Titre du projet: ALASKA HIGHWAY, km 597.2 BRITISH COLUMBIA
NORTH TETSA RIVER BRIDGE CULVERT No. 5 CULVERT REPLACEMENT

Designed by/Conçu par: KURT PETRICA, P.ENG - 2014/06/18
Drawn by/ Dessiné par: DEVAN KRAHN - 2014/06/18
PWOSC Project Manager/ Administrateur de Projets TPSC: ALEX TAMER, P.ENG
PWOSC Architectural and Engineering Resources Manager/ Ressources Architecturales et de Directeur d'ingénierie, TPSC:

Client/Client: [Blank]

INFORMATION SHEET

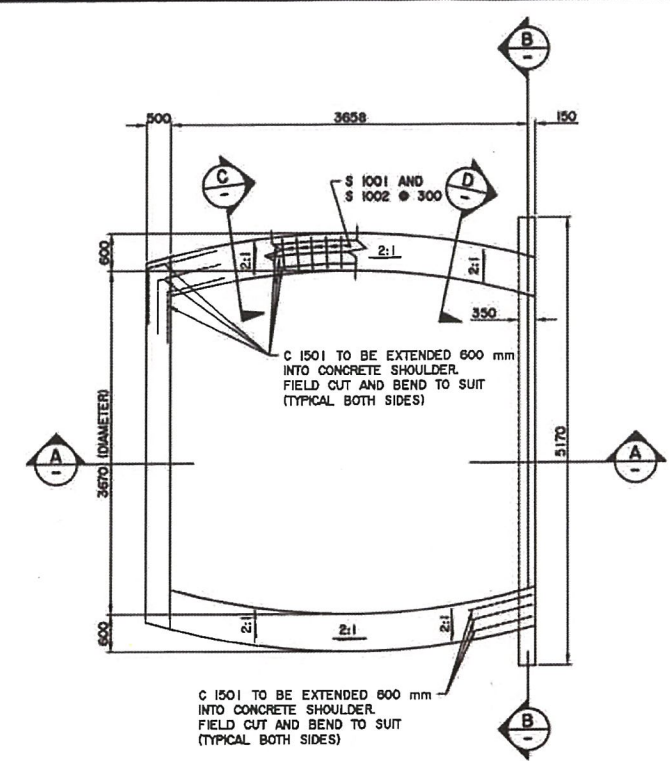
Project No./No. du projet	Sheet/Feuille	Revision no./La Révision no.
R.017173.031	2 of 3	0



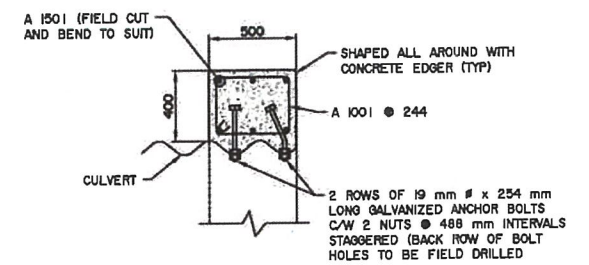
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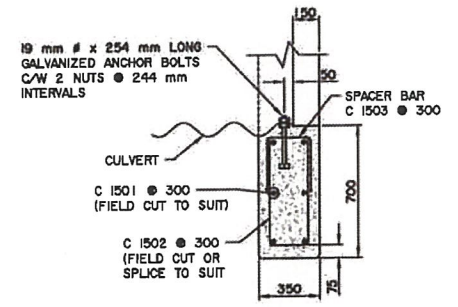
June 26/2014



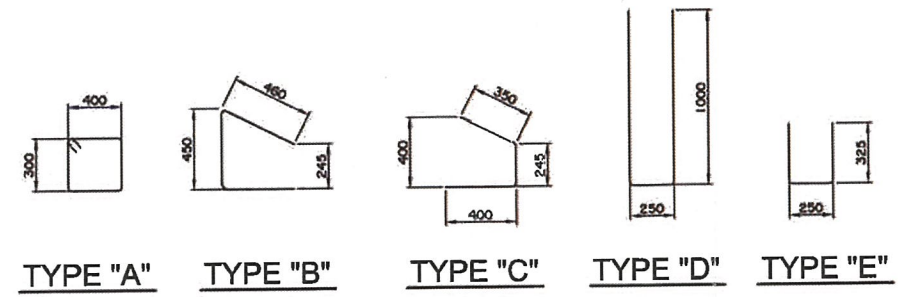
P CONCRETE END TREATMENT
NTS



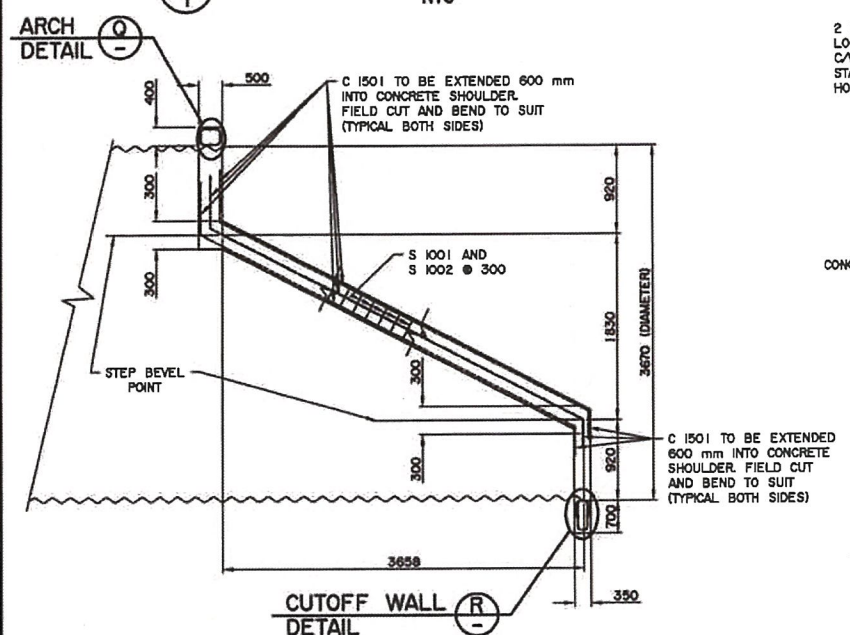
Q ARCH DETAIL
NTS



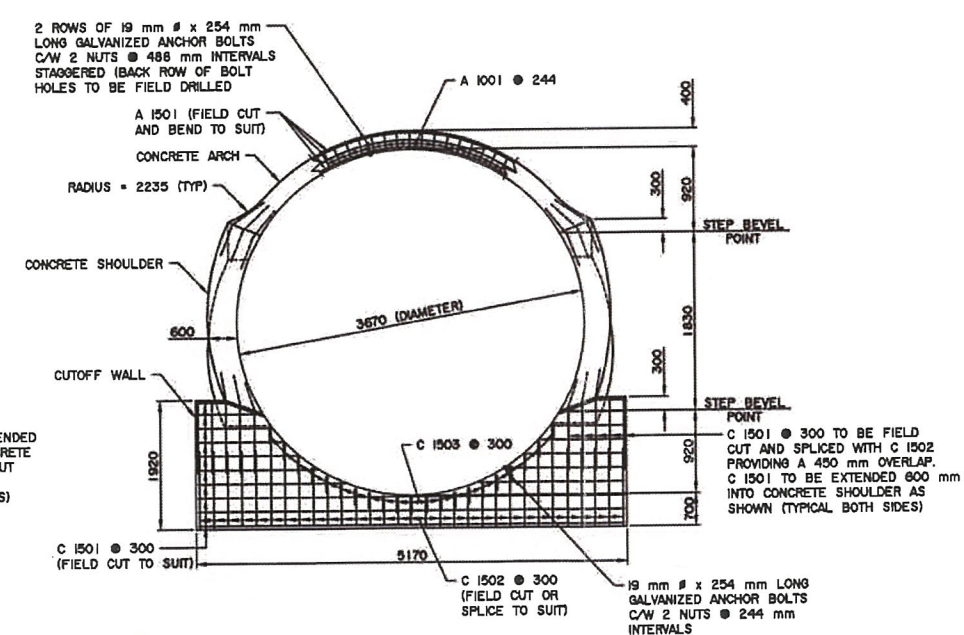
R CUTOFF WALL DETAIL
NTS



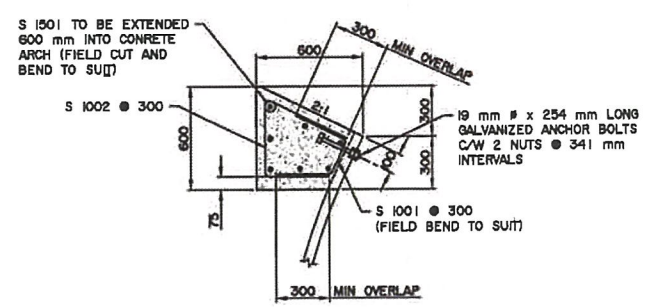
BAR LIST					
MARK	SIZE	NO.	TYPE	LENGTH	MASS (Kg)
A 1001	10	21	A	1 680	28
A 1501	15	6	STR	5 400	51
C 1501	15	7	STR	12 000	132
C 1502	15	18	D	2 250	64
C 1503	15	18	E	900	25
S 1001	10	30	C	995	23
S 1002	10	30	B	1 320	31
S 1501	15	14	STR	4 800	108
				TOTAL	460



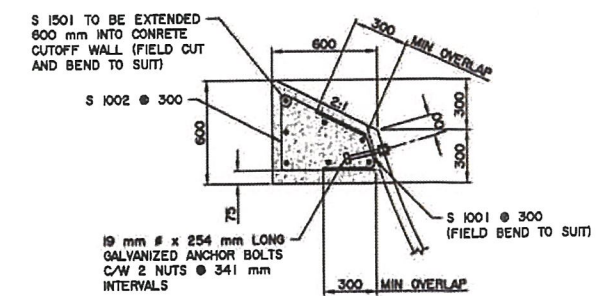
A LONGITUDINAL SECTION
NTS



B END VIEW SECTION
NTS



C SHOULDER SECTION
NTS



D SHOULDER SECTION
NTS

GENERAL NOTES FOR CONCRETE END TREATMENTS

- DIMENSIONS ARE GIVEN IN MILLIMETRES UNLESS NOTED OTHERWISE
- Holes in the culvert plate (22mm DIA) to be field drilled to receive anchor bolts (DO NOT BURN)
- AFTER PIPE HAS BEEN COMPLETELY BACKFILLED, CONCRETE END TREATMENT SHALL BE BUILT STARTING WITH THE CUT-OFF WALL FOLLOWED BY THE SHOULDERS AND ARCH. EACH CONCRETE SHOULDER TO BE POURED IN ONE CONTINUOUS POUR BEGINNING FROM THE CUT-OFF WALL
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-830.18 "BILLET-STEEL FOR CONCRETE REINFORCEMENT"
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE
- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST EDITION 1992, PUBLISHED BY THE REINFORCING STEEL INSTITUTE OF CANADA
- ALL REINFORCING BARS TO HAVE A MINIMUM OF 70 mm COVER UNLESS NOTED OTHERWISE
- ALL LAP SPLICES TO BE A MINIMUM OF 30 TIMES THE DIAMETER OF THE REBAR
- REINFORCING STEEL TO BE CONTINUOUS BETWEEN EACH SECTION. WELDING OF REINFORCEMENT IS NOT PERMITTED. REFER TO THE CURRENT VERSION OF B352 "REINFORCEMENT" SECTION 5 OF THE BRIDGE CONSTRUCTION SPECIFICATION FOR ADDITIONAL INFORMATION
- REINFORCING STEEL AS NOTED IN THE BAR LIST IS CALLED UP BY THE FOLLOWING CONVENTION:
A CONCRETE ARCH
C CONCRETE CUT-OFF WALL
S CONCRETE SHOULDER
- ALL CONCRETE SHALL BE CLASS "B", STRENGTH REQUIREMENT 32 MPA AT 28 DAYS
- CAST-IN-PLACE CONCRETE SHALL BE IN ACCORDANCE WITH THE CURRENT VERSION OF B351 "CAST-IN-PLACE CONCRETE" SECTION 4 OF THE BRIDGE CONSTRUCTION SPECIFICATIONS
- CONCRETE SHOULDERS AND CONCRETE ARCH TO BE GIVEN A CLASS 5 FINISH AT RIGHT ANGLES TO THE EDGE OF THE CULVERT; EXPOSED VERTICAL FACES TO BE GIVEN A CLASS 1 FINISH
- ALL OUTSIDE EDGES TO BE SHAPED WITH A CONCRETE EDGER
- CONCRETE TO BE COVERED WITH A CURING MEMBRANE UPON COMPLETION OF POUR
- FORMS ARE TO BE LEFT IN PLACE FOR A MINIMUM OF 24 HOURS FOLLOWING POUR

Rev	Description	Date

Client/Client
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
REAL PROPERTY SERVICES
PACIFIC REGION

Project title/Titre du projet
**ALASKA HIGHWAY, km 597.2
BRITISH COLUMBIA**
**NORTH TETSA RIVER
BRIDGE CULVERT No. 5
CULVERT REPLACEMENT**

Approved by/Approve par
Designed by/Conçue par
KURT PETRICA - 2014/06/18
Drawn by/Dessiné par
DEVAN KRAHN - 2014/06/18
PWSC Project Manager/Administrateur de Projets TPSC
ALEX TAHEDI
PWSC Architectural and Engineering Resources Manager/ Ressources Architecturales et de Directeur d'Ingénierie, TPSC

Client/Client
Drawing title/Titre du dessin

**CONCRETE END TREATMENT
DETAILS**

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.017173.031	3 OF 3	0

SUB-BASE MATERIAL

shall meet all the following requirements:

- .1 Sieve Size
100 mm 5 mm 0.075 mm
% Passing
100% 20 - 65% 0 - 8%
- .2 Material passing 0.425 mm sieve size shall have PL < 6 and LL < 25.
- .3 Regardless that the material meets the above gradation, PL and LL requirements, it will be rejected if the material ruts when a loaded tandem truck passes over it.

SELECT GRANULAR SUBGRADE FILL MATERIAL

shall meet all the following requirements:

- .1 Sieve Size
150 mm 0.075 mm
% Passing
100% 0 - 10%
- .2 Material passing 0.425 mm sieve size shall have PL < 6 and LL < 25.
- .3 Regardless that the material meets the above gradation, PL and LL requirements, it will be rejected if the material ruts when a loaded tandem truck passes over it.



Fill Sideslopes

- Subgrade Fill Height < 6 m 4:1 sideslope
 - Subgrade Fill Height > 6 m < 9 m 3:1 sideslope with 5m wide zone from bottom of sideslope clear of hazards to errant vehicle.
 - Subgrade Fill Height > 9 m 2:1 sideslope - BC Warrants for Guiderail will be used to determine guiderail requirements.
- Roadway to be widened 1 m in sections to receive concrete guiderail.

NOTE: Sideslopes of Crushed Base Gravels, the Sub-base Course and Select Subgrade Surface Material to be always 4:1.

<p>Project title: ALASKA HIGHWAY BRITISH COLUMBIA CONSTRUCTION DRAWING</p>		<p>titre du projet: ALASKA HIGHWAY BRITISH COLUMBIA CONSTRUCTION DRAWING</p>		<p>drawing title: STANDARD EMBANKMENT STRUCTURE TEMPLATE SELECT GRANULAR SUBGRADE FILL MATERIAL</p>		<p>titre du dessin: STANDARD EMBANKMENT STRUCTURE TEMPLATE SELECT GRANULAR SUBGRADE FILL MATERIAL</p>	
<p>Public Works and Government Services Canada</p>		<p>Travaux publics et Services gouvernementaux Canada</p>		<p>designed by: AHG</p>	<p>conçu par: AHG</p>	<p>drawn by: AHG</p>	<p>dessiné par: AHG</p>
<p>REAL PROPERTY SERVICES Western Region</p>		<p>PWSC Project Manager</p>		<p>approved by: [Signature]</p>		<p>scale: N.T.S.</p>	<p>date: FEBRUARY 2011</p>
<p>Project no. [Blank]</p>				<p>sheet: 03A</p>		<p>project no. [Blank]</p>	

REFERNCE DOCUMENTS

BC Provincial Government, MOE: Standards and Best Practices for Instream Works, available on-line at: <http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

DFO Bridge Maintenance Standard Operating Procedures, available on-line at:

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/qc/pdf/bridge_e.pdf

Environmental Protection Plan (EPP) – Checklist

Note: This checklist was developed to assist the Contractor in determining and mitigating environmental issues at site. It is considered a generic checklist and it is in the Contractor’s best interest to review the PWGSC Environmental Management Plan (EMP) or the Environmental Assessment (EA) as supporting documents in the completion of the site Environmental Protection Plan (EPP).

EPP Framework		Content Requirements	Yes	No	N/A
Project Setting and Site Activities					
<i>Project Description</i>	A brief description of the project and its location is provided.				
<i>Environmental Sensitivities</i>	Sensitive or protected features that could be impacted as a result of the Contractor’s activities are described.				
<i>Site Activities</i>	A scope of work and a list of all construction or related activities to be undertaken during the project are provided.				
Project Schedule and Site Drawings					
<i>Project Schedule</i>	A project schedule is provided, including scheduled shut-downs and restricted work periods due to environmental requirements.				
<i>Site Drawing</i>	One or more site drawings(s) are provided, indicating the site location; site set-up and layout; erosion and sediment controls; in-stream work areas; and environmental sensitivities.				
Potential Environmental Impacts and Controls					
<i>Potential Environmental Issues and Impacts</i>	The potential environmental issues and impacts that may result from the construction activities are described. Environmental Reports (Environmental Assessments; Fish Habitat and Compensation etc) will be provided to the contractor especially with respect to any in-stream work procedures that will be required. For example, in-stream works will impact fish and fish habitat in the surrounding ecosystem. It is the Contractor’s responsibility to ensure the work is completed in a manner that causes the least impact on the ecosystem (see section on Mitigation).				
<i>Permits, Approvals, and Authorizations</i>	List required permits, approvals and authorizations. As applicable, environmental mitigation measures prescribed by regulatory agencies and included in project permits, approvals and authorizations are described. NOTE: DFO, MOE and NWPA approvals and authorizations for in-stream works are PWGSC’s responsibility however, the Contractor must be aware of the requirements of these approvals/authorizations. Permitting for water withdrawal from the waterbody as part of construction activities is part of the Contractor’s responsibility.				
<i>Mitigation Strategies</i>	Procedures, controls or best management practices (BMPs) to prevent or reduce adverse impacts on the environment are provided. All work in BC must adhere to the BC MOE “Standards and Best Practices for Instream Works”.				
<i>Erosion and Sediment Control</i>	Erosion and sediment controls are provided, as appropriate for the jurisdiction.				
Waste Management and Hazardous Materials					

Waste Management and Hazardous Materials	Hazardous materials that will be used and/or stored on site are listed. Expected hazardous and non-hazardous waste materials along with proper handling, containment, storage, transportation and disposal methods are listed. As appropriate for the jurisdiction, estimated waste quantities and specific handling procedures are also provided. For example, re-fuelling of equipment will be conducted at least 100m away from any active drainage courses.			
EPP Implementation				
Site Representative	Name(s) and contact details for the person(s) who will be the Contractor's Site Representative(s) are provided.			
Training and Communication	Training and communication details are provided.			
Monitoring and Reporting	Monitoring and inspection procedures, including a schedule of monitoring activities and reporting procedures are provided. For example, this would include downstream monitoring activities for increased siltation during in-stream works.			
Documentation	Information and/or records that will be maintained relating to the EPP and end environmental matters on the project site are described.			
EPP Update	EPP review and update procedures are provided.			
Environmental Emergency Response Procedures				
Environmental Emergency Response Procedures	Potential incidents that may impact the environment are identified, and emergency response procedures to prevent and respond to incidents are provided. An environmental emergency response contact list is also provided.			

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Project Title	
Project Description	
Project Type	
Comments	

Issued By	Document Type	Yes	No	N/A
PWGSC Responsibility				
Federal				
DFO - Fisheries Act http://laws.justice.gc.ca/en/F-14/	Under the <i>Fisheries Act</i> , no one may carry out any work or undertaking that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery unless authorized under section 35(1) of the Act. (e.g. new bridges that are not clear span; erosion protection works that extend into the river channel in aquatic systems which will impact commercial, recreational or Aboriginal fisheries).			
	Self Assessment Review – DFO <i>Measures to Avoid Harm</i> (formerly known as Notification to DFO). Proponent completes a self assessment review using the DFO <i>Measures to Avoid Harm</i> . Most projects will fall under this category and will require an EEE and a contractor EPP. <ul style="list-style-type: none"> • Clear span bridges • Temporary ford stream crossing • Ice bridges and snow fills • Bridge maintenance • Maintenance of riparian vegetation in existing ROW 			
	Types of waterbodies where DFO review or self assessment is not required are: <ul style="list-style-type: none"> • Roadside drainage ditches • Quarries and aggregate pits • Any other waterbody that does not contain fish at any time during any given year 			
	Section 36 – under this Section of the Fisheries Act the proponent can be FINED resulting from deposition of substances deleterious to fish in waters frequented by fish – this includes release of silt laden waters from construction activities.			

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Transport Canada NWPA http://laws.justice.gc.ca/en/N-22/text.html	Section 5(2) Work Assessment for work resulting in insignificant impacts on navigability.			
	Section 6(4) Formal Approval for existing structures (existing bridges).			
	Minor Works and Waters Order – This is an amendment to the NWPA that streamlines the federal review process by establishing classes of waters and works (projects) that do not require an Application or Approval through the NWPP because they are "minor" in nature. These would include such "works" as repairs to riprap (no gryones) or "waters" that are not large enough for vessel traffic (ie. Contact Creek). http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-minorworks-menu-1743.htm			
Indian and Northern Affairs Canada – Indian Act	Approval for activities on lands under their jurisdiction. This was originally addressed under the EA review process and must now must be addressed by the PM or ES personnel under the EEE process (see below).			
Migratory Birds Convention Act (MBCA)	Environment Canada is responsible for implementing the <i>Migratory Birds Convention Act</i> , which provides for the protection of migratory birds through the <i>Migratory Birds Regulations</i> . This must be included and addressed in the EEE where applicable.			
Environmental Effects Evaluation (EEE)	The Canadian Environmental Assessment Act was amended on July 6, 2013 and under the new Act, only projects on the current Regulations Designating Physical Activities, such as the construction of pipelines and mines, will require environmental assessments. While the new act removes the previous requirement for federal departments to conduct EAs of projects identified in the Act and regulations, a new clause applies to PWGSC and all other departments and agencies. This clause, Section 67 of CEEA 2012, states that " departments must not carry out a project on federal lands, or exercise any power or perform any duty or function that would permit a project to be carried out, in whole or in part, on federal lands, or exercise any power or perform any duty or function that would permit a project to be carried out, in whole or in part, on federal lands, unless the department determines that the project is not likely to cause significant adverse environmental effects." As such, PWGSC has developed an Environmental Effects Evaluation report to ensure that the environmental effects of all site work undertaken in the completion of projects are mitigated and/or avoided			

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	completely.			
Species at Risk Act (SARA) http://www.sararegistry.gc.ca/default_e.cfm	<p>A list of federally-listed species at risk likely to occur at a given subject site must be compiled in order to identify potential impacts & propose mitigation measures for minimizing impacts to these species as a result of project activities. In cases where suitable habitat for a given species exists at/near the project site, mitigation measures are recommended, including avoidance of areas containing said habitat and informing site workers of these issues to prevent incidents.</p>			
First Nations Notifications and Consultations http://class.nrcan.gc.ca/googledata-donneesgoogle-eng.php	<p>Natural Resources Canada has developed an overlay to be used with Google Earth & Google Maps to identify First Nations lands throughout the country. Notifications of projects within 5 km of such lands and/or directly upstream from such lands should be submitted to the relevant First Nations for a determination of their interest in a given project and/or to request any traditional knowledge they may have to offer.</p>			
Provincial – Note one submission package for instream works is sent to FrontCounter BC at MOE who then send off to the appropriate departments for approval/notification/permitting – this does not apply to the archeological.				
Wildlife Act – WLAP – MOE http://www.qp.gov.bc.ca/statreg/stat/W/96488.01.htm	<p>Wildlife Act – Section 34 – Birds, Nests and Eggs – vegetation clearing should not occur during critical bird nesting periods, which typically occur in the spring and summer. Contact the local WLAP for vegetation clearing timing windows.</p>			
Water Act - Water Stewardship Division - MOE http://www.qp.gov.bc.ca/statreg/stat/W/96483	<p>Section 9 – regulates changes in or about a stream and ensure that water quality, riparian habitat, and the rights of licensed water users are not compromised. This is an approval process and takes approximately 140 days. An application fee is also required. Works requiring approval include channel realignment, retaining wall or bank protection stabilization ect.</p>			
Environmental Stewardship Division - MOE	<p>Notification process for such works as replacement and maintenance of culverts and outfalls; temporary stream diversions around a worksite and takes approximately 45 days to receive notification approval. In general, those works requiring a notification are those that do not involve any diversion of water.</p>			
Fish Protection Act – MOE http://wlapwww.gov.bc.ca/habitat/fishprotectionact/	<p>This Act was passed in 1997 and is reviewed as part of the Water Act under Section 9 when applying for approval.</p>			
Ministry of Forests, Lands and Natural Resources Operations	<p>When completing projects such as quarry pits and new highway alignments, a request is put into the archeological branch of MFLNSO via the</p>			

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<p>Archaeological http://www.for.gov.bc.ca/archaeology/requesting_archaeological_site_information/process_steps.htm Contact: Hayley Bond (250) 953-3343</p>	<p>EEE process to search the data base. An archaeological assessment may be required on those areas that are previously undisturbed or undeveloped.</p>			
<p>BC Parks</p>	<p>Various permits are required when completing construction activities within the Parks. Please note that all works within 150 feet of the centreline of the highway (Right-of-Way) are NOT subject to construction permitting. (this does not include permitting for fish surveys).</p>			
<p>Canada-British Columbia Agreement for Environmental Assessment Cooperation http://www.ceaa.gc.ca/default.asp?lang=En&n=04A20DBC-1</p>	<p>Most Alaska Highway Projects will not trigger this agreement, as both the Vancouver CEAA office and the Victoria BC Environmental Assessment Office (EAO) have confirmed that the types and scopes of the projects are not described in the <i>BC Environmental Assessment Act – Reviewable Projects Regulation</i>. However, for due diligence, it is recommended that notifications for all Alaska Highway projects be submitted to CEAA (info@ceaa-acee.gc.ca) for review and, if necessary, a determination of whether or not CEAA and/or the BC EAO should be involved. Due to the changes in the CEAA legislation this will be addressed under the EEE where possible.</p>			
<p>BC Ministry of Environment – BC Species and Ecosystems Explorer http://a100.gov.bc.ca/pub/eswp/</p>	<p>A list of provincially-listed species at risk likely to occur at a given subject site must be compiled in order to identify potential impacts & propose mitigation measures for minimizing impacts to these species as a result of project activities. This process involves conducting a search of the BC Species and Ecosystems Explorer inventory for the specific area of BC containing the proposed project site.</p>			
<p>Consultant Responsibility</p>				
<p>Provincial</p>				
<p>BC Parks Ministry of Forests, Lands and Natural Resources Operations http://www.env.gov.bc.ca/bcparks/permits/</p>	<p>Permit to Collect Fish For a Scientific Purpose - Regulation Research activities in parks and protected areas, including: collection; monitoring; survey and inventory; and, other research trigger a Park Permit - Ministry of Forests, Lands and Natural Resources Operations is responsible for the administration of fish and wildlife permits. Note that these permits are taking approx 6 months to receive due to recent involvement and subsequent consultation with Treaty 8. Subsection 42(1)(e) – It is the responsibility of the salvage crew to obtain the necessary permit required to complete a fish and amphibian salvage – in conjunction with the BC</p>			

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	Parks permitting.			
Water Act – Regulation’s Protection of Habitat - Section 42(1)	Permit to Collect Fish For a Scientific Purpose – Subsection 42(1)(e) – It is the responsibility of the salvage crew to obtain the necessary permit required to complete a fish and amphibian salvage – in conjunction with the BC Parks permitting.			
Note: research projects and inventory projects are under the same Permit and are applied for under the “Application to Collect Fish for a Scientific Purpose”. http://www.env.gov.bc.ca/pasb/applications/process/scientific_fish_collect.html#a5				
Contractor Responsibility				
Federal	End-of- pipe guidelines for freshwater intake to avoid fish entrainment.			
DFO – End of Pipe Guidelines	End-of- pipe guidelines for freshwater intake to avoid fish entrainment.			
Provincial	Schedule A – Water License Applications – use of water from waterbody for road maintenance.			
Water Act - MOE				

Relevant Environmental Publications

The below list of documents are those commonly used when determining how to design and advance a project with the potential to impact a waterbody.

Agency	Publications	Summary
DFO	Land Development Guidelines for the Protection of Aquatic Habitat - 1993	This document is a good reference guide for any works that are occurring in or around the water.
	Canada’s Fish Habitat Law	Document explaining the fish and fish habitat laws under the Fisheries Act.
	Riparian Revegetation	Information on minimizing, stabilizing and revegetating construction areas.
	Freshwater Intake End-of Pipe Fish Screen Guideline - 1995	Provides guidelines for the contractor to follow to ensure fish screens are used during freshwater intake operations at construction sites.
	Operational Statements Stream Crossings by Roads: <ul style="list-style-type: none"> • Clear Span Bridges • Temporary Ford Stream Crossing • Ice Bridges and 	Fisheries and Oceans Canada has developed a series of Operational Statements to streamline the undertaking of low risk activities. The Operational Statements outline conditions and measures for avoiding harmful alteration, disruption and destruction (HADD) of fish habitat, and applying them will ensure the project complies with subsection 35(1) of the <i>Fisheries Act</i> . You are NOT required to submit a proposal for review by Fisheries and Oceans Canada when you incorporate the measures and conditions outlined in an appropriate Operational Statement into

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	<ul style="list-style-type: none"> • Snow Fills • Bridge Maintenance • Maintenance of Riparian Vegetation in Existing Rights-of Way 	<p>your plans.</p> <p>http://www.pac.dfo-mpo.gc.ca/habitat/os-ee/index-eng.htm</p>
MOE	<i>Fish-stream Crossing Guidebook - 2002</i>	Guidelines in protection of fish and fish habitat and the safe passage of fish during construction at/on stream crossings.
	<i>Standards and Best Practices for Instream Works - 2004</i>	Guide to planning and carrying out the proposed construction activities to comply with relevant legislation, regulations and policies.
	<i>A User's Guide to Working In and Around Water - 2005</i>	Understanding the regulation under British Columbia's Water Act.
	<i>Fish-Stream Identification Guidebook - 1998</i>	Assists in providing information on determining fish streams.
	<i>The Streamkeepers Handbook</i>	A practical guide to stream and wetland care in regards to rehabilitation planting.