Public Services and Procurement Canada

Requisition No: EZ899-222288/A

DRAWINGS & SPECIFICATIONS
for

Bridge Replacement
Keogh River Bridge

Port Hardy, British Columbia

Project No. R.109401.001 **February 02, 2022**

APPROVED BY:

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Regional Manager, AES **Date**

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Project Manager **Date**

Real Property Services Branch, Professional and Technical Services, Pacific Region
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END OF SECTION

LIST OF STRUCTURAL
DRAWINGS

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S3	REMOVALS
S4	GENERAL ARRANGEMENT
S5	PILE CAP DETAILS
S6	STEEL GIRDER LAYOUT
S7	STEEL GIRDER DETAILS – SHEET 1 OF 2
S8	STEEL GIRDER DETAILS – SHEET 2 OF 2
S9	BEARING DETAILS
S10	PRECAST DECK PANELS
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LIST OF CIVIL
DRAWINGS

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C2	PLAN AND PROFILE
C3	PLAN AND PROFILE – ACCESS ROAD
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C6	THRIE BEAM DETAILS
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LIST OF APPENDICES

APPENDIX A: PLAN OF CONSTRUCTION OPERATIONS
APPENDIX B: PRELIMINARY HAZARD ASSESSMENT FORM
APPENDIX C: PRIME CONTRACTOR'S MAIN RESPONSIBILITIES
APPENDIX D: ENVIRONMENTAL CHECKLIST
APPENDIX E: EQUIPMENT FORMS
APPENDIX F: FISH HABITAT ASSESSMENT REPORT

END OF SECTION

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 Canadian Highway Bridge Design Code CAN/CSA S6-19, and other indicated Codes, Construction Standards, and/or any other Code or Bylaw of local application.

.3 Comply with applicable local by laws, rules and regulations enforced at the location concerned.

.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 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 Further Contracts may be awarded while this contract is in progress. It is recommended that the Bidder visit the site prior to submission of tender to satisfy themselves of the nature of site conditions and the extent of work required.

.2 The Contractor shall confirm onsite all dimensions required for fabrication and dimensions shown on the Contract Drawings prior to the preparation of shop and fabrication drawings.

.3 Cooperate with other Contractors and Agencies in carrying out their respective works and carry out instructions from Departmental Representative.

1.3 Other Contracts (Cont'd)

.4 Coordinate work with that of other Contractors and Agencies. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor or Agency, report promptly to the Departmental Representative, in writing, anything 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.

.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 All work under this Contract shall be complete by November 30, 2022.

.2 All work under this Contract must be completed in accordance with the requirements specified in Section 1.9 Work Schedule.

.3 All works below the top-of-bank for the Keogh River is to be fully complete prior to August 31, 2022. While the instream reduced risk window extends from June 15 to September 15, 2022, this project has commitments to other key stakeholders that requires all works below top of bank to be completed prior to August 31, 2022.

1.6 Summary of work

.1 The work should be represented as: Keogh River Bridge Replacement, Port Hardy, British Columbia.

.2 Work under this Contract general includes, but is not limited to, the following:
.1 Fabrication, supply, and install a 29.28m span steel composite bridge over the Keogh River;

1.6 Summary of work (Cont'd)

.2 (Cont'd)

.2 Assess the capacity of the existing bridge as required for use by the Contractor during construction. The Contractor is advised that the existing bridge is posted for a 9,100 kg Maximum Vehicle Weight; however, it is not known when that load restriction was posted or the reasons why the bridge is posted. The Contractor shall engage their own engineer to evaluate the existing bridge and determine its safe working capacity for use during construction. Contractor to provide temporary bridge and/or access platforms if required to construct the new bridge;

.3 Remove and dispose off-site the existing bridge superstructure;

.4 Remove timber crib abutment walls after removing bridge superstructure and dispose off-site;

.5 Construction of filled embankments at each approach to the new bridge;

.6 Placement of rip-rap protection on the head slopes;

.7 Supply and install guard rail system at the approaches and on the bridge; and

.8 Installation of signage and all site finishes as specified.

.3 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 come 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.

.3 Contractor to complete forms in Appendix E of this Specification and return each of the following forms to the Departmental Representative within 30 days of contract award or 10 days prior to mobilization, whichever date comes first governs:

1.7 Contractor's Responsibility (Cont'd)

.3 (Cont'd)
.1 Nav Canada Form F-LDU-111 Version 21.2 - Land Use Proposal Submission Form - Crane(s).
.2 Nav Canada Form F-LDU-102 Version 2.1 - Construction Start Notification.
.3 Nav Canada Form Z-LDU-100 Version 18.6 - Obstacle Information for Assessment.
.4 Transport Canada Form 26-0427E (1812-09) - Aeronautical Assessment Form for obstacle notice and assessment.

1.8 Hours of Work

.1 Restrictive as follows:
.1 Notify Departmental Representative of all after hours work, including weekends and holidays.

.2 Standard working hours shall be Monday to Friday (excluding holidays) from 6:00am to 5:30pm.

1.9 Work Schedule

.1 Carry on work as follows:
.1 Within 15 days of contract award or 10 days prior to mobilization,whichever date comes first governs, provide the following submittals:
.1 Phasing bar chart and schedule showing anticipated progress stages and final completion of the Work within the time period required by the Contract documents. Indicate the following:
.1 Submission of shop drawings.
.2 Commencement and completion of Work of each section of the specifications or drawings as outlined.
.3 Fabrication of structural steel.
.4 Production of precast deck panels.
.5 On-site works.
.6 Final completion date within the time period required by the Contract documents.
.2 Cost Breakdown and Anticipated Monthly Cash Flow Projection.
.2 Within 30 days of contract award or 10 days prior to mobilization, whichever date comes first governs, provide the following submittals.
.1 Quality Control Plan.
.2 Health and Safety Plan.
.3 Emergency Response Procedure.
.4 Filing of Notice of Project.
.5 Site Specific Health and Safety Plan.
.6 Environmental Protection Plan.

1.9 Work Schedule (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.7 Traffic Control Plan.
.8 Construction Staging Plan.
.9 Waste Management Workplan.
.10 Construction Equipment List and Rate.
.11 Granular Materials Certificates.

.2 No changes shall be made to the approved Schedule without prior authorization from the Departmental Representative.

.3 Interim reviews of work based on the schedule will be conducted as decided by the Departmental Representative and the schedule shall be updated by the Contractor throughout the duration of the Contract to reflect actual progress of the work.

1.10 Cost Breakdown

.1 Before submitting the first request for a progress payment, submit a breakdown of the Contract lump sum amount in detail as directed by the Departmental Representative and aggregating the total 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 reviewed work schedule.
.5 Change orders.
.6 Other modifications to Contract.
.7 Field test reports.
.8 Manufacturers' installation and application instructions.
.9 One set of record drawings and specifications for "as-built" purposes.
.10 Current construction standards of workmanship listed in technical Sections.
.11 Project Safety Plan.

1.12 Regulatory Requirements

.1 Obtain and pay for Building Permit, Certificates, Licenses, and other permits required by regulatory municipal, provincial or federal authorities to complete the work.

1.12 Regulatory Requirements (Cont'd)

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.13 Contractor

.1 Use of site:
.1 Provide access as required.
.2 Assume responsibility for assigned premises for performance of this work.
.3 Be responsible for coordination of all work activities on site, including access as may be required by Department of Fisheries and Oceans (DFO), to their infrastructure at this site.

.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 or be the subject of subsequent claims.

1.15 Existing Services

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

1.16 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.

1.16 Location of Equipment and Fixtures (Cont'd)

.3 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.

1.17 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 of bolt holes and their spacings.

.3 Provide devices needed to lay out and construct work.

.4 Supply all access as 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 workers, 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 the 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.

1.19 Works Coordination (Cont'd)

.2 (Cont'd)
.2 (Cont'd)
.1 Identify on coordination drawings, structural elements, services lines, rough-in points, and indicate location of services entrance to site.
.3 Facilitate meetings and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
.4 Record and distribute 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.
.7 Coordinate and plan for all necessary road closures ahead of time.

.3 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 delays, cutting, patching, and removal or replacement of completed work.
.3 Ensure disputes between subcontractors are resolved.

.4 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.

.5 Maintain efficient and continuous supervision.

1.20 Review 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 sufficient time for the following:
.1 Review of product data.
.2 Review of re-submission.
.3 Ordering of approved material and/or products.

1.21 Project Meetings

.1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.22 Testing and Inspections

.1 Particular requirements for inspection and testing to be carried out by a 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 the testing agency or testing laboratory as specified, and where required for the 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 the Contractor under the Departmental Representative's supervision.

.3 Where tests or inspections by a 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 5 working days 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 (Clause 1.22).

.8 Provide Departmental Representative with 2 copies of testing laboratory reports and mill tests and certificates of compliance as soon as they are available.

1.23 As-Built Documents

.1 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.

1.24 Cleaning

.1 Conduct daily cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.

1.25 Environmental Protection

.1 Refer to Section 01 35 43 - Environmental Procedures for additional requirements.

.2 Do not dispose of waste or volatile materials into water courses.

.3 Ensure proper disposal procedures in accordance with all applicable regulations.

1.26 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. Should more than 6 sets of documents be required the Departmental Representative will provide them at additional cost.

1.27 System of Measurement

.1 The metric system of measurement (SI) will be employed on this Contract.

1.28 Familiarization with Site

.1 Before submitting tender, visit the Project site to become familiar with all conditions likely to affect the cost of the Work.

1.29 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.

1.30 Measurement and Payment

.1 There will be no measurement for work covered in this Section.

.2 Payment for work covered in this Section will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 This section provides detailed requirements specific to work restrictions and operational constraints related to this Contract.

1.2 Measurement and Payment

.1 There will be no measurement for work covered in this Section.

.2 Payment for work covered in this Section will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 – PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 – EXECUTION

3.1 Access and Egress

.1 Maintain existing roads for "access to" and "egress from" Work areas.

3.2 Use of Site and Facilities

.1 Execute Work with least possible interference or disturbance to normal use of the existing operating Airport. Make arrangements with Departmental Representative to facilitate Work as stated.

.2 Maintain services and provide for personnel and vehicle access.

.3 Where security is reduced by Work, provide temporary means to maintain security.

.4 Provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.

3.3 Special Requirements

.1 Submit schedule in accordance with Section 01 32 16 - Construction Progress and Reporting.

.2 Allow adequate flexibility in the schedule for recognition that construction Work may have to be interrupted from time to time in certain areas to permit airport operational requirements to be met. There will be no additional payment associated with these interruptions.

.3 Access to Work areas will be as indicated on the Contract Drawings. Construction vehicles operating airside will be managed by Airport approved radio-controlled security agents and/or flagmen, supplied by the contractor.

.4 Only qualified personnel can operate equipment airside unless escorted or in an area that is closed to air traffic. In areas where construction work is required to be completed within an airside active maneuvering area, the contractor shall designate one (1) person to coordinate and communicate all vehicle and pedestrian movements.

.5 Unless otherwise authorized, all construction activities located within 26.0m of active taxiway centerlines and within 75.0m from the centerline or end of active runways must be performed in accordance with the controls as noted on the staging drawings and within the Plan of Construction Operations.

.6 Access and Restrictions include the following:

.1 Work is restricted to the areas identified in the Contract drawings.

.2 Security escorts will be required at all times for airside access during construction.

.3 Construction of temporary construction facilities and/or plant shall minimize impact to airport operations. Any requirements for runway threshold displacements will be dependent on Airport operations and weather conditions. While the Airport will endeavor to accommodate the Contractor, any critical activities that will impact Airport operations shall be scheduled at night.

.4 The Contractor will be responsible for operating the gates and shall document access by all workers and visitors.

.5 Location and height of material stockpiles to be approved by the Departmental Representative.

3.3 Special Requirements (Cont'd)

.6 (Cont'd)

.6 The Contractor will be responsible for maintaining all construction access roads.

.7 Contractor shall ensure that the perimeter access road is kept clear for access at all times. The contractor is to have use, but not exclusive use for access between the laydown area and designated construction area. It will need to be kept open for other access, including in relation to airport operations, with no parking permitted.

3.4 Smoking Environment

.1 Comply with smoking restrictions. Smoking is not allowed in airside areas.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Terms of Payment.

.2 Basis of Payment.

1.2 Terms of Payment

.1 The project's terms of payment shall be per General Conditions (GC) 5 - Terms of Payment. Progress payments shall be submitted by the Contractor on a monthly basis unless accepted otherwise by the Departmental Representative. The progress payment shall use PSPC's Request for Progress Payment Construction Contracts form: PWGSC-TPSGC 1792, found online.

.2 With each progress payment, provide to the Departmental Representative the required documentation as listed below. Upon receipt of this required documentation, PSPC will commence a review of the progress payment request in accordance with General Conditions (GC) 5 - Terms of Payment.
.1 Documentation required by General Conditions (GC) 5 - Terms of Payment including signed statutory declaration.
.2 WorkSafeBC Clearance Letter, indicating the Contractor is in active and good standing per the end date of the progress payment in accordance with Section 51 of the Workers Compensation Act.
.3 Updated construction progress schedule (accepted project schedule shown as the baseline and actual start dates / completion dates / percent complete show for each task, see Sectional 01 32 16 - Construction Progress and Reporting).
.4 Updated cash flow forecast.

.3 Upon achieving Substantial Performance per GC1.1.4, provide a schedule for the completion of any remaining defects, faults, and incomplete work as provided to the Contractor by the Departmental Representative. The Contractors schedule shall be provided in writing as follows:
.1 Include the completion dates for all items of defect, fault, and incomplete work as identified by the Departmental Representative.
.2 Be provided in a letter with company letter head and be signed by an authorized representative of the Contractor.

1.3 Basis of Payment

.1 Basis of payment shall be per the Measurement and Payment Procedures in the applicable specification section. Where not specified, basis of payment for all work included in these specifications or Contract Drawings not specifically mentioned is considered incidental to other work and is part of the Total Contract Amount. No additional payment will be made for incidental work.

.2 Payment for work shall be made per the Price per Unit as shown in the Unit Price Table.

.3 For unit price items in the Bid and Acceptance Form, progress payments shall be made based on the quantities of work in place and accepted by the Departmental Representative.

.4 For lump sum items in the Bid and Acceptance Form, progress payments shall be made based on the percent of work completed and accepted by the Departmental Representative.

.5 The Contractor must support any claims for products purchased, manufactured, or delivered to the place of work but not yet incorporated into work. The support for such claims must include such evidence as may be required by the Departmental Representative to establish value and the percentage of the work completed. During or at the completion of the work any products purchased, manufactured, or delivered to the place of work but not incorporated into the work shall be removed from the site at the Contractor's cost and no payment shall be made.

.6 Any work called for in the specifications or shown on the drawings but not specifically mentioned as an item for which payment will be made, will be considered incidental to the items of work listed. No additional payment will be made for this incidental work.

.7 All equipment, materials, and labour necessary to complete any item of work shall be included in the cost of that work.

.8 Materials shall be excavated or placed within the specified tolerances of the design lines and grades shown on the Contract Drawings but not uniformly high or low. Materials excavated or placed outside the specified tolerances will not be measured for payment unless preapproved by the Departmental Representative.

1.3 Basis of Payment (Cont'd)

.9 Payment of 25% of the Lump Sum Amount for the Mobilization, Demobilization, and General Conditions of Contract item shall be authorized when the Contractor has provided a Construction Schedule and Work onsite has commenced to the satisfaction of the Departmental Representative. Payment of 60% of the Lump Sum shall be made as a series of monthly payments, calculated on the basis of the expected schedule. If the Work falls behind or gets ahead of schedule, these payments will be adjusted accordingly. Payment of the remaining 15% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative. 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 to the satisfaction of the Departmental Representative.

.10 Payment for Traffic Control shall be considered incidental to the Work and no additional or separate payment will be made.

1.4 Measurement and Payment

.1 There will be no measurement for work under this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Coordination of Work with work by others under administration of Departmental Representative.

.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 During the course of work, the Departmental Representative may schedule construction progress meetings approximately once every two (2) weeks. At the Departmental Representative's discretion, the frequency of the meetings may be changed to weekly.

.2 Agenda to include, but not limited to, the following:
.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 and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for effect on construction schedule and on completion date.
.12 Other business.

.3 The Departmental Representative will record minutes, including significant proceedings and decisions, identify action by parties, and set time and date for next progress meeting.

1.3 Construction Progress Meetings and Project Meetings (Cont'd)

.4 The Departmental Representative will reproduce and distribute copies of minutes within ten (10) working days after each meeting and transmit to meeting participants, affected parties not in attendance, and Contractor.

1.4 Construction Organization and Start-up

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental 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 Appointment of official representative of participants in Work.
.3 Schedule of Work, progress scheduling in accordance with Section 01 32 16 - Construction Progress and Reporting.
.4 Schedule of submission of shop drawings, samples, colour chips, etc. 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 16 - 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.

1.4 Construction Organization and Start-up (Cont'd)

.4 (Cont'd)
.13 Other business.

.5 Comply with Departmental Representative's allocation of mobilization areas of sites; for field offices and sheds, 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 temporary utilities and construction facilities.

1.5 Schedules

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 16 –Construction Progress Reporting to Departmental Representative coordinated with Departmental Representative's project schedule.

.2 After review, revise and resubmit schedule to comply with revised project schedule.

.3 During progress of Work, provide updated Construction Progress Schedule on a monthly basis with the Request for Process Payment.

1.6 Submittal

.1 Submit request 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 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 Procedure.

.2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.

1.8 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for Mobilization, Demobilization and General Conditions of the Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Project Schedule.

.2 Schedule Format.

.3 Submission of Schedules

.4 Project Schedule Reporting During the Work

1.2 Project Schedule

.1 Develop detailed Project Schedule conforming to the project completion dates found in Section 01 11 55 - General Instruction.

.2 Ensure detailed Project Schedule includes as a minimum all relevant milestone activity types as follows:
- .1 Project Award.
- .2 Receipt of Necessary Permits.
- .3 Submittal Schedule:
  - .1 Pre-construction survey.
  - .2 Shop Drawings.
  - .3 As-built Survey and As-Built Drawing Mark-ups.
  - .4 Testing and Laboratory Reports
  - .5 Product Data Sheets
  - .6 Product Data for Precast Concrete
  - .7 Precast Concrete Quality Assurance Submittals
- .4 Mobilization.
- .5 Installation of turbidity barrier and environmental controls.
- .6 Civil works.
- .7 Pile driving.
- .8 Installation of new bridge.
- .9 Approach works.
- .10 Interim inspections.
- .11 Site Clean-up / De-mobilization.
- .12 Project Substantial Completion and Project Completion dates.

.3 Indicate dates for submitting, review time, resubmission time, and last date for meeting project schedule.

.4 Include dates when reviewed submittals will be required from the Departmental Representative.

1.3 Schedule Format

.1 Prepare schedule in form of a horizontal Gantt bar chart.

.2 Provide a separate bar for each item of work identified on the unit price table or if acceptable to the Departmental Representative, each operation.

.3 Provide horizontal time scale identifying first work day of each week.

.4 Format for listings: the chronological order of start of each item of work.

.5 Include complete sequence of construction activities and identify critical path and critical path work items in identifying colour.

.6 Include dates for commencement and completion of each major element of construction.

1.4 Submission of Schedules

.1 Submit initial format of schedules within fifteen (15) days after award of Contract or 10 days prior to mobilization on site, whichever date comes first governs.

.2 Submit schedules in electronic format via PSPC's cloud-based document filling system

.3 If requested submit two (2) hard copies to be retained by the Departmental Representative.

.4 The Departmental Representative will review the schedule and return any comments within ten days after receipt.

.5 Resubmit finalized schedule within seven (7) days after return of review copy. Once accepted by the Departmental Representative, the accepted schedule shall form a baseline which all schedule updates shall be compared against.

.6 Distribute copies of revised schedule to:
.1 Job site office.
.2 Subcontractors.
.3 Other concerned parties.

1.4 Submission of Schedules (Cont'd)

.7 Instruct recipients to report to Contractor within seven (7) days any problems anticipated by timetable shown in the schedule.

1.5 Project Schedule Reporting During the Work

.1 Update project schedule on a monthly basis or with each progress payment (whichever is more frequent) reflecting activity changes and completions, as well as activities in progress.

.2 Include as a baseline each line item and details from the initial project schedule accepted by the Departmental Representative at the start of the project. On an adjacent line indicate progress of each activity started and completed to the date of schedule submission by including actual start date / end date / percent complete.

.3 Show changes occurring since previous submission of schedule:
.1 Major changes in scope.
.2 Activities modified since previous submission.
.3 Revised projections of progress and completion.
.4 Other identifiable changes.

.4 Provide a narrative report to define:
.1 Problem areas, anticipated delays, and impact on schedule.
.2 Corrective action recommended and its effect.
.3 Effect of changes on schedules of other Prime Contractor's.

.5 Discuss project schedule at Construction Progress Meetings, identify activities that are behind schedule and provide measures to regain slippage. If requested by the Departmental Representative, provide a schedule recovery plan with details of the approach and changes the Contractor is planning on implementing to bring the project back on schedule.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 This section includes but is not limited to the following:
- .1 Product data.
- .2 Samples.
- .3 Waste Management Work Plan.
- .4 Environmental Protection Plan (EPP).
- .5 Traffic Management Plan.
- .6 Health and Safety Plan.
- .7 Certificates and transcripts.
- .8 Quality Testing Reports.
- .9 Quality Control Plan.

1.2 Administrative

.1 Submit to Departmental Representative submittals listed for review. 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 Work affected by submittal shall not proceed until review is complete.

.3 Present product data, samples, and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated, and identified as to specific project will be returned without being examined and shall be considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

1.2 Administrative (Cont'd)

.7 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.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.3 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, 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.

1.3 Product Data (Cont'd)

.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. Without restricting generality of foregoing, Contractor is 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.

1.4 Progress Photographs

.1 Submit progress photographs in accordance with Section 01 32 16 - 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 of a Quality Control Plan including but not limited to:

.1 Quality control processes and procedures.
.2 Quality control reporting and frequency.
.3 Testing companies and agencies employed to provide materials testing.
.4 Frequency and types of testing.
.5 Verification of materials and installation procedures, including but not limited to structural steel, bolts, welds, paint.
.6 Dimension checks of pre-fabricated and site-fabricated elements.

1.7 Measurement and Payment

.1 There will be no measurement for the work in this Section.

1.7 Measurement and Payment (Cont'd)

.2 Payment will be under the Lump Sum Amount for the Molilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Protection and Control of Public Traffic.

.2 Informational and Warning Devices.

.3 Operational Requirements.

1.2 References

.1 "2020 Traffic Management Manual for Work on Roadways" (distributed by Province of British Columbia, Ministry of Transportation and Highways).

1.3 Submittal

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

.2 Contractor to submit traffic control or construction staging plan to Departmental Representative for review and approval prior to construction.

1.4 Protection of Public Traffic

.1 Comply with requirements of the "Traffic Management Manual for Work on Roadways", current Acts, Regulations, and By-Laws for regulation of vehicle and pedestrian traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:
.1 Position equipment to present minimum of interference and hazard to travelling public.
.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
.3 Do not leave equipment on travelled way overnight.

.3 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 "2020 Traffic Management Manual for Work on Roadways".

.4 Keep travelled way graded, free of potholes, and maintain current travel width during construction.

1.4 Protection of Public Traffic (Cont'd)

.5 Provide well-graded, signed, and maintained detours or 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.

1.5 Informational and Warning Devices

.1 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list and review with Departmental Representative.

.2 Provide, erect, and maintain signs, flashing warning lights, and other devices required to indicate construction activities and other temporary and unusual conditions resulting from Project Work that requires road user response as specified in "2020 Traffic Management Manual for Work on Roadways".

.3 Supply signs, delineators, barricades, traffic cones, those shown specified in "2020 Work on Roadways" and in accordance with the Departmental Representative's requirements.

.4 Place signs and other devices in locations recommended in "2020 Traffic Management Manual for Work on Roadways" and in additional locations as appropriate or as directed by the 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 to ensure clarity and reflectance.
.2 Removing or covering signs which do not apply to conditions existing from day to day.

.6 Ensure that necessary traffic cones and signs are in place prior to interference with traffic on existing roadways.

1.6 Control of Public Traffic

.1 Provide traffic control in accordance with "2020 Traffic Management Manual for Work on Roadways". Ensure that current copy of manual is available on site at all times.

1.6 Control of Public Traffic (Cont'd)

.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 "2020 Traffic Management Manual for Work on Roadways".

.3 Flagpersons are required in the following (but not limited to) situations:

.1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.

.2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high, and traffic signal system is not in use.

.3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves, or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 When temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment, and public traffic is not provided by other traffic control devices.

.7 At each end of restricted sections where pilot cars are required.

.8 When construction traffic is crossing a roadway.

.3 Changes to traffic control operation are to be reviewed by Departmental Representative.

.4 Safely control traffic through unique or varied construction situations.

1.7 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. Full closure of the road is permitted during removal and replacement of the bridge. The dates and duration of the full closure shall be included in the Contractor's construction schedule.

.2 Maintain existing conditions for traffic crossing right-of-way.

.3 During progress of the Work, make adequate provision to accommodate normal traffic along onsite roads immediately adjacent to or crossing the Works so as to minimize inconvenience to site operations.

.4 Give minimum 48 hours notice or as otherwise required by Departmental Representative to local police, fire departments, emergency services, and site operations staff prior to beginning construction on roadways and comply in all respects with their requirements.

.5 Inform Departmental Representative where access is affected at least 24 hours in advance of proposed road closures.

.6 One-way alternating traffic will generally be permitted during work involving road crossings. Do not close any lanes of road without prior approval of the Departmental Representative. Before re-routing traffic erect suitable signs and devices as approved by the Departmental Representative. Provide sufficient crushed gravel to ensure a smooth riding surface during work. Replace surface asphalt within one week of completing the trench backfilling.

1.8 Measurement and Payment

.1 There will be no measurement of work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of the Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Protection

.1 The safe and efficient continuation of aircraft operations takes priority over the Contractor's operations at all times throughout the construction period. Do not disrupt airport business except as permitted by the Departmental Representative. Refer to the Plan of Construction Operations as appended for restrictions and operational constraints. The Contractor is required to complete all work in accordance with the Plan of Construction Operations.

1.2 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials to complete the Work.

PART 3 EXECUTION

3.1 General

.1 Provide and maintain barricades or snow fences at locations necessary to maintain the Place of the Work safe for workers and the public and relocate, as required, during different phases of the Work. Snow fence, if used, shall be installed in areas designated as no parking.

.2 When in the Airside Area, the Contractor's personnel and equipment must remain in designated construction areas at all times.

.3 The Contractor will supply, install, and maintain low profile hazard markers and temporary red lights as detailed in the Contract.

3.2 Aircraft Operations

.1 Work will take place adjacent to operational aircraft runways. Make sure all construction personnel are aware through safety orientation, that routine aircraft operations can result in prop wash or jet blast that may affect their work.

.2 Ensure the site is clean and free from litter and debris at all times.

.3 Dust resulting from construction activities will not be tolerated in any areas where aircraft are operating. When directed by the Engineer, such activities will be immediately suspended and rescheduled to a time when conditions and winds are more favourable. Contractor shall provide a water truck for dust control.

.4 Contractor shall ensure that any plant, stored equipment/materials, lifting operations and all other construction activities within the Designated Construction Area shall at no time encroach the Obstruction Limitation Surface as shown on Drawing No. R.109401.00-C100-RevC of Appendix A of the Contract Specifications.

.5 Contractor shall ensure that any plant, stored equipment/materials, lifting operations and all other construction activities within the Designated Laydown Area shall at no time encroach the Transitional Slope for Non-Instrument as shown on Section A of Drawing No. R.109401.00-C102-RevC of Appendix A of the Contract Specification.

3.3 Movement of Equipment, Material and Personnel

.1 In areas of airport not closed to aircraft traffic:
.1 Obtain the Departmental Representative's approval on scheduling of work.
.2 Move equipment and personnel in accordance with procedures described in the Contract Documents and as instructed by the Departmental Representative.
.3 Any Contractor's employee who fails to obey an instruction or signal from the escort or air traffic control tower or who disregards any such instruction will have their security pass revoked and will no longer be permitted airside.
.4 Ensure site is clean and free from litter and debris at all times. The Departmental Representative, at the Contractor's expense will remove litter and debris not cleaned up immediately.

3.3 Movement of Equipment, Material and Personnel (Cont'd)

.1 (Cont'd)

.5 Immediately stop the Work and move personnel and equipment clear of the aircraft operating area when instructed to do so.

.6 Contractor shall comply with Transport Canada's TP312E Attachment A, Section 5.3 "Temporary Hazards on Runway Strips" during all construction work completed in the active operating areas.

.7 The Contractor Shall comply with Transport Canada's AC302-003 Personnel and Equipment within the Critical Portion of the Runway Strip.

.2 Crane Booms and hoisting equipment:

.1 All crane boom and hoisting equipment may not be erected without specific written permission of the Airport and will require permission from the Departmental Representative thirty (30) working days prior to use.

3.4 Equipment Parking and Materials Storage

.1 Park equipment not in use and stockpile materials in areas designated by the Departmental Representative. If directed, mark tops with red lights.

3.5 Trenching and Excavation

.1 Trenching and excavating activities within 75 metres of active runway centerline routes must be scheduled and coordinated with the Departmental Representative. Personnel and equipment may be required to move from these areas to allow the passage of large aircraft. Excavations within these areas must be back filled at the end of each working day unless previously authorized by the Departmental Representative.

.2 There will be no additional payment for delays associated with accommodating aircraft operations.

3.6 Airport Facilities

.1 The Contractor will establish and stake the location of existing underground cables and utilities in the areas of work. The Contractor is to notify the Departmental Representative of work areas sufficiently in advance of operations to allow location of cables and utilities.

3.6 Airport Facilities (Cont'd)

.2 The Contractor is alerted to the fact that a number of existing underground power and communication cables pass through the work site which if damaged could seriously impact airport operations and airport approaches, as well as jeopardize the safety of the travelling public, airport personnel, etc. Contractor shall insure that no work is carried out by its forces or those of its subcontractors/subtrades prior to all locates being completed.

.3 The Contractor shall be responsible for all locates and shall review with the Departmental Representative prior to excavation.

3.7 Emergencies

.1 The Contractor shall abandon and evacuate the work site immediately upon request if an emergency situation is declared by the Departmental Representative.

.2 There will be no additional compensation for time lost as the result of such an occurrence.

3.8 Returning Aircraft Surfaces into Service

.1 Where the Work has required the Contractor to make use of an active aircraft surface and the area is to be used by aircraft, the Contractor shall:

.1 Ensure that all work is complete, and no further closures of the surface are required,

.2 Clean surface of debris by brooming. Collect debris and dispose off-site,

.3 Ensure elevation of ground adjacent to pavement is within 30mm of the elevation of the adjacent pavement, unless authorized by the Departmental Representative and

.4 Ensure material adjacent to pavement is compacted and stable.

END OF SECTION

PART 1 - GENERAL

1.1 PWGSC Update on Asbestos Use

.1 Effective April 1, 2016, all Public Works and Government Services of Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit use of asbestos-containing materials.

1.2 COVID-19

.1 All contractors shall follow Canadian Construction Association COVID-19-Standardized Protocols for All Canadian Construction Sites, Provincial Regulations and Federal Site Specific Guidelines.

1.3 References

.1 Government of Canada.
- .1 Canada Labour Code - Part II (as amended)
- .2 Canada Occupational Health and Safety Regulations. (as amended)

.2 National Building Code of Canada (NBC): (as amended)
- .1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electrical Code (as amended)

.4 Canadian Standards Association (CSA) as amended:
- .1 CSA S269.2-2016 (R2021)Access Scaffolding for Construction.
- .2 CSA S269.1-2016 (R2021)Falsework for Construction Purposes.
- .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
- .4 CSA Z1006-16 (R2021)Management of Work in Confined Spaces.
- .5 CSA Z462-21 Workplace Electrical Safety Standard
- .6 CSA Z797-18 Code of Practice for Access Scaffold

.5 National Fire Code of Canada 2015 (as amended)
- .1 Part 5 - Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI): (as amended)
- .1 ANSI/ASSP A10.3-2020, Construction and Demolition Operations Safety Requirements for Powder-Actuated Fastening Systems

1.3 References (Cont'd)

.7 Province of British Columbia:
.1 Workers Compensation Act Part 3-Occupational Health and Safety. (as amended)
.2 Occupational Health and Safety Regulation (as amended)

1.4 Related Sections

.1 Refer to the following current NMS sections as required:
.1 Section 01 11 55 - General Instructions

1.5 Workers' Compensation Board Coverage

.1 Comply fully with the Workers' Compensation Act, regulations 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.

1.6 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.

1.7 Submittals

.1 Work affected by submittal shall not proceed until review is complete.

.2 Submit the following:
.1 Organizations Health and Safety Plan.
.2 Site Specific Safety Plan or Health and Safety Plan (SSSP or HASP)
.3 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
.4 Copies of incident and accident reports.

1.7 Submittals (Cont'd)

.2 (Cont'd)
.5 Complete set of Material Safety Data Sheets (SDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
.6 Emergency Response Procedures.

.3 The Departmental Representative will review the Contractor's Site-Specific Safety Plan or Health and Safety Plan (SSSP/HASP) and emergency response procedures and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.4 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.

.5 Submission of the Site-Specific Safety Plan or 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.

1.8 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 and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 Health and Safety Coordinator

.1 Assign a competent and qualified Health and Safety Coordinator who shall:
.1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to preform work.
.2 Be responsible for implementing, daily enforcing, and monitoring the Site-Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).
.3 Be on site during execution of work.
.4 Have minimum two (2) years of site-related working experience.
.5 Have working knowledge of the applicable occupational safety and health regulations.

1.10 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 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.
.2 Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.11 Project/Site Conditions

.1 Work at site will involve contact with:
.1 Multi-employer work site.
.2 Federal employees and general public.
.3 Energized electrical services.
.4 Working from heights.
.5 Hazards - PWGSC Preliminary Hazard Assessment included as an Appendix to Specifications.

1.12 Utility Clearances

.1 The Contractor is solely responsible for all the utility detection and clearances prior to starting work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for Utility locations.

1.13 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.

1.14 Work Permits

.1 Obtain specialty permit(s) related to project before start of work.

1.15 Filing of Notice

.1 The General Contractor is to file Notice of Projects with Provincial authorities prior to commencement of work. (All construction projects require a Notice of Work)

.2 Provide copies of all notices to the Departmental Representative.

1.16 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.

.2 Prepare and comply with the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP) based on the required 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.

1.16 Site Specific Health and Safety Plan (Cont'd)

.2 (Cont'd)
.1 (Cont'd)
.10 Occupational Health and Safety communications and record keeping procedures.
.11 COVID-19 Protocols 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. SDS required for all products.
.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.

.4 Revise and update the Site Specific Safety Plan (SSSP) and/or Health and Safety Plan (HASP) as required and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Safety Plan and/or Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan and/or Health and Safety Plan of responsibility for meeting all requirements of construction and Contract documents and legislated requirements.

1.17 Emergency Procedures

.1 List standard operating procedures and measures to be taken in emergency situations. Include an emergency response and emergency evacuation plan and emergency contacts (ie. names/telephone numbers) of:
.1 Designated personnel from own company.
.2 Regulatory agencies applicable to work and as per legislated regulations.
.3 Local emergency resources.

1.17 Emergency Procedures (Cont'd)

.1 (Cont'd)
.4 Departmental Representative.
.5 A route map with written directions to the nearest hospital or medical clinic.

.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.
.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 or 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.

.6 Contractors must not rely solely upon 911 for emergency rescue in a confined space, working at heights, etc.

1.18 Hazardous Products

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

1.18 Hazardous Products (Cont'd)

.2 (Cont'd)

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable SDS and WHMIS 2015 documents as per Section 01 11 55.

.2 In conjunction with Departmental Representative schedule to carry out work during "off hours".

.3 Provide adequate means of ventilation in accordance with Section 01 51 00.

.4 The contractor shall ensure that the product is applied as per the manufacturer's recommendations.

.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.19 Asbestos Hazard

.1 Carry out any activities involving asbestos in accordance with current applicable Federal and Provincial Regulations.

.2 Removal and handling of asbestos will be in accordance with current applicable Provincial/Federal Regulations.

1.20 PCB Removals

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

1.21 Removal of Lead-Containing Paint

.1 All paint containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with current applicable Provincial/Territorial Regulations.

.3 Work with lead-containing paint shall be completed as per Provincial and Federal Regulations.

.4 Dry scraping/sanding of any materials containing lead is strictly prohibited.

.5 The use of Methylene Chloride based paint removal products is strictly prohibited.

1.21 Removal of Lead-Containing Paint (Cont'd)

.6 The existing bridge shall be assumed to contain lead paint.

1.22 Electrical Safety Requirements

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate arc flash protection, required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.23 Electrical Lockout

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.24 Overloading

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

.2 The existing bridge is posted with maximum vehicle weight of 9,100 kg.

1.25 Falsework

.1 Design and construct falsework in accordance with CSA S269.1.

1.26 Scaffolding

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA S269.2, CSA Z797 and B.C Occupational Health and Safety Regulations (as amended).

1.27 Confined Spaces

.1 Carry out work in compliance with current Provincial/Territorial regulations.

1.28 Powder-Actuated Devices

.1 Use powder-actuated devices in accordance with ANSI A10.3 (as amended) only after receipt of written permission from the Departmental Representative.

1.29 Fire Safety and Hot Work

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.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.

.3 Hot work permits are a mandatory requirement for any hot work activities.

1.30 Fire Safety Requirements

.1 Store oily/paint-soaked waste products, empty containers and materials subjected 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 (as amended).

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.31 Fire Protection and Alarm System

.1 Fire protection and alarm systems shall not be:
.1 Obstructed.
.2 Shut off.
.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes or hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

1.32 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.

1.33 Posted Documents

.1 Post legible versions of the following documents on site:
.1 Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).
.2 Sequence of work.
.3 Emergency procedures.
.4 Site drawings showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the 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 Workplace Hazardous Materials Information System (WHMIS 2015) documents.
.8 Material Safety Data Sheets (SDS).
.9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
.10 All Hazardous Material and Substance Reports including Lab Analysis.

.2 Post all Material Safety Data Sheets (MSDS) on site, 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.

1.33 Posted Documents (Cont'd)

.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.

1.34 Meetings

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.35 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 of 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".

1.36 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Products

.1 Not used.

PART 3 - EXECUTION

3.1 Execution .1 Not used

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDED

.2 Related Sections
.3 Definitions
.4 Measurement Procedures
.5 Regulatory Overview
.6 Submittals
.7 Site Access and Parking
.8 Protection of Work Limits
.9 Erosion Control
.10 Pollution Control
.11 Equipment Maintenance, Fueling and Operation
.12 Invasive Plant Management
.13 Fire Prevention and Control
.14 Fish and Wildlife
.15 Archaeological Resources
.16 Waste Materials Storage and Removal
.17 Wastewater Discharge Criteria
.18 Surface Water Quality Management
.19 Site Clearing and Vegetation Protection
.20 Environmental Protection Supplies
.21 Notification
.22 Environmental Monitoring

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures
.2 Section 02 81 00 – Hazardous Materials
.3 Section 31 00 99 – Earthworks for Minor Works

1.3 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably 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 prevention of habitat and/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 Environmental Protection Plan (EPP): is prepared by Contractor and describes in writing all the environmental protection and mitigation measures that will be applied throughout the life of the Project by the Contractor to avoid or

minimize the potential effects on the environment associated with the Project. The Environmental Protection Plan must be completed by a P.Bio or RPBio.

.4 Construction Environmental Management Plan (CEMP): is provided by the Departmental Representative for the project and provides a comprehensive overview of environmental management objectives and requirements, inclusive of the protection of surface water, soil, wildlife, fish and other receptors as a result of construction activities. Moreover, the CEMP includes provisions for Erosion & Sediment Control (ESC), and spill prevention. The CEMP was prepared to provide guidance to the Contractor in preparation of the EPP.

.5 Wetted Perimeter: area of stream where water is currently running or pooled.

.6 In-stream Work: any work performed below the high-water mark, either within or above the Wetted Perimeter of any Fisheries Sensitive Zone.

.7 Fisheries Sensitive Zone: in-stream aquatic habitats and out of stream habitat features such as side channels, wetlands, and riparian areas.

.8 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.

.9 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. See www.agf.gov.bc.ca/cropprot/noxious.htm.

.10 Riparian area – for a steam, the 30m strip on both sides of the stream, measured from the high water mark, (b) for a ravine less than 60 m wide, a strip on both sides of the steam measured from the high water mark to a point that is 30 m beyond the top of the ravine bank, and for a ravine 60 m wide or greater, a strip on both sides of the stream measured from the high water mark to a point that is 10 m beyond the top of the ravine bank (Riparian Areas Regulation).

.11 Species at risk: a species that has been defined as “at risk” [of extirpation] by either the federal or provincial government.

.12 Timing windows: periods when human activities are least likely to cause damage to species and ecosystems.

.13 Qualified Environmental Professional (QEP): The QEP must be acting under their professional association’s code of ethics and subject to the organization's disciplinary action. QEPs may hold the following designations: Agrologist (P.Ag), Applied technologist or technician, Professional biologist (RPBio; PBio), Professional engineer (P.Eng), Professional forester (RPF), Professional geoscientist (P.Geo) or Registered forest technologist (RPT).

QEPs can conduct assessments as individuals or together with other qualified environmental professionals. They must have an area of expertise that is recognized in the regulation as one that is acceptable for the purpose of providing all or part of an assessment report for the particular development proposal that is being assessed. They will only be considered a QEP for that portion of the assessment that is within their area of expertise, as identified in the regulation.

.14 Environmental Monitor (EM): The Environmental Monitor shall be retained by the Contractor and must be a QEP and work under the direct supervision of the RPBio, or PBio who completes the Environmental Protection Plan (EPP). The EM shall be on-site for any works occurring below the top-of-bank for the Keogh River or other aquatic features.

.15 Ancestral Remains: A term used to describe Indigenous human remains, whether intact burials, disarticulated skeletal elements, or fragmentary remains.

.16 Archaeological Monitor (AM): an individual retained by the Departmental Representative to assess and monitor for the presence/absence of archaeological resources, and recommend and implement mitigations if Chance Finds are encountered.

.17 Archaeology Awareness Briefing: A site-specific introduction to the archaeological resources of a proposed development area to establish familiarity with the types of archaeologically and historically significant materials that can be expected to be uncovered. This briefing may be accompanied by a review of Chance Find Procedures and other relevant heritage protocols or requirements.

.18 Archaeology Feature: Non-portable archaeological or historic remains such as a fire hearth, cache pit, or house post.

.19 Archaeology Materials – Artifacts, features (e.g., hearths) and associated remains that can be studied by archaeological methods of investigation, including site survey, excavation, and archaeological analytical techniques.

.20 Archaeology Monitoring: Supervision of ground disturbing activities by an archaeologist to identify, document and generally manage archaeological remains that may be encountered during land alteration activities.

.21 Organic native sediments: the original surface soils that existed prior to past land disturbing activities.

.22 Artifact: An object that was manufactured or used by humans in the past.

.23 Chance Find: Archaeological objects (e.g., stone tools, bones), features or sites that are encountered unexpectedly during a land alteration activity.

.24 Chance Find Procedure: A process to be followed when suspected archaeological materials are discovered during land alteration activities when an archaeologist is not present. This document will include response procedures and a communication protocol to be developed by the AM and in consultation with the Kwakiutl Nation.

.25 Culturally Modified Tree (CMT) – A tree that has been altered by Indigenous peoples as part of traditional forest practices. Common examples in coastal regions include bark-stripped trees, felled trees or stumps, and trees with planks removed.

1.4 MEASUREMENT PROCEDURES

.1 Preparation and implementation of the Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Protection will not be measured separately for payment and will be considered incidental to work.

1.5 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:

.2 Comply with and be subject to those permits and approvals obtained from the Departmental Representative to conduct the Work.

.3 Specific legislation, policies, guidelines include but are not limited to:

- *Impact Assessment Act*
- *Fisheries Act*
- *Species at Risk Act*
- DFO *interim code of practice for temporary stream crossings.*
- *Regional Terms & Conditions & Timing Windows - Vancouver Island Terms and Conditions and Timing Window*
- *Migratory Birds Convention Act*
- BC ENV guidelines in Standards and Best Practices for Instream Works
- ENV Develop with Care (2014)
- Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia (2013)
- Best Management Practices for Amphibian and Reptile Salvages in BC (2016)
- Beaver Management Guidelines in BC
- Interim Code of Practice for Beaver Dam Removal (DFO)
- Canadian Wildlife Service Songbird Nesting Survey Protocol
- Best Management Practices for Pile Driving and Related Operations – BC Marine and Pile Driving Contractors Association 2003.

.4 Where in-water work is conducted, adhere to the most current version of the BC Water Quality Guidelines.

.5 Comply with the BC *Heritage Conservation Act* and the Archaeological Impact Assessment Guidelines, BC Archaeology Branch.

.6 Where suspected contaminated soil is identified, adhere to applicable guidelines set forth in the Canadian Council of Ministers of the Environment (CCME) and the Contaminated Site Regulations (CSR).

1.6 SUBMITTALS

.1 The Contractor is required to prepare an Environmental Protection Plan (EPP) in accordance with Section 01 33 00 – Submittal Procedures. The EPP shall include all relevant environmental impacts/issues at the site as indicated by the completion of the EPP Checklist. Prior to commencing construction activities or delivery of materials to site, submit the EPP (See Appendices for Checklist) for review 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 RPBio or P.Bio, and shall, at a minimum include the following:

1. The specifics of a detailed environmental monitoring program as a component of the EPP. This includes details and rationale concerning water quality 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 to ensure that control measures are in compliance with the requirements of the applicable regulatory requirements and all other applicable regulations including the requirements of these specifications.

4. Drawings shall show locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, lay down area(s), 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. 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.

8. Outline the avoidance and mitigation measures which the Contractor will undertake and implement to ensure compliance with the environmental

regulations applicable to the project, inclusive of project-specific regulatory requirements and these contract specifications.

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

10.The procedures for stopping work shall the Contractor encounter archaeological materials or ancestral remains based on Chance Find Procedure prepared by Archeological Monitor retained by the Departmental Representative. A cultural resource protection section shall be included in the EPP, as per 1.15.2.1.

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

1.7 SITE ACCESS AND PARKING

.1 The Contractor shall review both short and long-term access requirements with the Departmental Representative, both at the start-up and on an on-going basis. Given the limited work area and vehicle parking constraints in proximity to the site, the Contractor shall, in consultation with the Departmental Representative, 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 15 meters 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.

1.8 PROTECTION OF WORK LIMITS

.1 The Contractor shall include in the Environmental Protection Plan (EPP) details on the work limits, how these shall be demarcated and what procedures will be implemented to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative. Wildlife exclusion measures may be required, contingent on discussions with the Departmental Representative, to prevent sensitive wildlife from actively entering the work area. Prior to the onset of work in the laydown area and at the bridge site, the Contractor's EM must conduct pre-work sweeps for wildlife and wildlife salvages until the work areas have been cleared of vegetation and prepared for construction. Refer to Section 1.14.4 for additional salvage-related details.

1.9 EROSION CONTROL

.1 Erosion control measures that prevent sediment from entering any drainage feature, water body or wetland in the vicinity of the bridge construction site and laydown area are a critical element of the project and shall be implemented by the Contractor.

.2 All applicable on-site sediment control measures shall be constructed and functional prior to initiating construction-related activities. The Contractor's RPBio or PBio shall prepare an Erosion & Sediment Control Plan

(ESC), to be part of the EPP, to the satisfaction of the Departmental Representative (as per section 1.18.4).

.3 The regular maintenance of all erosion control measures shall be the responsibility of the Contractor. The Contractor's EM is responsible for ESC monitoring and recommendations. The Departmental Representative will provide Environmental Monitoring oversight and liaise with the Contractor's EM. ESC recommendations are to be promptly followed to ensure no potential adverse impacts to any drainage features, water bodies or wetlands. If the design of the control measures is not functioning effectively they are to be replaced. 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 and applicable Best Management Practices (BMPs).

1.10 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 meters to any surface water and be situated in flat areas graded away from sensitive habitats.

.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 30 meters from any surface water, graded away from sensitive habitats in a lockable container to avoid vandalism or theft.

.4 Secondary containment or an impervious berm shall be utilized for storage of any fuel and/or oil products as well as any materials included in the Schedule of the BC Spill Reporting Regulation B.C. Reg. 187/2017. Storage volume shall be capable of holding 110% of stored material volume 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.

drilling and blasting by methods that are approved by the Departmental Representative.

.6 The Contractor shall provide spill kits, inclusive of oil booms, spill pads (oil) and spill pads (general – inclusive of coolant), 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 phone numbers shall be part of the Contractor's EPP.

.8 In the event of a major spill, the Contractor shall prioritize the cleanup and all other work shall be stopped, where appropriate, and personnel devoted to spill containment and clean up.

.9 Any incident and associated remediation (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 and all relevant inspection agencies (ENV/DFO authorities).

1.11 EQUIPMENT MAINTENANCE, FUELING AND OPERATION

.1 The Contractor shall ensure that equipment delivered to the site is free of all soil, seeds and any debris (e.g. power washing, wheel wash etc.) prior to delivery to the work site.

.2 Equipment fuelling sites shall be identified in the EPP. Except for chain saws, any fuelling closer than 30 meters to any surface water (streams, wetlands, water bodies or watercourses) shall be approved by the Departmental Representative.

.3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 30 meters 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 all fueling 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 1.10.4 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 shall ensure that unnecessary idling of the vehicles is avoided.

.6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at designated lay-down / maintenance locations satisfactory to the

Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility, No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of 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. Equipment left on-Site overnight shall be equipped with a drip tray

.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 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

.9 For equipment working at or within 10 m of the top-of-bank of a drainage feature, waterbody, or wetland, hydraulic oil is to be an environmentally friendly hydraulic oil, or Departmental Representative approved alternative, given the sensitivity of the work area and potential for impact as a result of a hydraulic line break.

.10 Equipment movements shall be restricted to the approved, designated "footprint" of the active construction area. The work limits shall be identified per the methods outlined in Section 1.9 to the satisfaction of the Departmental Representative. No machinery will enter, work in or cross over drainage features, rivers, wetlands, water bodies or watercourses, 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.

.11 No 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.

.12 When, in the opinion of the Departmental Representative has identified negligence on the part of the Contractor resulting in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative.

.13 Restrict vehicle movements to the established work limits.

.14 Workers vehicles are to remain within the designated work limits.

1.12 Invasive Plant Management

.1 Keep equipment clean and avoid parking, turning around or staging equipment in known invasive species infested areas.

.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 Use only clean fill material from an "invasive plant free" source approved by the Departmental Representative.

.5 Disturbed areas and prospective restoration areas are to be re-vegetated with culturally and regionally appropriate native vegetation as approved by the Departmental Representative. Restoration will include placement of soil into the interstitial voids/spaces of the rip-rapped areas on each side of the bridge coupled with pocket planting at an averaging spacing of 1 plant per 1 m^2.

1.13 FIRE PREVENTION AND CONTROL

.1 A fire extinguisher shall be carried and available for use on each machine and at locations within the project footprint in the event of fire. Appropriate firefighting equipment to the satisfaction of the Departmental Representative 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. An area, sufficiently away from any flammable materials, shall be designated as the smoking area.

.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. Obtain all required permits from the province

1.14 FISH AND WILDLIFE

.1 The reduced risk window for Vancouver Island, inclusive of the site, is June 15th to September 15th. Supplementary mitigation measures for all instream works will be required, such as, additional isolation of the active work areas, regular checks for fish within the active work area, and supplementary salvages, as well as strict adherence to turbidity criteria(per Section 1.18).

.2 Any instream / in-water work and works at or below the top-of-bank of watercourse / drainage feature are to be monitored full-time by the contractor's EM. The area is to be isolated via a method deemed suitable by the contractor and approved by the Departmental Representative. Prior to the onset of instream / in-water works, the Contractor's EM will coordinate and conduct timing for a fish salvage in consultation with the Departmental Representative. The salvage shall be conducted by the Contractor's EM and is to be undertaken with a minimum of two methods implemented – hand netting, seining, minnow/gee-trapping, and electrofishing.

.3 Any vegetation clearing within nesting zone A1 (01 April to 15 August) will require a bird nest survey(s) by the Contractor's EM prior to the onset of works to ensure no impacts to nesting birds.

.4 Any vegetation clearing within 15 m of a watercourse will require a wildlife salvage. The wildlife salvage will be conducted (contingent on site-specific conditions, work schedule and discussions with the Departmental Representative) prior to vegetation clearing and rip-rap placement in the laydown area and work areas between the high water mark and top-of-bank given the noted amphibian and/or reptile presence in the vicinity of the works.

.5 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, deer or elk, that display aggressive behavior or persistent intrusion.

.6 Controls are to be implemented and maintained to prevent attraction of wildlife to the work area. All garbage / refuse must be placed in appropriate containers and closed when not in use with wildlife tamper-proof lids. Leftover food is not to be left out at any time over the duration of construction.

.7 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 to the Departmental Representative.

.8 Effectively manage Beaver activity within the vicinity of the work area and develop a strategy, as required, to minimize impact to this species;

.9 Follow appropriate practices for beaver management including the DFO Interim Code of Practice for Beaver Dam Removal and coordinate with agencies in consultation with Transport Canada and PSPC for beaver trapping / relocation, if required;

.10 During pile driving works, visual and hydrophone monitoring of the impact on fish by soundwaves emitted will be required initially to ensure that the sound pressure threshold of 30 kPa is not exceeded. If sound pressures over 30 kPa is measured, the contractor will introduce effective means of reducing the level of the shock waves including timing, frequency, duration, completing works when fish are not present in the active work area, or other mitigation measures such as bubble curtains.

1.15 ARCHAEOLOGICAL RESOURCES

.1 Archaeological Protection

.1 Archaeological sites in B.C. are investigated and protected for their historical, cultural, scientific and educational value to the general public, local communities and Indigenous groups.

.2 Ensuring adequate management of archaeological resources consists of preventing, reducing or mitigating impacts to archeological sites and materials.

.3 All historical or archaeological artifacts found on the Project site are protected under Federal and Provincial Acts and regulations. The Contractor and workers shall protect any archaeological materials found and request direction from the Departmental Representative (DR) and Archaeological Monitor(s)(AM).

.4 Due to the sensitivity of the archaeological resources, information regarding archaeological sites, materials, artifacts, and locations is confidential. No photographs or information about archaeological sites and/or materials will be made public or shared on social media platforms by the contractor or sub-contractors.

.2 General

.1 A cultural resource protection section is to be included in the Contractor’s EPP.

.2 For all persons working for the contractor and subcontractors, cultural resource awareness training shall be a component of the initial contractor orientations and of the daily tailgate meetings. This will include training on the Chance Find Procedures.

.3 The Departmental Representative’s Archaeological Monitor will have the authority to stop work in regards to archaeological requirements.

.4 Contractor will provide timely scheduling information to the Departmental Representative (5 working days minimum notice) to enable monitoring coordination.

.5 The Contractor and workers shall stop work and protect any artifacts and/or features found by chance and request immediate direction from the Departmental Representative and Archaeological Monitor before proceeding with their work. No archaeological or historical artifacts shall be intentionally moved.

.3 Archaeological Monitoring

.1 The Archaeological Monitor must be present during any construction activities that disturb or remove organic native sediments to record and collect any observed archaeological materials.

includes any earthworks, such as excavation, removal of abutments, density testing, test-pitting / exploratory work, and pile driving / sheet piling

.2 The Departmental Representative and Archaeological Monitor will conduct a walk-through of the project area ahead of any ground disturbance with the successful contractor to discuss the best approach for construction. Archaeological concerns will be identified.

.3 Method of excavation shall be coordinated with the Departmental Representative.

.4 All excavated organic native sediments shall be handled as per the direction of the Archaeological Monitor. The training program includes a review of this procedure.

.5 Excavation will be conducted under the direction of the Archaeological Monitor. Prior to ground disturbance, the ground surface will be inspected by the Archaeological Monitor for cultural deposits or features. The ground alteration activities will be inspected while in progress. If sediments with potential for archaeological deposits are to be excavated, then a sample of those sediments will be visually examined for cultural deposits. The size of the sample of sediments to be inspected through raking and/or screening will be determined in the field by the Archaeological Monitor. The Archaeological Monitor may request excavation in 10 cm lifts where cultural materials are anticipated.

.6 Archaeological deposits identified during monitoring will be documented, photographed, and georeferenced in the field by the Archaeological Monitor.

.7 Contractor shall coordinate and permit the Archaeological Monitor time to monitor the excavated material.

.8 The most common chance finds site types which may be encountered are:

1. Pre-Contact Archaeological Sites – These sites can include artifact scatters, shell middens, shell-less middens, rock art, culturally modified trees (CMTs), organic materials;
2. Found or suspected human remains;
3. Historical Sites – These sites can include historical artifacts and structures, and historical refuse such as crockery, metal and glassware indicating presence of historical camp sites, cabins, temporary shelters, or sites associated with early logging and mining

.4 Chance Find Procedures

.1 If potential cultural deposits, artifacts, human remains or suspected human remains, or features are identified while the Archaeological Monitor is not present, the following procedures should be immediately implemented:

1. STOP ground disturbance WORK immediately that could cause additional damage to cultural deposits and retain potentially cultural sediments on-site so it may be inspected by the Archaeological Monitor;
2. Immediately inform Departmental Representative and Archaeological Monitor;
3. Record location of the find:
    a. Date (when the find was encountered);Observer (name of the person recording information about the find);
    b. Location of Find (Labelled flagging so that it may be relocated, GPS coordinates if possible);
    c. Type of find (e.g., archaeological, historical, suspected human remains);
    d. Description of the obvious disturbance to the find (by equipment, work, erosion etc.); and
    e. Photograph of find, with scale in photograph if possible. In the case of suspected human remains photographs are only be permitted to be taken by the Archaeological Monitor or Departmental Representative for the purpose of confirming if the remains are human, and document and maintain chain of custody.

.2 Be prepared to initiate work at another location under direction of the Departmental Representative while archaeological testing and/or mitigation is conducted. Work may only continue in the location of the Chance Find under the direction of the Departmental Representative.

.3 In the event that a chance find is confirmed to be of found human remains, local law enforcement police will be informed by the Departmental Representative. The human remains must be accorded full dignity and respect by prohibiting public access and photography. A cover will be placed over any exposed bones with plastic sheeting, blanket, or other clean covering (not back fill). If the affected location is busy or has high public visibility, a delegate of the contractor will be assigned to stand watch and secure the location until the Departmental Representative is able to have a representative of the Owner relieve the contractor employee. The secured watch will continue until the Archaeological Monitor and local policing authorities are on site.

1.16 WASTE MATERIALS STORAGE AND REMOVAL

.1 The Contractor and workers shall manage, handle, store, and dispose of hazardous wastes in conformance with the applicable federal and provincial regulations and shall be part of the EPP.

.2 Sampling and analysis of the existing bridge paint have confirmed the presence of lead at an average concentration of 33,000 mg/kg (dry weight). Appropriate management and disposal of the lead paint is required. No sandblasting or removal of paint from the existing bridge is permitted on-

site. Contractor is to ensure no material enters the watercourse during the bridge deconstruction and removal. Management and disposal conditions are to be accepted and verified by the Departmental Representative.

.3 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.

.4 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.

.5 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials where possible.

.6 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition, situated at least 30 m from any natural or man-made water feature, including but not limited to drainage swales, ditches, watercourses, ponds and wetlands.

1.17 WASTEWATER DISCHARGE CRITERIA

.1 Any waste water discharged to the ground will conform to the discharge requirements set out in Section 1.18 and any regulatory documentation obtained for this Project. No turbid water is to be discharged to swales, ditches, wetlands, ponds or watercourses without confirmation that turbidity meets the applicable BC Water Quality guidelines prior to discharge under supervision of the contractor's EM with input from the Departmental Representative. Any suspect contaminated wastewater or groundwater shall be contained and tested for potential contaminants to determine appropriate measures of discharge or removal.

.2 Contractor must obtain approval from the provincial *Water Sustainability Act* Officer prior to discharging any treated wastewater or arrange for appropriate off-site disposal.

1.18 SURFACE WATER QUALITY MANAGEMENT

.1 Do not pump water containing suspended materials into waterways or drainage systems.

.2 The EM shall conduct water quality (pH & turbidity) monitoring upstream and downstream of the work zone during all instream activities prior to works and during the initial stage of work to ensure water quality conditions, applicable letter/permit(s), if any, and conditions are met. Water quality will also be sampled during routine monitoring events over the duration of works. Active construction-related works will be temporarily halted if the thresholds listed below are exceeded to allow water to clear or until contingency measures are implemented, as follows:

1. Turbidity related water quality change, associated with a Project, in discharge watercourse/waterbody can be no more than 8 Nephelometric Turbidity Units (NTU) above background at any one time for a duration of 24 h in all waters during clear flows or in clear waters.

2. Turbidity related water quality change, associated with a Project, in discharge watercourse/waterbody can be no more than 2

NTUs above background at any one time for a duration of 30 days in all waters during clear flows or in clear waters.

3. Turbidity related water quality change, associated with a Project, in discharge watercourse/waterbody can be no more than 5 NTUs at any time when background is 8 – 50 NTUs during high flows or in turbid waters.
4. Turbidity related quality change, associated with a Project, in discharge watercourse/waterbody can be no more than 10% when background is >50 NTUs at any time during high flows or in turbid waters.

5. All water must meet applicable water quality guidelines (pH 6.5 to 9.0) prior to discharge to vegetation or watercourses.

.3 Any in-water / instream work areas shall be isolated via a turbidity barrier serving to maintain turbidity levels outside the isolated active work area within acceptable limits per item 1.18.2. A section detailing site-specific isolation measures is to be included in the EPP.

.4 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative as part of the Environmental Protection Plan. The ESC Plan is to incorporate any 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 (if required) 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.

.8 Any dewatering activities will be released onto the ground at a location that is a minimum of 30 meters from natural drainage courses and 100 meters from fish bearing waters.

.9 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.

1.19 SITE CLEARING AND VEGETATION PROTECTION

.1 Verify trees to be protected during construction and install tree protection fencing around designated Root Protection Zones (RPZs).

.2 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.

.3 Minimize stripping of topsoil and vegetation.

.4 Restrict tree removal to areas indicated or designated by Departmental Representative.

.5 Vegetation clearing shall be conducted outside of the least-risk timing window for nesting birds, as per federal Nesting Zone A1. If vegetation clearing occurs within this window (01 April to 15 August), a bird nest survey is to be conducted prior to any clearing works by the Contractor’s EM.

.6 The Contractor shall be aware that BC has culturally modified trees (CMTs) that are protected under the Heritage Act. If a CMT is encountered, stop work immediately and contact the Departmental Representative.

1.20 ENVIRONMENTAL 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 100 m of polypropylene silt fence (typical height of 0.9m) and prevent sediment transport into water bodies.

.3 Provide a minimum of 50 spill pads (general spill pads and oil pads), as well as 50 lineal meters 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 Provide inventory of environmental protection supplies prior to mobilization

1.21 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance 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.

.5 Any environmental incidents or non-compliances observed by the contractor's EM or identified by the contractor will be reported to the Departmental Representative immediately.

1.22 ENVIRONMENTAL MONITORING

.1 The environmental monitor shall be retained by the contractor and shall meet the definition of a QEP per Section 1.3.13 and as detailed in Section 1.3.14. It will be the responsibility of the contractor's EM to keep the Departmental Representative apprised of the work schedule, activities, incidents, and any deviations or changes in the EPP or mitigation strategies.

.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. The EPP shall clearly identify how the contractor's environmental monitoring program will adhere to this approach.

.3 The environmental 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 to potential environmental incidents and non-compliances.

.4 The environmental monitor shall attend the site for full-time monitoring during active construction works for all instream works (defined as any works below the top-of-bank of any watercourse or drainage feature or aquatic habitat), and shall attend the site at a minimum of once per week for all other construction activities, scheduled to coincide with those activities with the highest potential for environmental risk.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 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, prior to project startup.

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 Control and Quality Assurance testing laboratory and field staff including as follows:
.1 Where specified in the text of these specifications, including but not limited to:

1.4 Independent Inspection Agencies (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.1 Onsite and laboratory testing.

.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 Mill tests and certificates of compliance.

.5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.

.6 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 and access as 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 reinspection.

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.

1.6 Procedures (Cont'd)

.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.

.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 to Subcontractor of Work being inspected or tested and to manufacturer or fabricator of material being inspected or tested.

1.9 Test Certificates

.1 Submit all test certificates as required of specification Sections.

1.10 Measurement and Payment

.1 There will be no measurement for the work in this Section.

1.10 Measurement and Payment (Cont'd)

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

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.

1.4 Heating and Ventilation of Work Area and Enclosures

.1 Provide temporary heating required during construction period, including attendance, maintenance, and fuel.

.2 Construction heaters used inside enclosures 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 prepared 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.
.6 Provide ambient temperatures and humidity levels for all stages of work.

.4 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours, or gases in areas occupied during construction.
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied area.

1.4 Heating and Ventilation of Work Area and Enclosures (Cont'd)

.4 (Cont'd)
.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.

.5 Payment:
.1 Heating and ventilation of work area and enclosures is incidental to the Work and no separate payment will be made.

.6 Be responsible for damage to Work due to failure in providing adequate heat, ventilation, and protection during construction.

1.5 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.

1.6 Temporary Communication Facilities

.1 Provide and pay for temporary telephone necessary for own use.

1.7 Fire Protection

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations, and bylaws.

.2 Burning rubbish and construction waste materials is not permitted onsite.

.3 Refer to Section 01 35 43 – Environmental Procedure for more details on fire prevention and control.

1.8 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project Identification.

1.2 Installation and Removal

.1 Provide construction facilities in order to execute work expeditiously.

.2 Remove from all sites all such facilities 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 products.

.3 Do not load or permit to load any part of Work with a weight or force that will endanger the Work. Special consideration & planning is required so that the posted limit of 9,100 kg Maximum Vehicle Weight on the existing bridge is not exceeded and that the maximum loads on the new bridge as specified in the Contract Documents is not exceeded.

1.6 Construction Access and Parking

.1 Parking will be permitted onsite provided it does not disrupt performance of Work or access to DFO's infrastructures.

.2 Parking is permitted within the contractor's work area.

.3 Parking for off-hour vehicles are allowed within the temporary staging area providing that any height resitrictions are obeyed and followed for airport operations.

.4 Provide and maintain adequate access to project site.

.5 Build and maintain temporary roads as required to complete the work.

.6 If authorized to use existing roads for access to project sites, maintain such roads for duration of Contract and repair damage resulting from Contractors' use of roads. Provide snow removal during period of Work.

.7 Refer to Section 01 35 43 - Environmental Procedure for more details on site access and parking.

1.7 Sanitary Facilities

.1 Provide sanitary facilities for work force/construction use in accordance with governing regulations and ordinances. Refer to Section 01 35 43 - Environemental Procedure for more details on sanitary facilities.

.2 Post notices and take such precautions as required by local health authorities.

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 - Traffic Control, of these Specifications for more information.

1.8 Construction Signage (Cont'd)

.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 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

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. Refer to Section 01 35 43 - Environmental Procedure for more details on tree protection.

1.4 Guard Rails and Barricades

.1 Provide as required by governing authorities.

1.5 Dust Tight Screens

.1 Provide dust tight screens partitions to localize dust generating activities, and for protection of workers, finished areas of Work, and public.

.2 Maintain and relocate protection until such work is complete.

1.6 Access to Site

.1 Provide and maintain access roads as may be required for access to Work.

1.7 Public Traffic Flow

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public. Refer to Sectin 01 35 00 – Traffic Control for more details.

1.8 Fire Routes

.1 Maintain access to property for use by emergency response vehicles.

1.9 Protection for Off-Site and Public Property

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.10 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 or improper protection.

1.11 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

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 part of infrastructure at own expense and to satisfaction of Departmental Representative.

.5 Metal fastenings:
.1 Prevent electrolytic action between dissimilar metals.
.2 Use non-corrosive fasteners, anchors, and spacers for securing exterior work.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Bolts may not project more than 1 diameter beyond nuts.

.8 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.

.9 Prevent damage, adulteration, and soiling of products during delivery, handling, and storage. Immediately remove rejected products from site.

.10 Store products in accordance with suppliers' instructions.

.11 Store products subject to damage from weather in weatherproof enclosures.

.12 Touch-up damaged finished surfaces to Departmental Representative's satisfaction.

1.1 Products/Material and Equipment (Cont'd)

.13 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.

.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 Availability of Products

.1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

1.3 Availability of Products (Cont'd)

.2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.

.3 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 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.

1.5 Contractor

.1 Where products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.

.2 Where 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 Where products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

1.5 Contractor (Cont'd)

.4 Where products are specified to meet particular design requirements or to match existing materials: use only material specified Approved Products. 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.

1.6 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 will be considered by the Departmental Representative if:
.1 products selected by tenderer from those specified 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.

1.7 Transportation

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

1.8 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 Coordination

.1 Ensure cooperation of workers during Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves, and accessories.

1.10 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the 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.

.2 Use best quality products.

END OF SECTION

PART 1 - GENERAL

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 Cleanup work area as work progresses. 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.

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, debris and tools on completion of work. Leave work area in a clean and orderly condition.

1.4 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Waste Management Workplan including Waste Audit, Waste Reduction Workplan and Demolition Waste Audit. Refer to Section 01 35 43 - Environmental Procedure for more details on waste materials storage and removal.

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 14 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.

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/or recycling (3Rs) of materials.

.4 Post workplan or summary where workers at site are able to review its content.

1.7 Waste Processing Sites

.1 Provide waste processing sites as applicable within the Province of British Columbia to Departmental Representative within 14 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.

1.11 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General COnditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - EXECUTION

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.

.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 Source separate materials to be reused/recycled into specified sort areas. Refer to Section 01 74 00 - Cleaning for more details.

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 that the following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.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 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance shall be date of commencement for warranty period.

1.2 Inspection and Declaration (Cont'd)

.7 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.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with General Conditions.

1.3 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 35 33 - Health and Safety Requirements.

.2 Section 01 35 43 - Environmental Procedures.

.3 Section 02 81 00 - Hazardous Materials.

1.2 References

.1 CSA International
.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

.2 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 Canadian Environmental Protection Act (CEPA), 1999, C.33.

1.3 Action and Information Submittals

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

.2 Hazardous Materials:
.1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

1.4 Delivery, Storage and Handling

.1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures and Section 02 81 00 - Hazardous Materials.

.2 Storage and Protection.
.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
.2 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.
.3 Remove and store materials to be salvaged, in manner to prevent damage.

1.4 Delivery, Storage and Handling (Cont'd)

.2 (Cont'd)
.4 Store and protect in accordance with requirements for maximum preservation of material.
.5 Handle salvaged materials as new materials.

1.5 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the removal of existing bridge and abutments and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Products

.1 Not used

PART 3 - EXECUTION

3.1 Examination

.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. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 Preparation

.1 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.2 Temporary Erosion and Sedimentation Control:
.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction.

3.2 Preparation (Cont'd)

.2 (Cont'd)
.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

.3 Protection of In-Place Conditions:
.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
.2 Keep noise, dust, and inconvenience to occupants to minimum.
.3 Protect building and bridge systems, services and equipment.
.4 Provide temporary shoring/underpinning of buildings/structures affected by proposed work.
.5 Provide temporary dust screens, covers, railings, supports and other protection as required.
.6 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.

3.3 Removal of Hazardous Wastes

.1 Remove contaminated or dangerous materials in accordance to Section 01 35 33 - Health and Safety Requirements, Section 01 35 43 - Environmental Procedures, and Section 02 81 00 - Hazardous Materials.

.2 PSPC must be advised of all field and remedial work at least 72 hours in advance.

3.4 Demolition/ Removal

.1 Remove existing bridge and timber log crib abutments and all other items as required.

.2 Currently, old timber abutments exist within the Keogh River. The abutments may have been historically preserved using creosote, a hydrocarbon product. The following environmental mitigation measures are to be implemented during the removal of the timber pilings:
.1 Utilize absorbent pads/booms during removal of wood abutments as precautionary measure given the potential for historical creosote treatment.
.2 Remove abutments by mechanical means to prevent breaking the abutments and ensure no wood debris remains within the river after removal works.

3.4 Demolition/ Removal (Cont'd)

.2 (Cont'd)

.3 Store removed abutments at least 30m from the Keogh River on a solid surface (such as polyethelene sheeting or trap) to prevent potential leaching into the environment.

.3 Disconnect, cap, plug or divert, as required, existing utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Coordinate any service disruptions with Departmental Representative for hours of work, duration of shutdown, and emergency procedures in case of prolonged outage.

.2 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.3 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

.4 Excavate at least 200mm below pipe invert, when removing pipes under existing or future pavement area.

.5 Removal of Pavements, Concrete Slabs, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

.6 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

.7 Expose, cut, remove, and dispose of any asbestos cement pipe in accordance with all applicable WorkSafeBC guidelines and regulations.

3.5 Stockpiling

.1 Proper stockpiling will help maintain the value of salvaged materials.

.2 Label stockpiles, indicating material type and quantity.

.3 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.4 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.5 Stockpile in locations as directed by Departmental Representative.
.1 Stockpile height not to exceed 2 m and should be protected from erosion.

.6 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.6 Restoration and Cleaning

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas or to conditions that existed prior to beginning of Work.

.2 Progress Cleaning: clean in accordance with Section 01 35 43 – Environmental Procedures.
.1 Leave Work areas clean at end of each day. Refer to Section 01 74 00 – Cleaning for more details.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 35 43 – Environmental Procedures. Refer to Section 01 74 00 – Cleaning for more details.

.4 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.5 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 35 43 – Environmental Procedures.

3.6 Restoration and Cleaning (Cont'd)

.5 (Cont'd)

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility. Refer to Section 01 74 19 - Waste Management and Disposal for more details.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures

.2 Section 01 35 43 – Environmental Procedures

1.2 References

.1 Export and Import of Hazardous Waste Regulations (EIHW Regulations), SOR/92637.

.2 National Fire Code of Canada 2015

.3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T19.01).

.4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/8577, SOR/85585, SOR/85609, SOR/86526).

1.3 Definition

.1 Dangerous Goods: Product, substance, or organism that specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulation.

.2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 Submittals

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

.2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.

.3 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

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 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.

.5 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
.1 Store hazardous materials and wastes in closed and sealed containers that are in good condition.
.2 Label containers of hazardous materials and wastes in accordance with WHMIS.
.3 Store hazardous materials and wastes in containers compatible with that material or waste.
.4 Segregate incompatible materials and wastes.
.5 Ensure that different hazardous materials or hazardous wastes are not mixed.
.6 Store hazardous materials and wastes in a secure storage area with controlled access.
.7 Maintain a clear egress form storage area.
.8 Store hazardous materials and wastes in a manner and location that shall prevent them from spilling into the environment.

1.5 Storage and Handling (Cont'd)

.5 (Cont'd)
.9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
.10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.6 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.7 Report spills or accidents immediately to Departmental Representative and the ESO. Submit a written spill report to Departmental Representative within 24 hours of incident.

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 on site:
.1 Coordinate transportation and disposal with Departmental Representative.
.2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
.3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
.4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
.6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
.7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.

1.6 Transportation (Cont'd)

.3 (Cont'd)

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

1.7 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Materials

.1 Only bring on site the quantity of hazardous materials required to perform work.

.2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 Disposal

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.

.3 Send hazardous wastes only to authorized hazardous waste disposal treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

3.1 Disposal (Cont'd)

.6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

PART 1 - GENERAL

1.1 Measurement and Payment

.1 Payment will be under the Lump Sum Amounts for the Precast Concrete items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

1.2 References

.1 Canadian Standards Association (CSA)
.1 CAN/ CSA-A23.1/A23.2-2019, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CAN/ CSA-O86.1-2019, Engineering Design in Wood.
.3 CSA-0121-2017, Douglas Fir Plywood.
.4 CSA-0151-2017, Canadian Softwood Plywood.
.5 CSA 0153, Poplar Plywood
.6 CAN3-0188.0, Standards Test Methods for Mat Formed Wood Particleboard and Waferboard.
.7 CSA-0437 Series -93 (R2011), Standards for OSB and Waferboard.
.8 CSA-S269.1-2016, Falsework and Formwork.

.2 Council of Forest Industries of British Columbia (COFI)
.1 COFI Exterior Plywood for Concrete Formwork.

1.3 Waste Management and Disposal

.1 Separate and recycle waste materials

.2 Place material defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

.4 Use sealers, form release and stripping agents that are nontoxic, biodegradable and have zero or low VOC's.

PART 2 - PRODUCTS

2.1 Materials

.1 Formwork materials: to CAN/CSA-A23.1

.2 Form ties:

2.1 Materials (Cont'd)

.2 (Cont'd)
.1 Use snap ties complete with plastic cones and light grey concrete plugs or cement mortar fill in surface to be left smooth, even and uniform in colour.

.3 Form liner:
.1 Plywood: high density overlay Douglas Fir to CSA O121 exterior grade, square edge, 19 mm thick.

.4 Form release agent low VOC.

.5 Form stripping agent colorless mineral oil, low VOC, free of kerosene with viscosity between 70 and 110s Saybolt Universal 15 to 24 mm^2/s at 40°C, flashpoint minimum 150°C, open cup.

.6 Falsework materials: to CSA-S269.1.

PART 3 - EXECUTION

3.1 Fabrication and Erection

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 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 and COFI Exterior Plywood for Concrete Formwork.

.5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.

.7 Align form joints and make watertight. Keep form joints to minimum.

3.1 Fabrication and Erection (Cont'd)

.8 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.

.9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.10 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.12 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Concrete Forming and Accessories 03 10 00

.2 Precast Structural Concrete 03 41 00

1.2 References and Standards

.1 CAN/ CSA-A23.1-19/A23.2-19 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standards Practices for Concrete.

.2 CAN/ CSA-A23.3-19 - Design of Concrete Structures.

.3 CAN/CSA-G30.18-09 (R2014) - Carbon Steel Bars for Concrete Reinforcement.

.4 CAN/CSA-W186-M1990 (R2012) - Welding of Reinforcing Bars in Reinforced Concrete Construction.

.5 American Concrete Institute (ACI) Detailing Manual 2004-(SP-66)

.6 Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, 28th Edition.

1.3 Submittals

.1 Prepare and submit shop drawings, consisting of bending, cutting and placing drawings for all reinforcing steel
.1 Generally, placing to be in accordance with the ACI Manual of Standard Practice for Detailing Reinforcing Concrete Structures and the CRSI Manual of Standard Practice for Placing of Reinforcing Bars.
.2 Structural drawings take precedence over placement drawings and bar schedules.

1.4 Inspection

.1 The Departmental Representative's general review are undertaken to inform the Owner of the Contractor's performance, and in no way shall augment the Contractor's quality control procedure or relieve him or his contractual responsibilities.

1.4 Inspection (Cont'd)

.2 Advise the Departmental Representative a minimum of 24 hours prior to placement of concrete. Failure to give adequate notice may cause Consultant to classify the work as defective.

.3 Concrete shall not be placed until the reinforcement and its placement has been reviewed by the Departmental Representative.

.4 Correct defects and irregularities to the satisfaction of the Departmental Representative, at no cost to the Owner.

1.5 Delivery, Storage and Cleaning

.1 Reinforcing steel, welded wire fabric, and accessories shall be delivered, handled and stored as required to prevent contamination and damage.

.2 All steel reinforcement, before being placed, shall be cleaned of loose scaly rust, dirt, oil, paint and other coatings that may be detrimental.

1.6 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amounts for the Precast Concrete items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Materials

.1 Reinforcing bars: billet steel deformed bars, Grade 400R 400MPa (60 ksi) yield strength, conforming to CAN/CSA-G30.18.

.2 Weldable reinforcing bars: weldable low alloy steel deformed bars, Grade 400W 400MPa (60 ksi) yield strength, conforming to CAN/CSA-G30.18.

.3 Welded steel wire fabric: sizes and gauges are to be as shown on the structural drawings, flat sheets only.

2.1 Materials (Cont'd)

.4 Supports: wire chairs, bolsters, hanger bars, spirals, stirrups and plastic spacers of size and strength to adequately support reinforcing in required position.

.5 Tie wire: annealed wire, 1.5mm (16ga) or heavier. annealed wire, 1.5mm (16ga) or heavier.

2.2 Fabrication

.1 Fabricate reinforcing to CAN/CSA-A23.1/A23.2.

.2 Reinforcing bars shall be cold bent. Reinforcing bars shall not be straightened or re-bent without written approval of the Departmental Representative.

.3 The location of reinforcement splices not shown on the drawings shall be approved by the Departmental Representative.

2.3 Source Quality Control

.1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request, inform Departmental Representative of proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 Placing

.1 Place reinforcing steel in accordance with CSA A23.1/A23.2 and CSA A23.4.

.2 Rebar to oxidize for 6 weeks after Chromation and before casting.

.3 Place reinforcement within a tolerance of 6 mm (1/4") for slab steel and 12 mm (1/2") for other steel.

.4 Provide minimum concrete cover to reinforcing steel in accordance with CAN/CSA-A23.1 and as indicated on drawings.

3.2 Welding

.1 Any welding of reinforcing steel shall be in accordance with CAN/CSA-W186.

.2 No welding of reinforcing steel shall occur without approval of the Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 This section outlines the requirements for precast concrete deck panels and precast concrete ballast walls.

1.2 Measurement Procedure

.1 All precast elements measured as a single lump sum to include cost, supply, delivery, storage and erection of precast concrete elements, removal and patching of erection devices, transverse connections, and field grouting of grout keys between precast members and grout pockets that provide composite connection to the steel plate girders.

1.3 Reference Standards

.1 ASTM International (ASTM)
.1 ASTM A 775/A 775M-19, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
.2 ASTM A 884/A 884M-19 Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
.3 ASTM A 1064/A 1064M-18A, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
.4 ASTM C 260/C 260M-10a (2016), Standard Specification for Air-Entraining Admixtures for Concrete.

.2 CSA Group (CSA)
.1 CSA A23.1-19/A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA A23.3-19, Design of Concrete Structures.
.3 CAN/CSA-A23.4-16, Precast Concrete - Materials and Construction.
.4 CAN/CSA- A3000-18, Cementitious Materials Compendium.
.5 CAN/CSA-G30.18-09 (R2014), Carbon steel bars for concrete reinforcement.
.6 CSA S6-19, Canadian Highway Bridge Design Code.

.3 ULC Standards
.1 CAN/ULC-S701.1-17, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 Design Requirements

.1 The Contractor is responsible to design precast elements to CSA A23.3 and CAN/CSA A23.4 to carry, transport, handling and erection stresses.

.2 The Contractor is responsible to design connections/attachments of precast elements to carry the load/forces during erection and construction as per CSA S6-19.

.3 Provide detailed shop drawings stamped and signed by a Professional Engineer registered in the Province of British Columbia for all precast elements and connections. The use of seal is limited to design of elements as specified in this section.

.4 Any protruding lifting accessory/steel to be removed after the placement is complete. Any void shall be patched with Grout.

1.5 Performance Requirements

.1 Tolerance of precast elements to CAN/CSA-A23.4.

1.6 Action and Informational Submittals

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Precast Structural Concrete and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by a Professional Engineer registered in the province of British Columbia.
.2 Submit shop drawings prepared in accordance with CSA A23.3 and CAN/CSA-A23.4 and include following items:
.1 Details of non-prestressed members, reinforcement and connections.
.2 Details of lifting accessories with exact location and capacity.
.3 Concrete strength and classification.
.4 Finishing schedules.
.5 Methods of handling and erection.

1.6 Action and Informational Submittals (Cont'd)

.3 (Cont'd)
.2 (Cont'd)
.6 Openings, sleeves, inserts and related reinforcement.
.3 Submit 2 copies of design drawings for typical precast elements and connections for review by Departmental Representative 2 weeks prior to manufacture.

.4 Quality Assurance Submittals:
.1 Submit in accordance with Section 01 45 00 - Quality Control.
.2 Mill Test Report: submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 2 weeks prior to beginning reinforcing work.
.3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.
.4 Provide quality management plan to ensure verification of concrete quality to specified performance.
.5 Submit concrete supplier's certification.

.5 The Contractor, through their supplier, shall undertake the concrete mix design and pay for all costs associated with the development, testing, and submissions of the mix design and results of performance testing.

1.7 Quality Assurance

.1 Quality Control Plan: submit written report, to Departmental Representative verifying concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

.2 Precast concrete manufacturers to be certified to Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program in Precast and Prestressed Bridge Products, prior to the time of bid.

.3 Only precast elements fabricated under the CPCQA plant certification program to be acceptable, and plant certification is to be maintained for the duration of fabrication, erection, and until warranty expires.

1.8 Qualifications

.1 Precast concrete manufacturer certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting Bid and to verify as part of Bid that plant has current certification in appropriate category, Structural.

.2 Welding companies certified to CSA W47.1.

1.9 Delivery, Storage and Handling

.1 Store and manage hazardous materials in accordance with Section 02 81 00 – Hazardous Materials.

.2 Deliver, handle and store precast/ units according to manufacturer's instructions.

.3 Protect unit corners from contacting earth to prevent from staining.

1.10 Warranty

.1 Warrants precast elements not to spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, but warranty period extended to 24 months.

1.11 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Precast Concrete items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 – PRODUCTS

2.1 Materials

.1 Cement to CAN/CSA-A3001, Type GU.

.2 Supplementary cementing materials: by mass of total cementitious materials to CAN/CSA-3001.

.3 Water: to CSA 23.1/A23.2.

.4 Reinforcing steel: to CSA G30.18.

2.1 Materials (Cont'd)

.5 Hardware and miscellaneous materials: to CSA A23.1/A23.2.

.6 Forms: to CAN/CSA-A23.4.

.7 Air entrainment admixtures: to ASTM C 260/C 260M.

.8 Chemical admixtures: to ASTM C494. Upon request and submission by the Contractor, Departmental Representative to review accelerating or set retarding admixtures during cold and hot weather placing.

2.2 Mixes

.1 Concrete:

.1 Normal density concrete to follow the following performance criteria in accordance with CSA A23.1/A23.2.

.1 Cement: use Type 10SF Portland Cement.

.2 Minimum compressive strength at 28 days: 35 MPa.

.3 Supplementary cementing materials (SCM): Silica Fume – 7% to 10% by mass of cementing materials; Fly ash – maximum 20%.

.4 Water/cement ratio: 0.35 to 0.37.

.5 Class of exposure: C-1.

.6 Aggregate:

.1 Nominal maximum aggregate size: 5 to 14 mm.

.2 Aggregates not to react with alkalis in the concrete.

.7 Entrained air content in plastic concrete: 5% to 8%.

.8 Maximum slump after superplasticizer: 180 mm.

.9 Water: to be potable, clear and free of oils, acids, alkalis, soluble chlorides, organic matter and sediment.

.2 Grout:

.1 Grout for block-outs shall be target traffic patch with coarse aggregate, or alternate equivalent products. Equivalent products must be approved by the Departmental Representative prior to use.

.2 Grout for panel joints shall be target traffic patch with fine aggregate, or alternate equivalent product. Equivalent products must be approved by the Departmental Representative prior to use.

2.2 Mixes (Cont'd)

.2 (Cont'd)

.3 Cold weather grouting: where it is anticipated that the temperature shall drop below 5°C during grouting (including a period extending 24 hours prior to grouting through five (5) days after grouting), the Contractor shall implement cold weather concreting procedures in accordance with CAN/CSA A23.1. Prior to commencing the grouting operation, the Contractor shall provide the Departmental Representative with the written cold weather concreting procedures.

.3 Grout: fast setting, non-shrink, one component, polymer modified cementitious based grout.

.1 Compressive strength: to ASTM C 109/C 109M, 17.4 MPa at 1 day; 35 MPa at 7 days; 52.1 MPa at 28 days.

.2 Flexural strength: to ASTM C 348, 5.6 MPa at 1 day; 6.9 MPa at 7 days; 10.4 MPa at 28 days.

.3 Splitting tensile strength: to ASTM C 496/C 496 M, 2.6 MPa at 1 day; 3.1 MPa at 7 days; 4.2 MPa at 28 days.

.4 Bond strength: to ASTM C 1059/C 1059M, 6.8 MPA at 1 day; 12.1 MPa at 7 days; 17.7 MPa at 28 days.

.5 Drying shrinkage: to ASTM C 596, 28 day -0.093%.

.6 Rapid chloride permeability: to ASTM C 1202, 28 day - 365/very low.

.7 Freeze/thaw resistance: to ASTM C 666/C 666M, (Procedure A), 300 cycles - 93.0% RDF.

.8 Abrasion Resistance: to ASTM C 779/C 779M, (Procedure A), depth of wear 0.419 mm/hour.

2.3 Fabrication

.1 Precast fabrication to meet the requirements of CAN/CSA-A23.4, and CPCQA certification requirements.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast in location not exposed in finished work.

.3 Cast members in accurate rigid molds designed to withstand high frequency vibration. Set reinforcing anchors and auxiliary items to indicated on shop drawings. Cast in anchors, blocking and inserts supplied by other Sections as required to accommodate their work. Vibrate concrete during casting for full thickness. Provide necessary holes and sinkages for flashings, anchors, and cramps. Maintain even and uniform appearance.

2.3 Fabrication (Cont'd)

.4 Anchors, lifting hooks, shear bars, spacers and other inserts or fittings required for a complete and rigid installation. Lift hooks adequately sized to safely handle panels according to member dimension and weight. Conceal anchors and inserts where practical.

.5 Shop prime anchors and steel inserts after fabrication and touch up primer on anchors after welding. Do not apply primer to embedded portion of anchor or inserts.

.6 Galvanize anchors and steel embedments after fabrication and touch up with zinc-rich primer after welding.

2.4 Finishes

.1 Finish units to to CAN/CSA-A23.4.

2.5 Source Quality Control

.1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA-A23.4.

.2 Provide records from in-house quality control program based upon plant certification requirements to Departmental Representative for inspection and review.

.3 Provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.4 Precast plants to keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

2.5 Source Quality Control (Cont'd)

.5 Independent inspection and testing: The Departmental Representative may appoint an independent inspection and testing agency to undertake concrete strength, slump and air content tests. Laboratory curing and testing of samples will be carried out in accordance with CSA A23.1/A23.2 and CSA A23.4. Provide a group of four cylinders for each standard strength test. One cylinder shall be tested at 7 days. The 28 days test result shall be the average of the strengths of the remaining three specimens, except that if one specimen in a test in the opinion of the Departmental Representative shows manifest evidence or improper sampling, molding, or testing, it shall be discarded and the remaining two strengths averaged. Additional cylinders may be cast, at the discretion of the Departmental Representative.

.6 Non-destructive Methods for Sampling and Testing Concrete shall be in accordance with CAN/CSA A23.2.

.7 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve their contractual responsibility.

PART 3 - EXECUTION

3.1 Erection

.1 Precast concrete work in accordance with CAN/CSA-A23.4 CSA A23.3 and CSA S6-19.

.2 Erect precast elements within allowable tolerances as specified.

.3 Set elevations and alignment between units to within allowable tolerances before connecting units.

.4 Provide Crane services and operative(s) qualified to operate unit and offload and place precast concrete elements in identified positions. Crane provider to comply with all local Health and Safety legislation as applicable to service provided.

.5 No grout is permitted to pond. Mixed grout, not yet deposited, shall be re-agitated at frequent intervals to prevent segregation. Any grout that has not been placed within 45 minutes will be rejected.

3.2 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 Basis of Payment

.1 Payment of 50% of the Lump Sum amount for the Supply, Fabrication and Erection of Structural Steel item will be made after delivery of all steel has been made to the site. The remaining 50% will be made once erection of the structural steel is complete.

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.
.5 ASTM F3125-19e2, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

.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 S6-19, Canadian Highway Bridge Design Code.
.4 CAN/CSA-S16-19, 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).
.8 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

1.3 Shop Drawings

.1 Prepare and 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 in accordance with Canadian Welding Bureau standards.

.4 Prepare and submit all drawings and documents necessary to describe the following:
.1 Access to work.
.2 Type and capacity of equipment to be used.
.3 Sequence of operation: position of cranes, snooper vehicles, and trucks with members.
.4 Position of cranes and snooper vehicles with details of load distribution of wheels and outriggers.
.5 Lifting devices and lifting points.
.6 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 torqueing, method of providing temporary supports for stability.
.7 Details of temporary works: method of providing temporary supports for stability.
.8 Bolt torqueing sequence and method.
.9 Details of release of falsework and/or shoring.
.10 Details of all welds.
.11 All necessary specifications for the materials to be used.
.12 Identification of fracture-critical and primary tension members and component parts.

.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 Review of the Erection Proposal submission shall not relieve the Contractor 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 Protect threads of bolts and nuts during use, storage and after installation.

.4 Mark mass on members weighing more than 3 tonnes.

.5 Ensure that no portion of steel comes into contact with the ground. Support all material on wood blocking and keep all bolts, nuts, and washers in containers protected from moisture.

.6 Provide Departmental Representative with delivery schedules a minimum of 7 days prior to shipping. Submit site delivery and storage plan as part of the erection plan. Show truck and crane locations including swings and obstructions such as hydro poles and lines.

1.6 Record Drawings

.1 The Contractor shall modify the shop drawings to complete As-Built Drawings for the structure based on all changes that occur. It is anticipated that the Shop Drawings will form the basis for the As-Built Drawings for the steel work, marked with changes that occurred during fabrication and the field.

1.7 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Lump Sum Amount for the Supply, Fabrication and Erection of Structural Steel item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.3 Payment for steel bearing plates will be under Lump Sum Amount for the Steel Bearing Plates item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.4 Payment for bridge guardrail will be under Lump Sum Amount for the Bridge Guardrail - TL-1 item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.5 Payment for elastomeric bearings will be under Lump Sum Amount for the Elastomeric Bearings item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.6 Payment for signage will be under Lump Sum Amount for the Signage item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

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.

2.1 General (Cont'd)

.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 All structural steel shall conform to CAN/CSA-G40.21. Structural steel member labeled "Fracture Critical" shall be Grades 350AT, Category 3. All other structural steel shall be 350A.

.2 High strength bolts, nuts, and washers: to ASTM F3125-19e2 grade A325M, Type 3.

.3 Welding electrodes: to CSA W48 series.

.4 Bolts shall be tightened using the turn of the nut method.

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.

.5 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspections and tests required.
.1 Inspection of the bolted connections will be carried out by the Departmental Representative. Supply power, scaffolding, weather protection, and access as required. Pay for all costs, including the cost of re-inspection, associated with the correction or repair of rejected defects.

2.3 Source Quality Control (Cont'd)

.5 (Cont'd)

.2 Give the Departmental Representative not less than seven (7) working days prior to steel being ready for inspection.

PART 3 - EXECUTION

3.1 Erection

.1 Do not commence steel erection until review 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 riverbanks or embankments without prior written permission of Departmental Representative.

.4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking, or sharply bending metal of any unit. Enlarge holes if necessary, by reaming only after written permission is obtained from Departmental Representative. Reamed holes not to exceed size of bolt used by more than 2 mm.

.5 Check exact position, diameter, and number of existing bolt holes when these have to be used for connecting new members or elements. Immediately report any discrepancies to Departmental Representative.

.6 Straightening onsite of existing bent steel members/elements which are not specified on the Contract drawings to be replaced to be done by cold straightening. Any steel members/elements that are cracked due to cold straightening shall be replaced at the Contractor's expense.

.7 The Contractor shall confirm onsite 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 S6-19, Canadian Highway Bridge Design Code.

3.2 Installation (Cont'd)

.2 Allowable tolerances for elements:
.1 Conform to Clause 29.3 of CAN/CSA S16.19 standard.
.2 Conform to prescriptions of CAN/CSA G40.20 standard.
.3 Conform to prescriptions of CAN/CSA W59 standard.

.3 Falsework shall be 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 their authorization.
.3 Minimal fillet weld size: conform to the requirements prescribed in CAN/CSA S6-19 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 S6-19 and CAN/CSA S16-19 standards. Tighten using turn of the nut method.

.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:

Center-to-Center Distance (m)	Tolerance Plus or Minus (mm)
Less than 10	1
10 to 20	2
20 to 30	3

3.2 Installation (Cont'd)

.7 (Cont'd)
.5 Correct mispunched or misdrilled members only as directed by Departmental Representative.

.8 Span length tolerances in accordance with CAN/CSA S6-19 and CAN/CSA S16-19 standards.

.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. For bottom flange splice plate, install bolts with nuts up.

.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.

.14 A full pre-assembly of all structural steel including all braces and mid-span splice at the place of fabrication is required. Notify Departmental Representative 7 days in advance of pre-assembly.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C88/C88M-18, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C136/C136M-19, Method for Sieve Analysis of Fine and Coarse Aggregate.

.3 ASTM C117-17, Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.

.4 ASTM D1557, Specification for Test Methods for Aggregate Mixtures using 10 lb (4.54 kg) Rammer and 18 inch (457 mm) Drop.

.5 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m^3)

.6 ASTM D 2487-17e1, Classification of Soils for Engineering Purposes (Unified Soil Classification System.

.7 ASTM D 5434-12, Standard Guide for Field Logging of Subsurface Explorations of Soil and Rock.

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1-19/A23.2-19, Concrete Materials and Methods of Concrete Construction.

1.2 Regulations

.1 Protect slopes and banks and perform all work in accordance with Federal, Provincial and Municipal regulations whichever is more stringent.

.2 Not later than one week before backfilling or filling, provide test results from the approved testing firm certifying the suitability of the chosen material.

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

.4 Not later than 48 hours before backfilling or filling with approved material, notify the Departmental Representative.

1.2 Regulations (Cont'd)

.5 Before commencing work, conduct, with the Departmental Representative, condition survey of existing structures, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey benchmarks and monuments which may be affected by work.

1.3 Buried Services

.1 Before commencing work verify the location of all buried services on and adjacent to the site.

1.4 Protection

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the 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 unless approved by the Departmental Representative.

.5 Protect buried services that are required to remain undisturbed.

.6 Midden shall not be disturbed without prior written approval from the Departmental Representative.
.1 Contractor's personnel must attend pre-excavation archaeological site meeting prior to any excavation work.
.2 Excavation work shall be carried out in concert with archaeological monitoring by specialist consultant retained by the Departmental Representative and First Nations Representative.

1.5 Measurement and Payment

.1 There will be no measurement for the work in this Section.

1.5 Measurement and Payment (Cont'd)

.2 Payment will be under the Lump Sum Amount for the Mobilization, Demobilization and General Conditions of Contract item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Materials

.1 Furnish all necessary materials, at a minimum furnish:
.1 6 mil minimum plastic sheeting for base of any stockpiles;
.2 8 mil plastic sheeting for covering of contaminated soil in any stockpiles.

.2 Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles. In absence of satisfactory performance records over a five-year period for particular source of material, soundness to be tested according to ASTM test procedure C-88 or latest revised issue. Maximum weight average losses for course and fine aggregates to be 30% when magnesium sulphate is used after five cycles.

.3 All crushed gravel when tested according to ASTM C-136 and ASTM C-117, or latest revised issue, to have a generally uniform gradation and conform to following sieve must have one or more fractured faces. Determination of the Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "A", which determines fractured faces by count. The Plasticity Index for crushed gravel to not exceed 6.0.

.4 Native material is workable soil free of organic or foreign matter; obtained within limits of Contract may be deemed native material if it is approved by the Departmental Representative. Native material may be reused only if tested and approved by the Departmental Representative. Native material is not acceptable if it is contaminated or impracticable to control its water content or compact to specified density.

PART 3 – EXECUTION

3.1 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

.3 Remove and dispose of existing fencing where indicated on the drawings. Make good all affected surfaces and assemblies to the satisfaction of the Departmental Representative.

3.2 Excavation

.1 All excavated soil under this contract shall be treated as potentially contaminated soil. Excavate, handle and store excavated soil as per this Section and other related sections.

.2 Topsoil stripping

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.

.3 Excavate as required to carry out work, in all materials met. Do not disturb soil or rock below bearing surfaces. Notify the Departmental Representative when excavations are complete.

.4 Excavate for concrete sidewalks and paving to subgrade levels. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

.5 Refer to Section 01 35 43 – Environmental Procedure for more details on excavations.

3.3 Backfilling

.1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by the Departmental Representative.

3.3 Backfilling (Cont'd)

.2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.

.3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.4 Compaction: place backfill and compact to following Modified Proctor densities in compliance with ASTM D1557. (All densities in compliance with ASTM D1557).
.1 Roads, driveways, shoulders, re-shaped ditches and sidewalks to minimum 95%.
.2 Use caution in pipe zone to ensure no damage to pipe.

.5 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.6 Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.

.7 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.4 Contaminated & Midden Containing Material

.1 Potentially Contaminated and Midden Containing Soil
.1 There has been unknown contamination in the project area. However, Contractor is to take appropriate measures per this Section for excavation work if contaminated soil is encountered.

.2 Contaminated/Midden Material Removal
.1 Excavation
.1 As per direction from Departmental Representative.
.2 Dewatering
.1 Surface water shall be diverted to prevent entry into the excavation. Dewatering shall be limited to that necessary to assure adequate access, a safe excavation, prevent the spread of contamination, and to ensure that compaction requirements can be met. Refer to Section 01 35 43 - Environmental Procedure for more details on dewatering activities.

3.4 Contaminated & Midden Containing Material (Cont'd)

.2 (Cont'd)

.2 (Cont'd)

.3 Contaminated/Midden Containing Soil Handling

.1 Soil Segregation

.1 Excavate known or suspect material and place in stockpile at storage area designated by Departmental Representative. In no case will the material be transported off site before laboratory analysis has been received and excavated materials have been characterized for disposal.

.2 As per direction from Departmental Representative.

.2 Soil Testing

.1 Testing of excavated soil will be performed by the Contractor. Soil will be assessed for indications of contamination and will be classified as confirmed contaminated soil, special waste soil, or uncontaminated soil.

.2 The Contractor will dispose of the excavated soil material after testing is completed, according to applicable rules and regulations.

3.5 Grading

.1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by the Departmental Representative.

3.6 Shortage and Surplus

.1 Supply all necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.

.2 Dispose of surplus aggregate material off site.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 33 00 Submittal Procedures.

.2 Section 01 35 43 Environmental Procedures.

.3 Section 31 23 33.01 Excavating, Trenching and Backfilling

1.2 Reference Standards

.1 ASTM International
.1 ASTM D4791-19, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.2 Master Municipal Construction Document
.1 MMCD Platinum Edition 2019

1.3 Action and Information Submittals

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit gradation curves of aggregate material as outlined in Section 31 23 33.01 - Excavating, Trenching and Backfilling to Departmental Representative for review.
.2 Allow continual sampling by Departmental Representative during production when requested.
.3 Provide Departmental Representative with access to source and processed material for sampling.
.4 Supply new or clean sample bags or containers according appropriate to aggregate materials.
.5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 Delivery, Storage and Handling

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

.2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.

.3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

1.5 Measurement and Payment

.1 Measurement: Based on the tonne using truck tickets supplied from the pit source.

.2 Payment will be under the appropriate Civil Works pay items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.3 No payment will be made for material that is wasted and not incorporated into the works as a result of transportation, handling, temporary storage or stockpilling, nor will any payment be made for material used for temporary works such as laydown areas, crane pads, and other uses on-site. The Departmental Representative reserves the right to complete a final neat line survey of the as-constructed embankments and any material beyond the design limits will be deducted from payment.If a quantity adjustment is required based on the final survey, the unit weight for all granular materials will be calculated using 2,200 kg/m3.

PART 2 - PRODUCTS

2.1 Materials

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
.1 Greatest dimension to exceed 5 times least dimension.

2.1 Materials (Cont'd)

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
.1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
.1 Crushed rock.
.2 Gravel and crushed gravel composed of naturally formed particles of stone.
.3 Light weight aggregate, including slag and expanded shale.

2.2 Source Quality Control

.1 Inform Departmental Representative of proposed source of aggregates and provide gradation curves 2 weeks minimum before starting production.

.2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.3 Advise Departmental Representative 2 weeks minimum in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 - EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with topsoil stripping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

.1 Topsoil stripping:

3.2 Preparation (Cont'd)

.1 (Cont'd)

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Begin topsoil stripping of areas as indicated after area has been cleared of grasses, weeds, brush and removed from site.

.3 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Departmental Representative.

.5 Dispose of topsoil as directed by Departmental Representative.

.2 Aggregate source preparation:

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed Departmental Representative.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 2:1 slope, or as noted in the drawings and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.6 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.

.3 Processing:

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, as required in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.

.5 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.

3.2 Preparation (Cont'd)

.6 Stockpiling:

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.5 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.

.6 Stockpile materials in uniform layers of thickness as follows:

.1 Maximum 1.5 m for coarse aggregate and base course materials.

.2 Maximum 1.5 m for fine aggregate and sub-base materials.

.3 Maximum 1.5 m for other materials.

.7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.8 Do not cone piles or spill material over edges of piles.

.9 Do not use conveying stackers.

.10 During cold weather operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 35 43 - Environmental Procedures.

.1 Leave Work area clean at end of each day. Refer to Section 01 74 00 - Cleaning for more details.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 35 43 - Environmental Procedures. Refer to Section 01 74 00 - Cleaning for more details.

.3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

3.3 Cleaning (Cont'd)

.4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

.5 Waste Management: separate waste materials in accordance with Section 01 35 43 – Environmental Procedures. Refer to Section 01 74 19 – Waste Management and Disposal for more details.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 33 00 Submittal Procedures.

.2 Section 01 35 33 Health and Safety Requirements.

.3 Section 01 35 43 Environmental Procedures.

.4 Section 01 45 00 Quality Control.

.5 Section 32 11 23 Aggregate Base Courses.

1.2 References

.1 Master Municipal Contract Documents (MMCD), Volume II - 2019, British Columbia.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM C117-17, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
.4 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ^{3}) (600 kN- m/m ^{3}).
.5 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ^{3}) (2,700 kN- m/m ^{3}).
.6 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.3 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.4 Canadian Standards Association (CSA International)
.1 CAN/CSA-A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.1 CSA-A3001-18, Cementitious Materials for Use in Concrete.

1.2 References (Cont'd)

.4 (Cont'd)
.2 CSA-A23.1-19/A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.5 U.S. Environmental Protection Agency (EPA)/Office of Water
.1 EPA 832/R92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Definitions

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
.1 Rock: solid material in excess of 1.00m3, and which cannot be removed by means of heavy-duty mechanical excavating equipment available on site. Frozen material not classified as rock.
.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:
.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:
.1 Weak, chemically unstable, and compressible materials.

1.3 Definitions (Cont'd)

.7 (Cont'd)

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 Submittals

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

.2 Preconstruction Submittals:

.1 Contractor to submit records of underground utility pre-locates of existing utilities for review by Departmental Representative.

.2 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.1 All tracked equipment to have rubber track pads when working on concrete or paved surfaces on site.

.2 Any damaged sections of pavement/concrete to be repaired by the contractor at the Contractor's expense.

.3 Submit certificates for proposed granular materials to confirm compliance with the Canadian Council of Ministers of the Environment (CCME) Residential/Parkland (RL/PL) Land Usage Soil Quality Guidelines.

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

1.4 Submittals (Cont'd)

.3 (Cont'd)

.1 Submit name of professional engineer retained by the Contractor for design and review of temporary works related to underpinning and bracing of existing structure and excavations for review and approval by Departmental Representative.

.2 Submit name of testing laboratory retained by Contractor for materials testing for review and approval by Departmental Representative.

.3 Submit condition survey of existing conditions as described in this Section.

.4 Submit for review by Departmental Representative proposed dewatering heave prevention methods as described in this Section.

.5 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.

.6 Submit to Departmental Representative written notice when bottom of excavation is reached.

.7 Submit to Departmental Representative testing inspection results report as described in this Section.

.4 Samples:

.1 Inform Departmental Representative at least 2 weeks prior to beginning Work, of proposed source of fill materials and provide documentation that proposed fill meets CCME guidelines.

1.5 Quality Assurance

.1 Qualification Statement: submit proof of insurance coverage for professional liability for professionals retained by Contractor.

.2 Submit design and supporting data for excavations at least 2 weeks prior to beginning Work. Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of British Columbia, Canada.

.3 Keep design and supporting data on site.

.4 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

.5 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.6 Waste Management and Disposal

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

.2 Divert materials from landfill to local facility for reuse.

1.7 Existing Conditions

.1 Examine soil report prepared by Geotechnical Engineer.

.2 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to work area.

.2 Conduct Ground Penetrating Radar (GPR) in all areas of excavation to identify location and approximate depth of services.

.3 Conduct a "Hydro-Vac" excavation of utilities identified on Control documents and:

.1 Conduct a survey and record vertical and horizontal location of service in UTM-10 NAD 86 coordinate and geodetic elevation format.

.2 Record the diameter of piping, width and depth of concrete ducting and size of structures.

.4 Arrange with appropriate authority for relocation of buried services that interfere with execution of work.

.5 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.6 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.7 Prior to beginning excavation Work, notify applicable Departmental Representative to establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.

.8 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.9 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.

.10 Record location of maintained, re-routed and abandoned underground lines on project record drawings.

.11 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

1.7 Existing Conditions (Cont'd)

.3 (Cont'd)

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

1.8 Measurement and Payment

.1 There will be no measurement for the work in this Section.

.2 Payment will be under the Civil Works items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART - 2 PRODUCTS

2.1 Materials

.1 Granular Base and Granular Sub-Base material: properties in accordance with the following requirements:

.1 Crushed or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

2.1 Materials (Cont'd)

.1 (Cont'd)

.3 Table:

Sieve Designation	% Passing Crushed Well Graded Base (WGB)	% Passing Select Granular Sub Base (SGSB)
150 mm	–	–
75 mm	–	100
50 mm	–	–
37.5 mm	–	–
25 mm	100	–
19 mm	80–100	15–100
12.5 mm	–	–
9.5 mm	50–85	0–100
4.75 mm	35–70	–
2.36 mm	25–50	–
1.18 mm	15–35	–
0.600 mm	–	0–100
0.425 mm	–	–
0.300 mm	5–20	0–15
0.075 mm	0–5	0–5

.2 150mm Minus Crushed Angular Rock Granular Base and Granular Sub-Base material: properties in accordance with the following requirements:

.1 Crushed rock.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.3 Table:

Sieve Designation	% Passing
150 mm	100
75 mm	80–95
50 mm	–
37.5 mm	60–90
25 mm	–
19 mm	35–85
12.5 mm	–
9.5 mm	25–80
4.75 mm	15–60
2.36 mm	–
1.18 mm	–
0.600 mm	–
0.425 mm	–
0.300 mm	3–35
0.075 mm	0–10

.3 Unshrinkable fill: proportioned and mixed to provide:

2.1 Materials (Cont'd)

.3 (Cont'd)
.1 Maximum compressive strength of 0.4 MPa at 28 days.
.2 Maximum cement content of 25 kg/m; to CSA-A3001, Type GU.
.3 Minimum strength of 0.07MPa at 24 h.
.4 Concrete aggregates: to CSA-A23.1/A23.2.
.5 Cement: Type GU.
.6 Slump: 160 to 200 mm.

PART 3 - EXECUTION

3.1 Temporary Erosion and Sedimentation Control

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 Preparation/ Protection

.1 Protect existing features in accordance with applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

3.3 Preparation/ Protection (Cont'd)

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative.

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

3.4 Stripping of Topsoil

.1 Begin topsoil stripping of areas as indicated after area has been cleared of brush, weeds, grasses and removed from site.

.2 Strip topsoil to depths as indicated.
.1 Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Departmental Representative.
.1 Stockpile height not to exceed 2 m and should be protected from erosion.

.4 Dispose of unused topsoil as directed by Departmental Representative.

3.5 Soil Stockpiling Facilities

.1 Provide, maintain, and operate storage/stockpiling facilities as required. Locate stockpiles to minimize handling. Location to be coordinated with and approved by Departmental Representative.

.2 Install 6-mil polyethylene liner below proposed stockpile locations to prevent contact between stockpile material and ground.

.3 Stockpile granular materials in manner to prevent segregation.

.4 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

.5 Equip facility with tarps capable of covering all stockpiled material until Departmental Representative advises Contractor to dispose of material offsite.

3.5 Soil Stockpiling Facilities (Cont'd)

.6 Contractor will ensure that stockpiled material not being actively added to is covered with tarps and these are secured so they do not blow off. Any stockpiles not fully covered by tarps must be fixed immediately.

3.6 Cofferdams, Shoring, Bracing and Underpinning

.1 Contractor is responsible for the protection and temporary support of all project excavations, with special attention to work adjacent to crane rails and existing structures and in tidally influenced zones.

.2 Contractor to retain and pay for services of professional engineer registered in the Province of British Columbia for design and review of temporary works related to underpinning and bracing of existing structure and excavations.

.3 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 33 – Health and Safety Requirements and WorkSafe BC.
.1 Where conditions are unstable, Contractor to retain and pay costs for geotechnical engineer to review condition and provide recommendations

.4 Obtain permit from authority having jurisdiction for temporary diversion of water course.

.5 Construct temporary Works to depths, heights and locations as indicated by Contractor

.6 During backfill operation:
.1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
.2 Do not remove bracing until backfilling has reached respective levels of such bracing.
.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.7 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.8 Upon completion of substructure construction:
.1 Remove cofferdams, shoring and bracing.

3.7 Dewatering and Heave Prevention

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut- offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved runoff areas or containment facilities and in manner not detrimental to public and private property, or portion of Work completed or under construction.
.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

.7 Refer to Section 01 35 43 - Environmental Procedure for more details on dewatering activities.

3.8 Excavation

.1 Advise Departmental Representative at least 7 days in advance of excavation operations. Excavate to lines, grades, elevations and dimensions as indicated.

.2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation offsite.

.3 Excavation must not interfere with bearing capacity of adjacent foundations and slabs. Contractor to notify Departmental Representative immediately where undermining of slabs of foundations occurs. Contractor responsible for devising and executing a remediation plan for filling all voids associated with undermining of slabs and foundations.

3.8 Excavation (Cont'd)

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw, as directed by the project Arborist.
.2 Provide 24 hours-notice to Departmental Representative of need for Arborist on site.

.5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations. No more than 5 m of trench may be exposed at end of day's operation and must be securely covered. Road plates are to be used to cover exposed excavations in areas of vehicular travel.

.6 Restrict vehicle operations directly adjacent to open trenches.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Departmental Representative when bottom of excavation is reached.

.10 Obtain Departmental Representative approval of completed excavation.

.11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.12 Correct unauthorized over-excavation as follows:
.1 Fill with granular base material to not less than 95% Modified Proctor Density.

.13 Hand trim, make firm and remove loose material and debris from excavations.
.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
.2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

.14 Refer to Section 01 35 43 - Environmental Procedure for more details on excavation.

3.9 Bedding and Surround of Underground Services

.1 Place and compact granular material for bedding and surround of underground services as indicated.

.2 Place bedding and surround material in unfrozen condition.

3.10 Backfilling

.1 Do not proceed with backfilling operations until completion of following:
.1 Departmental Representative has inspected and approved installations.
.2 Departmental Representative has inspected and approved of construction below finish grade.
.3 Inspection, testing, approval, and recording location of underground utilities.
.4 Removal of concrete formwork.
.5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:
.1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
.2 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.150 m.
.3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.

.6 Place unshrinkable fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

.8 Install drainage system in backfill as indicated.

3.10 Backfilling (Cont'd)

.9 All subbase and base fills to be compacted to a 95% modified proctor maximum dry density and densities proven through quality control testing using a nuclear densometer. Nuclear density testing is to be completed at a minimum of once every 25 linear meters per lift. The contractor is required to engage a 3rd party for nuclear density testing and pay for the associated cost of this testing. All test results shall be sent to the Departmental Representative for review. Nuclear density testing will be considered incidental to the work and no additional payment will be made.

3.11 Restoration

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 35 43 - Environmental Procedures, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil as indicated.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

.7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

PART 1 - GENERAL

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 the riprap and no additional payment shall be made.

1.3 Related Sections

.1 Section 31 00 99 - Earthworks for Minor Works.

.2 Section 31 37 10 - Riprap.

1.4 References

.1 American Society for Testing and Materials (ASTM).
.1 ASTM D4491-99a (2014), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
.2 ASTM D4595-17, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
.3 ASTM D4716/D4716M-20, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
.4 ASTM D4751-21A, 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.

1.4 References (Cont'd)

.2 (Cont'd)
.2 (Cont'd)
.5 No. 10-[94], Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.3 CSA International.
.1 CSA G40.20/G40.21-13 (R2018), 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.

1.6 Delivery, Storage and Handling (Cont'd)

.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.

1.7 Measurement and Payment

.1 There will be no measurement for the work in this Section.

PART 2 - PRODUCTS

2.1 Materials

.1 Geotextile: Nonwoven synthetic fiber 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 Minimum physical properties for nonwoven geotextile:
.1 Grab Strength: 900 N
.2 Elongation (Failure): 50%
.3 CBR Puncture Strength: 2300 N
.4 Trapezoidal Tear: 350 N

.3 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A123/A123M.

.4 Factory seams: sewn in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

3.1 Examination (Cont'd)

.1 (Cont'd)

.3 Proceed only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Installation

.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 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.

.6 After installation, cover with overlying layer within 4 hours of placement.

.7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.3 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 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. Refer to Section 01 35 43 - Environmental Procedure for more details on waste management.

3.4 Protection .4 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Riprap.

1.2 Riprap - Class 100 kg

.1 Measurement: Based on the tonne using truck tickets supplied from the pit source.

.2 Payment: Unit price per tonne. Payment shall include complete preparation including environmental protection, stripping, excavation, grading, material and installation cost for the geotextile, material and installation cost for the riprap, clearing of work area after installation, and any ancillary work. Payment for riprap beyond the thickness shown on the drawing shall not be considered unless previously approved by the Departmental Representative.

1.3 Related Sections

.1 Section 31 00 99 - Earthworks for Minor Works.

.2 Section 31 32 19 - Geotextiles.

1.4 Waste Management and Disposal

.1 In accordance with Section 01 74 19 - Waste Management and Disposal. Also refer to Section 01 35 43 - Environmental Procedure.

PART 2 - PRODUCTS

2.1 Stone

.1 Rock should meet Class 100 kg riprap requirements as per the 2020 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 size distribution as specified in the Standard Specifications for Highway Construction.

2.1 Stone (Cont'd)

.3 Riprap that does not meet the required specification should not be used without the written permission of the Departmental Representative.

PART 3 - EXECUTION

3.1 Placing

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

.2 Fine grade area to be protected with riprap to uniform, even surface. Fill depressions with excavated material and compact to provide firm bed.

.3 Place riprap to thickness and details as indicated.

.4 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 This Section describes the requirements for installation and acceptance criteria of all piles. The design drawings provide specific requirements including embedment length and material specifications. Additionally, and in the absence of specific direction on the design drawings, the requirements of this Section shall be used as appropriate.

1.2 Related Sections

.1 Section 01 33 00 – Submittal Procedures

.2 Section 01 35 43 – Environmental Procedures

1.3 Measurement and Payment Procedures

.1 Measurement will be per linear metre based on installed finished lengths of pile. Pile removed by fresh-heading will not be included in payment.

1.4 Reference Standards

.1 British Columbia Marine and Pile Driving Contractors Association (BCMPDCA)
.1 BCMPDCA Best Management Practices for Pile Driving and Related Operations

.2 API 5L, Specification for Line Pipe

.3 ASTM A252/A252M-19, Specification for Welded and Seamless Steel Pipe Piles

.4 CSA W59-18, Welded Steel Construction (Metal Arc Welding)

.5 CAN/CSA – G40.21, General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel

.6 CAN/CSA – W47.1, Certification of Companies for Fusion Welding of Steel Structures

.7 ASTM D 4945, Standard Test Method for High-Strain Dynamic Testing of Deep Foundations

1.4 Reference Standards (Cont'd)

.8 ASTM D 3966, Standard Test Methods for Deep Foundations Under Lateral Load

1.5 Submittals

.1 All submittals shall be made in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit details in a consolidated manner and a narrative on procedures, including mobilizing equipment, sequencing, erection and temporary restraints, schedule, and quality control, in accordance with the Work Plan requirements of proposed pile driving to the Departmental Representative for review a minimum of 14 days prior to mobilization of equipment. Include clear reference to proposed environmental/biological protection measures that relate to pile installation.

.3 Submit for review the equipment that shall be used for pile driving, such as vibratory and hammers and provide manufacturer's name, type,rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions. For other Non-impact methods of installation such as auguring, jacking, vibratory hammers or other means: give full details of characteristics necessary to evaluate performance. Submit to the Departmental Representative for review a minimum of 14 days prior to mobilization of equipment.

.4 Submit for review QC and QA records demonstrating that pile material and fabrication are in compliance with this Section. Including, but not limited to:

.1 Steel producer's certificates that material meets the specifications and any additional testing required by this section.

.2 Shop drawings of weld design for splicing and procedures to the Departmental Representative for approval prior to making any splices; and,

.3 Evidence to the Departmental Representative of any welding operators to be employed for the Work, are currently qualified by C.W.B. in the processes in which they are to be involved. Expired welding certificates shall not be acceptable for qualifications, ONLY current valid certifications will be recognized by the Departmental Representative.

1.5 Submittals (Cont'd)

.5 Provide the Departmental Representative with survey data to confirm that piles have not moved during driving of adjacent piles.

.6 Submit QC and QA records demonstrating that the pile installations are in compliance with this Section, including a Bridge Construction Pile Driving Record (Form H0053) after the pile installation is complete.

1.6 Quality Management

.1 General

.1 The Contractor shall perform all work in accordance with the approved Quality Plan. The procedures, personnel, products, methods, and submittals noted in this section shall be considered a minimum requirement of that plan. Additional submittals, checklists, procedures and methods may be required to meet the requirements of the Contract and fulfil the obligations of the Quality Plan.

.2 The Contractor shall hold a preconstruction meeting with the Departmental Representative to review the Contractor's work method and the Inspection and Test Plan for the installation of the driven piles. The meeting shall be scheduled by the Contractor to allow adequate time for review and comment from the Departmental Representative and to allow time to implement required modifications prior to construction. The Departmental Representative will submit comments and recommendations, if any, no later than 14 days after the meeting.

.2 Protection

.1 Take all necessary precautions, including the provision of suitable screening fences or barriers to protect public, existing structures, facilities, and services from damage due to the pile installation and associated works.

.2 Complete pile driving in conformance with BCMPDCA Best Management Practices for Pile Driving and Related Operations.

.3 Cleaning and environmental protections in accordance with Section 01 35 43 – Environmental procedures.

.3 Pile Driving Requirements

1.6 Quality Management (Cont'd)

.3 (Cont'd)

.1 The Contractor shall review all information pertinent to the work, visit the site and carry out all necessary examinations and shall make independent interpretations of all available information regarding the requirements, limitations, and constraints of the Work and the conditions under which the Work will be performed.

.2 The Contractor shall promptly notify the Departmental Representative of any ambiguity, inconsistency, or error in the Contract documents that may be discovered.

.4 Quality Control

.1 It shall be the Contractor's responsibility to undertake all quality control and quality assurance testing necessary to ensure that the Work is performed in accordance with the Contract Documents.

.5 On-Site Quality Assurance

.1 The Departmental Representative may develop quality assurance reports during pile installation, including but not be limited to detailed and accurate pile and casing installation logs and survey data in accordance with standard practice. Quality Assurance work does not relieve the Contractor from the responsibility for proper installation and maintenance of records for all piles.

.2 Contractor to mark piles with perimeter markings visible for observation by the Departmental Representative.

1.7 Pile Driving Criteria & Site Conditions

.1 Subsurface investigation reports are available for inspection and independent interpretation by the Contractor. The Departmental Representative assumes no responsibility for the contractor's use, or reliance upon any information included in these reports.

.2 The information provided in the geotechnical reports shall not be considered as indicative of the construction methods and procedures appropriate for the work indicated in the drawings and specifications. The subsurface information provided in the geotechnical reports is intended to provide general representation of the materials which may be encountered.

1.7 Pile Driving Criteria & Site Conditions (Cont'd)

.3 Notify the Departmental Representative in writing if subsurface conditions at the site differ from those indicated and obtain further instructions from the Departmental Representative.

.4 In general, the site is underlain by 5.5 m of silt or clay capped with a layer of coarse-grained fill and underlain by silty sand till. The upper zone of soil may include debris related to previous installations or site activities.

.1 It is the Contractor's responsibility to fully assess the appropriate pile installation method.

.2 The Contractor shall employ whatever methods that are necessary to ensure proper installation of pile foundations to the Departmental Representative's satisfaction. The contractor is responsible for installing all piles to the minimum penetration and elevations as specified on the Drawings.

.5 Jetting shall not be used for pile installation.

.6 Pile design is governed by the lateral and axial resistance within the till and the need to achieve minimum embedment into the till material encountered below a depth of 5.5 m. Accordingly, it is acceptable from a geotechnical perspective to advance piles with vibratory method to the top of the till and driving within the till and, if necessary, restrikes after pore pressure dissipation.

1.8 Measurement and Payment

.1 Measurement for this work will be by the linear metre.

.2 Payment will be under the Unit Price for Supply of Steel Pipe Piles and Installation of Steel Pipe Piles and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 – PRODUCTS

2.1 Equipment

.1 The Contractor shall select equipment suitable for installing piles through the surficial very dense sandy gravel fill with variable fines into the underlying soils without damage to the pile and all other material, equipment and labour necessary to install the piling without exceeding the yield strength of the steel as required by the Contract Documents. Pile installation equipment shall be capable of installing the pile to the estimated pile tip elevations and to a factored capacity of three times the maximum unfactored design load. The Contractor is fully responsible for selection of equipment for the satisfactory installation of piles and conformance to specifications.

.2 All pile driving equipment shall be in good mechanical condition and shall be capable of delivering the manufacturer's rated energy output and shall be operated in accordance with the manufacturer's instructions. If requested by the Departmental Representative, the Contractor shall obtain, fit, and operate a properly calibrated indicator diagram recorder so as to verify the hammer cylinder pressures and other equipment characteristics.

.3 The pile hammer shall have sufficient capacity to mobilize the driven pile enough to obtain meaning full results from High-Strain Dynamic Tests (hereafter called Dynamic Testing in this Section). Sufficient mobilization of the pile is defined as either a penetration of 3 mm or more per blow.

PART 3 – EXECUTION

3.1 Preparation

.1 Protect public and construction personnel, adjacent structures and Work of other Contractors from hazards attributable to pile driving operations.

.2 Ensure that site conditions are adequate to support pile installation operation, including bank stability. Make provision for access and support of piling equipment during performance of work.

3.1 Preparation (Cont'd)

.3 Remove existing visible obstacles prior to installing piles.

.4 The Contractor shall be responsible for providing suitable control of wastewater discharge and any necessary quality control testing. This work shall include the suitable off-site disposal of all sediment or disturbed material resulting from the foundation installation work.

.5 Use highly visible, contrasting colour of paint to clearly mark each pile with its number and its overall length. In addition, clearly mark each pile at intervals of 300 mm along its full length prior to driving. As a minimum, label every fifth mark with the appropriate value from pile tip.

.6 Piles shall be securely held in position during installation and shall be installed in the locations shown on the drawings. The Contractor is responsible for laying out the piles as shown on the design drawings.

3.2 Pile Driving

.1 Each pile is to be installed open ended by advancing to the specified embedment elevation indicated on the drawings, or as otherwise directed by the Departmental Representative, in order to achieve the necessary compressive, uplift, and lateral capacities. A minimum penetration depth of 2 m into till must be achieved to meet lateral loading requirements. Axial loading requirements may be deemed to have been met prior to the elevation shown on the drawings if practical refusal on an obstacle is encountered while driving and the minimum embedment into the till (2 m) has been met. Axial capacity to be confirmed by PDA testing a minimum of one pile per abutment driven to the embedment elevation shown on the drawings and any pile that does not achieve this embedment elevation. Cleanout and churning of piles will not be permitted except under extreme conditions (ie. where obstructions are encountered, not for dense soil conditions) and only under specific approval of the Departmental Representative. Contractor to submit a procedure for approval if churning is required. If obstructions are encountered, the preferred procedure will be to excavate to remove the obstruction where possible.

.2 All piles are to be installed open ended.

3.2 Pile Driving (Cont'd)

.3 Use of water jetting for driving piling is not permitted.

.4 Install all piles continuously to final penetration. Final set requirements will be established by the Departmental Representative and will depend on the hammer efficiency. At minimum, the final 4 meters are to be advanced by driving with an impact hammer. If installation is interrupted before final penetration is reached, do not take the record for final penetration until at least 0.3 metres of penetration has been obtained after resumption of installation.

.5 Pile driver leads (if used) shall be constructed in a manner which affords freedom of movement of the hammer and they shall be held in position by guys, stiff braces or by attaching to cranes or derricks so as to ensure proper support for the pile during driving. Hammer blows at all times shall be in direct line with the axis of the pile. Inclined leads shall be used for driving batter piles. Pile driving leads shall be of sufficient length that the use of a follower is not required. Ensure that the leads of the pile driving equipment do not exert lateral forces on the piles during driving. No adjustment of a possible misalignment will be permitted during driving, except at the very initial stage.

.6 Hold piles securely and accurately in position while driving. If a hammer is used, deliver hammer blows in direct axis of pile. Reinforce pile heads if necessary.

.7 Piles shall be installed without excessive deformation of the head of the pile. The head of the pile shall be cut square. A driving cap shall be provided to hold the axis of the pile in line with the axis of the hammer if a hammer is used. Any pile so damaged as to be unfit for the use for which it is intended, or any pile that cannot be brought within tolerance for location will be rejected. A rejected pile shall be extracted and replaced by a new pile. Costs associated with rejected piles shall the responsibility of the Contractor. Sufficient lengths of pile above cut-off shall be allowed so that no part of the head of the pile damaged during installation remains in the work.

.8 The Contractor shall re-drive piles which heave during driving of adjacent piles.

3.2 Pile Driving (Cont'd)

.9 Remove obvious sharp objects such as rip rap boulders (if present) or remnants of former structures etc.

.10 The Contractor shall provide 48 hours notice of pile driving commencement so that the Departmental Representative can witness that the pile installation criteria has been achieved.

3.3 Field Splice

.1 Field splicing of steel piles is not permitted.

3.4 Pile Cut Off and Completion

.1 After installation, all piles shall be cut to level at the elevations shown on the Drawings. Sufficient length above cut off shall be allowed so that no part of the head of the pile damaged or deformed during installation remains in the work. Cut offs are to be to a true even plane once the installed pile length has been accepted by the Departmental Representative and, if deemed necessary, the pile capacity has been proved by Dynamic testing.

.2 Plumb piles shall be cut in a flat plane at right angles to the longitudinal axis of the pile. A suitable guide shall be used to aid in cutting piles so that the cut off plane is flat to within 2 mm. If a satisfactory handheld cut cannot be obtained, the Contractor shall cut the pile with an automatic cutter operated so as to leave a true square cut.

.3 For safety, all steel pipe piles shall be temporarily capped after installation.

3.5 Temporary Restraint of Driven Piles

.1 Contractor shall furnish sufficient labour and materials to adequately secure the piles of any given group against motion relative to others in the group.

3.6 Pile Acceptance Criteria & Damaged or Defective Piles

.1 Unless otherwise indicated on the Drawings, the tolerance limits on installed piles shall be as follows and shall be met after all piles that are driven:

.1 Pile heads shall be within 75 mm, measured laterally, of locations indicated.

.2 Piles shall not be more than 1/150 of length out of alignment.

3.6 Pile Acceptance Criteria & Damaged or Defective Piles (Cont'd)

.2 The integrity of the piles shall remain at all times the responsibility of the Contractor. Should any pile be damaged by overdriving or by pile installation techniques or other causes including attempting to pass an obstruction or be out of position as a result of improper survey or driving practice, drive an extra pile or piles in its place as directed by the Departmental Representative.

.1 No extra compensation will be made for removing and replacing piles, driving extra piles or other work made necessary through rejection of a defective or damaged pile.

.3 Installation of each pile will be subject to the approval of the Departmental Representative, who will be sole judge of acceptability of each pile.

.4 Do not remove equipment from the site until the Departmental Representative has approved the installation of all piles.

.5 Pile Driving Analyzer (PDA) Testing shall be conducted on a minimum of one pile at each abutment driven to the embedment elevation and on any pile not driven to the embedment elevation due to an obstruction. PDA testing will be completed in accordance with ASTM D 4945.

.1 The Contractor shall allow in their schedule and installation program for the assessment of pile capacities with PDA testing. The contractor is to co-ordinate and facilitate completion of the PDA testing at no additional cost to the Owner. PDA results will be provided to the Departmental Representative for review prior to acceptance of the piles.

.2 Initial pile capacities will be affected by pore pressures generated during installation due to some relatively fine-grained deposits and it will be desirable to conduct PDA load testing after a "set-up period following initial driving (i.e. the longer the better). The contractor is to advise how pile set-up (i.e. dissipation of excess pore pressure) and related PDA testing can be accommodated in their construction schedule.

3.6 Pile Acceptance Criteria & Damaged or Defective Piles (Cont'd)

.6 If in the judgement of the Departmental Representative, the Contractor is unable to properly complete installation of any pile by resorting to the reasonable methods described above, the Departmental Representative may order an additional pile or piles to be installed for which the Contractor will be paid in accordance with provisions of the contract for evaluation of changes to the work.

.1 Piles abandoned or installed out of place or alignment because of obstructions, as determined by the Departmental Representative, will be paid for as completed piles.

.2 Such abandoned piles shall be removed if required by the Departmental Representative and their removal paid for in accordance with the provisions of the Contract for evaluation of changes to the work.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 33 00 - Submittal Procedures.

1.2 Reference Standards

.1 ASTM International
.1 ASTM C117-17, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C131/C131M-20, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
.3 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN- m/m^3).
.5 ASTM D1557-12e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).
.6 ASTM D1883-16, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
.7 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 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.

.4 Master Municipal Contract Documents (MMCD), Volume II - 2019, British Columbia.

1.3 Action and Information Submittals

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

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit certificates for proposed granular materials to confirm compliance with the Canadian Council of Ministers of the Environment (CCME) Residential/Parkland (RL/PL) Land Usage Soil Quality Guidelines.

1.4 Delivery, Storage and Handling

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

1.5 Measurement and Payment

.1 Measurement: Based on the tonne using truck tickets supplied from the pit source.

.2 Payment will be under the appropriate Civil Works pay items and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.3 No payment will be made for material that is wasted and not incorporated into the works as a result of transportation, handling, temporary storage or stockpilling, nor will any payment be made for material used for temporary works such as laydown areas, crane pads, and other uses on-site. The Departmental Representative reserves the right to complete a final neat line survey of the as-constructed embankments and any material beyond the design limits will be deducted from payment.If a quantity adjustment is required based on the final survey, the unit weight for all granular materials will be calculated using 2,200 kg/m3.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular Base and Granular Sub-Base material: properties in accordance with the following requirements:
.1 Crushed or screened stone, gravel or sand.
.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
.3 Refer to Clause 2.1.3 of Section 31 23 33.01 - Excavation, Trenching and Backfilling for aggregate gradation.

PART 3 - EXECUTION

3.1 Preparation

.1 Temporary Erosion and Sedimentation Control:
.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 Placement and Installation

.1 Place granular base after sub-base and subgrade surface is inspected and approved in writing by Departmental Representative.

.2 Placing:
.1 Construct granular base to depth and grade in areas indicated.
.2 Ensure no frozen material is placed.
.3 Place material only on clean unfrozen surface, free from snow and ice.
.4 Begin spreading base material on crown line or on high side of one-way slope.

3.2 Placement and Installation (Cont'd)

.2 (Cont'd)
.5 Place material using methods which do not lead to segregation or degradation of aggregate.
.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
.1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
.8 Remove and replace that portion of layer in which material becomes segregated during spreading.

.3 Compaction Equipment:
.1 Ensure compaction equipment is capable of obtaining required material densities.

.4 Compacting:
.1 Compact to density not less than 95% Modified Proctor Density to ASTM D1557 or as specified on contract documents.
.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
.3 Apply water as necessary during compacting to obtain specified density.
.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.5 Proof rolling:
.1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
.2 Obtain written approval from Departmental Representative to use non-standard proof rolling equipment.
.3 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
.4 Where proof rolling reveals areas of defective subgrade:
.1 Remove base, sub-base and subgrade material to depth and extent as directed by Departmental Representative.
.2 Backfill excavated subgrade with common material and compact.

3.2 Placement and Installation (Cont'd)

.5 (Cont'd)

.4 (Cont'd)

.3 Replace sub-base material and compact.

.4 Replace base material and compact in accordance with this Section.

.5 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with this section at no extra cost.

3.3 Site Tolerances

.1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.4 Protection

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

3.5 Cleaning

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 33 00 Submittal Procedures.

.2 Section 01 35 43 Environmental Procedures.

1.2 Measurement Procedures

.1 Measurement for stripping will be by the cubic metre based on the area and depth of stripping indicated on the contract drawings and as agreed to by the Departmental Representative. Quantity verification by survey will be the Contractor's responsibility if deemed necessary.

.2 Measure finish grading in square metres from actual surface measurements as determined by Departmental Representative.

1.3 Payment

.1 Payment for stripping shall be per m3 based on the unit price table. Payment shall include all material, labour and equipment required to carry out the stripping as indicated in the contract drawings, including but not limited to: costs associated with stockpiling on site, protecting from contamination or compaction and hauling and disposing of excess stripped material at an off site location.

.2 Payment for topsoil placement and grading shall be per m2 based on the unit price table. The thickness of topsoil shall be 150mm. Payment shall include all preparation and finished grading. Contractor shall pay for cost of testing.

1.4 References

.1 Agriculture and Agri-Food Canada
.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment
.1 PN1340-2005, Guidelines for Compost Quality.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water.

1.4 References (Cont'd)

.3 (Cont'd)
.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 Definitions

.1 Compost:
.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss on Ignition (LOI) test.
.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)) and contain no toxic or growth inhibiting contaminates.
.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.6 Action and Informational Submittals

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

.2 Quality control submittals:
.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 Quality Assurance

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 11 55 - General Instructions.

1.8 Waste Management and Disposal

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

1.8 Waste Management and Disposal (Cont'd)

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
.1 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

.3 Refer to Section 01 74 19 - Waste Management and Disposal for more details.

PART 2 - PRODUCTS

2.1 Topsoil

.1 Topsoil for seeded areas: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.
.1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.

.2 Contain no toxic elements or growth inhibiting materials.

.3 Finished surface free from:
.1 Debris and stones over 50 mm diameter.
.2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.4 Consistence: friable when moist.

2.2 Soil Amendments

.1 Fertilizer:
.1 Fertility: major soil nutrients present in following amounts:
.2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
.3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
.4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
.5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
.6 Ph value: 6.5 to 8.0.

2.2 Soil Amendments (Cont'd)

.2 Peat moss:
.1 Derived from partially decomposed species of Sphagnum Mosses.
.2 Elastic and homogeneous, brown in colour.
.3 Free of wood and deleterious material which could prohibit growth.
.4 Shredded particle minimum size: 5 mm.

.3 Sand: washed coarse silica sand, medium to course textured.

.4 Organic matter: compost Category A, in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Limestone:
.1 Ground agricultural limestone.
.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 Source Quality Control

.1 Advise Departmental Representative of sources of topsoil, manufactured topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to supply topsoil as specified.

.3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

.4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
.1 Soil sampling, testing and analysis to be in accordance with Provincial standards

PART 3 - EXECUTION

3.1 Temporary Erosion and Sediment Control

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 Stripping of Soil

.1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush, weeds, grasses and removed from site.

.2 Strip topsoil to depths as directed by Departmental Representative.
.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative.
.1 Stockpile height not to exceed 2 m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.3 Preparation of Existing grade

.1 Verify that grades are correct.
.1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

3.3 Preparation of Existing grade (Cont'd)

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
.2 Remove debris which protrudes more than 75 mm above surface.
.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 Placing and Spreading of Topsoil/ Planting Soil

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after settlement.
.1 150 mm for seeded areas.
.2 135 mm for sodded areas.
.3 300 mm for flower beds.
.4 500 mm for shrub beds

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 Finish Grading

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.
.1 Prepare loose friable bed by means of cultivation and subsequent raking.

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

3.6 Acceptance

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

3.7 Surplus Material

.1 Dispose of materials except topsoil not required off site.

3.8 Cleaning

.1 Proceed in accordance with Section 01 35 43 – Environmental Procedures.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 Administrative Requirements

.1 Scheduling:
.1 Schedule hydraulic seeding using grass mixtures and mixtures containing Certified Canada No. 1 as per items listed below.
.1 Schedule hydraulic seeding to coincide with preparation of soil surface.
.2 All seeding shall be done during calm weather and on soil that is free of frost, snow and standing water, when seasonal conditions are likely to ensure successful germination and continued growth of all species of seed in the grass mix.
.3 Schedule hydraulic seeding using grass mixtures after frost has left ground and before June 15th or between September 1st and October 15th. Note that unanticipated variances in weather may require that alternate dates be considered.

1.2 References

.1 Canada Seed Act.

.2 British Columbia Landscape Standard, 6th edition, 2001.

1.3 Delivery, Storage and Handling

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

.2 Seed shall be packed and delivered in original containers clearing showing:
.1 Name of supplier
.2 Analysis of seed mixture
.3 Percentage of pure seed
.4 Year of production
.5 Net weight (mass)
.6 Date and location of bagging

1.4 Action and Informational Submittals

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

.2 Product Data:

1.4 Action and Informational Submittals (Cont'd)

.2 (Cont'd)
.1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
.2 Submit copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements 01 35 43 - Environmental Procedures.

.3 Submit in writing 7 days prior to commencing work:
.1 Volume capacity of hydraulic seeder in litres.
.2 Amount of material to be used per tank based on volume.
.3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

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

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

1.5 Warranty

.1 Contractor hereby warrants that seeding will remain free of defects in accordance with General Conditions, but for 24 months.
.1 End-of-warranty inspection will be conducted by Departmental Representative.

1.6 Measurement and Payment

.1 Measurement for this work will be per square metre.

.2 Payment will be under the unit price and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

PART 2 - PRODUCTS

2.1 Materials

.1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.

2.1 Materials (Cont'd)

.1 (Cont'd)

.1 Grass seed for all seeded lawn areas shall meet the requirements of the Canada Seed Act for Certified Canada No. 1 Seed

.1 Mixture composition:

.1 30% Kentucky Bluegrass

.2 30% Hard Fescue

.3 40% Perennial Rye Grass

.2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:

.1 Type I mulch:

.1 Made from wood cellulose fibre.

.2 Organic matter content: 95% plus or minus 0.5%.

.3 Value of pH: 6.0.

.4 Potential water absorption: 900%.

.2 Type II mulch:

.1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.

.2 Tackifier: water soluble vegetable carbohydrate powder.

.3 Water: free of impurities that would inhibit germination and growth.

.4 Fertilizer:

.1 The type, formulation and rate of application of fertilizer shall be as recommended by the laboratory soil specialist on the basis of tests of the growing medium.

.5 Inoculants: inoculant containers to be tagged with expiry date.

PART 3 - EXECUTION

3.1 Examination

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for hydraulic seeding in accordance with manufacturer's written instructions.

3.1 Examination (Cont'd)

.1 (Cont'd)
.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 Protection of Existing Conditions

.1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.

.2 Immediately remove any material sprayed where not intended as directed by Departmental Representative.

3.3 Preparation of Surfaces

.1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.

.2 Fine grade areas to be seeded free of humps and hollows.
.1 Ensure areas are free of deleterious and refuse materials.

.3 Cultivated areas identified as requiring cultivation to depth of 25 mm.

.4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.

.5 Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

3.4 Slurry Application

.1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.

.2 Hydraulic seeding equipment:
.1 Slurry tank.

3.4 Slurry Application (Cont'd)

.2 (Cont'd)
.2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method. Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
.3 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".

.3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
.1 Using correct nozzle for application.
.2 Using hoses for surfaces difficult to reach and to control application.

.4 Blend application 300 mm into adjacent grass areas or sodded areas to form uniform surfaces.

.5 Re-apply where application is not uniform.

.6 Remove slurry from items and areas not designated to be sprayed.

3.5 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 35 43 - Environmental Procedures.
.1 Leave Work area clean at end of each day.
.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 35 43 - Environmental Procedures.
.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
.2 Divert unused fertilizer from landfill to official hazardous material collections site.

3.6 Protection

.1 Protect seeded areas from trespass until plants are established.

3.6 Protection (Cont'd)

.2 Remove protection devices as directed by Departmental Representative.

3.7 Maintenance During Establishment Period

.1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.

.2 Perform following operations from time of seed application until acceptance by Departmental Representative.

.3 Grass Mixture:

.1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.2 Mow grass to 60 mm whenever it reaches height of 100 mm. Remove clippings which will smother grass offsite.

.3 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles; water in well.

.4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.

.5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.8 Acceptance

.1 Seeded areas will be accepted by Departmental Representative provided that:

.1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.

.2 Areas have been mown at least twice.

.3 Areas have been fertilized.

.2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.9 Maintenance During Warranty Period

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

.2 Mow areas seeded, remove clippings that will smother grassed areas, offsite.

3.9 Maintenance During Warranty Period (Cont'd)

.1 (Cont'd)

.3 Fertilize seeded areas in accordance with fertilizing program.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 33 00 - Submittal Procedure

1.2 Measurement and Payment

.1 Measure supply and erection of roadside steel Thrie-beam guide rail including posts and necessary hardware in metres of guide rail installed and measured from outer tips of steel Thrie-beam guide rail, including guide rail used in anchorages and terminal sections.

.2 Payment will be as per the unit price table and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

1.3 Reference Standards

.1 American Association of State Highway and Transportation Officials (AASHTO).
.1 AASHTO M180-18, Standard Specification for Corrugated Sheet Steel Beams for Highway Guardrails.
.2 AASHTO-ARTBA-AGC Joint Committee "A Guide to Standardized Highway Barrier Hardware, 2nd Edition" Task Force 13.
.3 AASHTO M120-08, Standard Specification for Zinc.
.4 AASHTO T65M/T65-19, Standard Method of Test for Mass of Coating on Iron and Steel Atricles with Zinc or Zinc-Alloy Coatings.
.5 AASHTO M30-15 (R2019), Standard Specification for Zinc-Coated Steel Wire Rope and Fittings for Highway Guardrail.

.2 ASTM International.
.1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
.3 ASTM B6-18, Standard Specification for Zinc.
.4 ASTM A90/A90M-21, Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

1.3 Reference Standards (Cont'd)

.2 (Cont'd)

.5 ASTM E376-19, Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy Current Testing Methods.

.6 ASTM A563/A563M-21a, Standard Specification for Carbon and Alloy Steel Nuts.

.7 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.8 ASTM A36/A36M-19, Standard Specification for Carbon Structural Steel.

.9 ASTM A53/A53M-20, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

.3 CSA Group (CSA).

.1 CAN/CSA O80 Series-21, Wood Preservation.

.2 CAN/CSA G164-18, Hot-Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel.

.4 CAN/CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.

.4 British Columbia Standard Specifications for Highway Construction 2020.

1.4 Action and Informational Submittals

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for guide rail, wood, and coatings and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.

.4 Sustainable Design Submittals: Not Required

1.5 Quality Assurance

.1 Sustainable Standards Certification.
.1 Certified Wood: submit listing of wood products and materials used in accordance with CSA O80.

1.6 Delivery, Storage and Handling

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect guide rails from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel Thrie-beam guide rail as indicated and as follows:
.1 Steel rail and terminal sections: to AASHTO M180, class A Type 2 zinc coated. The zinc coating shall have an average of 1220 g/m2 and 1100 g/m2 for individual minimum.
.2 Shape shall be SGM09 installation accurately formed to profile, dimensions and tolerances of AASHTO M-180 with overall cross sections of 508 mm x 85 mm respectively.
.3 Length - Normally 3.81m, nominal length beams 4.19m, +0mm/-75mm overall will be required.
.4 Punchings - Designed as 7.82m, 3.81m, or 1.9m.
.5 Metal: Yield point minimum 345 MPa, Tensile Strength minimum 483 MPa, Elongation minimum in 50mm: 12%, and End and Buffer sections shall have a minimum yield point of 227 MPa and a minimum tensile strength of 310 Mpa.
.6 Sheet Thickness: Class A base metal thickness shall be 2.8mm nominal (2.82mm minimum) with tolerance of minus 0.23 mm.
.7 Sheet Widths - Min 749mm for Thrie-Beams with a permissible tolerance of minus 3.2mm.

2.1 Materials (Cont'd)

.2 Galvanized acid etching: to MPI #25.

.3 Guardrail Accessories

.1 Bolts, nuts and washers: to ASTM A 307, ASTM A536 Grade A, ASTM A36 and galvanized to ASTM A153.

.2 Post Sleeve: 150mm length of 60mm outside diameter galvanized pipe confirming to ASTM A 53.

.3 Square timber posts and offset blocks:

.1 Species: Douglas Fir/Hemlock "No. 1, Structural Posts and Timber", graded in conformity with the requirements of NGLA "Standard Grading Rules for Canadian Lumber".

.2 Type: pressure treated in accordance with CAN/CSA-O80 Series.

.3 Wanes on any face shall not exceed the following width, being the minimum permissible post width less the portion entirely free of wane: above grade (including blocks) - 25mm, below grade - 60mm

.4 Dimensions: Posts and blocks shall be supplied in the exact lengths ordered or specified and unless otherwise required on the Purchase Order, Work Order, drawing or specification the scantling shall be nominal 200 mm x 200 mm, and pair of 200 mm x 150 mm for each BCT installation, with dressed on four sides minimum dimension of 189 mm x 189 mm and 189 mm x 138 mm respectively and a tolerance of plus 3 mm.

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 guide rail installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied andipt of written approval to proceed from Departmental Representative.

3.2 Preparation

.1 Temporary Erosion and Sedimentation Control:

3.2 Preparation (Cont'd)

.1 (Cont'd)

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 Erection

.1 Set posts by instrument for alignment, and locations as indicated and as directed by Departmental Representative.

.2 Excavate post holes to depths as indicated and to diameter of 360 mm plus or minus 20 mm.

.1 Compact bottom to provide firm foundation.

.2 Set post plumb and square in hole.

.3 Backfill around posts using excavated material and compact in uniform layers not exceeding 150 mm compacted thickness.

.4 Cut off tops of posts as indicated, with tops parallel to grade of pavement edge.

.5 Construct anchorages to details as indicated.

.1 Place and compact backfill for anchors as directed by Departmental Representative.

.6 Erect steel Thrie-beam components to details as indicated. Lap joints in direction of traffic.

.1 Tighten nuts to 100 N.m torque.

.1 Maximum protrusion of bolt 12 mm beyond nut.

3.4 Painting Touch Up

.1 Galvanized steel-touch up:

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings.

.1 Apply 2 coats of organic zinc-rich paint to damaged areas.

.1 Pre-treat damaged surfaces in accordance with manufacturer's written recommendations for zinc-rich paint.

.2 Painted steel:

3.4 Painting Touch Up (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.1 Apply 1 coat of primer and 2 coats of finish paint to exposed surface.

.3 Painted posts and offset blocks:

.1 Apply 2 coats of paint to exposed surfaces of posts and offset blocks.

3.5 Cleaning

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 Protection

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by guide rail installation.

END OF SECTION

APPENDIX A:

PLAN OF CONSTRUCTION OPERATIONS

Keogh Bridge Replacement

Plan of Construction Operations

Issued for Permit
January 14, 2022
WSP Project No. 19M-01601-02

Rev A	16 April 2021	DRAFT-Issued for TC Review
Rev B	16 July 2021	Issued for Permit
Rev C	14 January 2022	Re-issued for Permit

wsp

Transport Canada Transports Canada

PLAN OF CONSTRUCTION OPERATIONS

Project Number: 19M-01601-02

Project Name: Keogh Bridge Replacement

Project Location: Port Hardy Airport, BC

Rev B Prepared by:

Cozmin Radu, M.Sc., P.Eng.

Manager, Transportation Engineering _____ July 16, 2021

WSP Canada Inc. Signature Date

Rev C Prepared by:

Matthew Bowser, M.A.Sc., P.Eng.

Senior Project Manager, Bridges _____ January 14, 2022

WSP Canada Inc. Signature Date

Engineers & Geoscientists BC Permit #1000200

Reviewed and Approved by:

Airport Manager _____ _____

Port Hardy Airport Signature Date

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APPENDIX B – ADDITIONAL SAFETY INFORMATION

1.0 INTRODUCTION

1.1 Background

The Keogh River Bridge is a 21m-span (70 ft) Acrow-panel bridge located approximately 500m southeast of the Port Hardy Airport's end of Runway 29's threshold bar. The bridge is owned by Transport Canada and provides the only means for vehicle access to the east side of the Keogh River which serves as an emergency response area and provides access to fish counting facilities. The current substructure is near the end of its service life and the existing bridge will be replaced as part of this project.

As part of the project scope, WSP prepared draft plan of construction operations (PCO) sketches to determine operational constraints that may be required in the technical specifications and general conditions of the contract, including limitation of crane heights and other equipment. These sketches were presented to Port Hardy Airport/ Transport Canada in discussion as to how best accommodate erection of the bridge superstructure and pile foundations with airport operations of Runway 11-29, running east-west.

WSP presented three options in a meeting with Public Services and Procurement Canada (PSPC) and Transport Canada (TC) representatives during a meeting on March 01, 2021:

1. **Option 1**: Displace the threshold at Runway 29 for a two to three-week duration in which pile foundations and steel girders would be erected and installed on-site;

2. **Option 2**: Temporarily close the runway for two to three days during which Runway 11-29 would not be operational and all airfield and approach lights for Runway 11-29 would be unserviceable.

3. **Option 3**: Alternate Runway 11-29 operational hours to limit airside operations during a time window. If required, TC will provide advance notice for contractors to boom down equipment in the event of incoming medivac flights.

From the meeting, it was confirmed the preferred option by TC was to displace the threshold on Runway 29 (**Option 1**). This was chosen to maintain airside operations at the airport given Runway 11-29 is the primary runway and used most often, especially during summer months. It also has a Flight Service Station (FSS) tower and is open 24 hours, and thus issuing a one-time only Notice to Airmen (NOTAM) to advise of situation and duration of the runway is the preferable solution.

Note that Runway 29 has a clearway of 250m (820ft). Transport Canada TP312E 5th Edition for Obstruction Limitation Surface (OLS) Figure 4.9 indicates a 1.25% clearway plane slope before becoming the required 2.5% take-off approach surface. However, this has been superseded by the Port Hardy's Airport Operations Manual (AOM) that measure the 2.5% take-off approach surface starting 60 m distance from the Runway 29 threshold.

Construction is currently scheduled to commence in Summer of 2022.

1.2 Purpose of the Plan of Construction

The purpose of this Plan of Construction Operations (PCO) is to:

- Provide notification of deviations from the certification standards and typical airport operations;
- Formulate in advance the coordination required to implement this construction project with minimal interruption to, and conflict with, airport operations and to ensure that airport security and flight safety are not compromised by the construction operations;
- Inform all airport users, tenants and operators, Transport Canada and NAV Canada of the project activities, such that they are aware of the effect on their operations; and
- Inform all parties of work procedures to be followed in a safe and secure manner.

2.0 CONSTRUCTION OPERATIONS AND SCHEDULE

This section details the proposed construction works, staging and scheduling, and impacts to operations. The proposed construction work will be within an active airport and accordingly the work has been phased to minimize disruption to airfield operations.

The Construction Staging is as follows and is shown in the attached drawings in Appendix A:

C100 – Plan of Construction Operations Stage 1

C101 – Plan of Construction Operations Stage 2

C102 – Plan of Construction Operations Transitional Surface

C103 – Plan of Construction Operations Details

2.1 STAGE 1 RUNWAY 11-29

2.1.1 Construction Timing

Estimated August 16 – September 3 (3 weeks), Daytime Work from 0700 to 1800 hours. To be confirmed with the Contractor's schedule. Note the reduced risk window for in water works will be between June 15 – September 15.

2.1.2 Construction Activity

The proposed work on this stage will primarily be civil and structural work, which includes clearing and grubbing, pile driving, and steel girder erection for the bridge superstructure. Existing threshold marking and bar and the first aiming point markings will be covered with dark grey plastic sheets secured to the ground with sandbags painted with the similar colour. New temporary threshold and runway close markings

will be placed and secured to ground with sandbags to indicate the new temporary displacement as noted in Drawing C103.

The electrical work components will be limited to placing black sheets over the top of existing precision approach path indicators (PAPI) and covering existing edge lights outside the temporary active runway with cones.

2.1.3 Construction Site Access

Construction access to Keogh River Bridge will be from an existing unpaved perimeter road east of Runway 11-29. A laydown area located off the road (see Drawing C102), as approved by TC, will house construction vehicles and equipment for the duration of the project construction period; construction vehicles and equipment can only reach a maximum height of 20 m measured from the runway centerline elevation with the transitional slope of 14.3% measured from the edge of the 75.0m runway strip in this area. Any equipment will have to stay below the transitional slope as outlined in Aerodrome Standards and Recommended Practices for non-instrument runways. Dust control mitigation measures will be required throughout the construction phase.

It was noted by TC (Port Hardy Airport) Supervisor, an airside escort will not be required to provide the necessary control of truck and equipment traffic given the location of the project site. However, TC Supervisor will meet with the contractor at the pre-construction meeting to discuss and briefing all personnel about access to/from the project site, security regulations, and applicable Airport rules. TC will monitor airport traffic over the local ground frequency and will control construction vehicles and personnel movements as needed. Communication between the TC's Supervisor and vehicles accessing the site will be undertaken using handheld radios to be supplied by Contractor.

2.1.4 Airport Operation

(All items listed below to be reviewed, approved, and implemented by the Airport Operations)

1. To accommodate the 23m-tall cranes at the project site, Runway 29 threshold will need to be relocated by 253.3m (831 ft), measured from the existing threshold. All aircraft operations will be limited to the area west of the relocated threshold during this stage.

2. On airfield lighting component, the following modifications will be done during this stage:

    i. Install temporary runway bar threshold and temporary "X" runway closure marking behind the displaced threshold bar;

    ii. Temporarily cover the existing edge lights, threshold lights and runway end lights with cones or high-grade black plastic beyond the temporary threshold bars. Disconnect or cover the PAPI (2) and ODALs for Runway 29. These lighting instruments will be unserviceable during this stage; and

3. Runway 11-29 declared distances will be reduced. See Drawing C100 for all declared distances at this stage. There will be no direct impact to other runways or taxiways operations.

The following is a sample NOTAM for Runway 29 work.

NOTAM CYZT
FIRST 831 FT RWY 29 CLSD MARKED.

Declared distances:
Runway 11: TORA 4,168 FT, TODA 4,168 FT, ASDA 4,168 FT, LDA 4,168 FT
Runway 29: TORA 4,168 FT, TODA 4,988 FT, ASDA 4,168 FT, LDA 4,168 FT

The RW29's Edge Lights, End Lights, Threshold Lights, ODALs, and PAPI behind the Temporary Threshold will be U/S during this time.

FROM 2108160000Z TIL 2109032400Z

2.2 STAGE 2 RUNWAY 11-29

2.2.1 Construction Timing

Estimated September 4 – October 2 (4 weeks), Working hours: 0700 to 1800 hours. To be confirmed with the contractor's schedule.

2.2.2 Activity

The proposed civil and structural work at this stage will be mostly related to remaining activities that do not require encroachment to the OLS. A notification to the contractor of limited height to be provided and enforced.

2.2.3 Construction Site Access

Construction access and staging area will remain the same (see Drawing C102) and will not impede to airport operations.

2.2.4 Airport Operations

1. Runway 11-29 will resume normal airside and aircraft operations. The temporary Runway 29 threshold bar and "X" runway closure markings from Stage 1 will be removed and the full runway length will be reinstated.

2. On airfield lighting component, the following modifications will be done during this stage:

    i. Remove covered edge, threshold, and runway end lights;

ii. Reinstate existing PAPI, ODAL, and Localizer for Runway 29; and

iii. Reinstate Runway 29 to pre-construction conditions.

3. Existing Runway 11-29 declared distances will be reinstated. See Drawing C101 for existing declared distances as provided by TC. There will be no direct impact to other runways or taxiways operations as a result of construction at this stage.

The NOTAM issued for Runway 29 during Stage 1 work will be rescinded.

3.0 AIRPORT OPERATIONS AND RESTRICTIONS

3.1 Restrictions on Airside

All vehicles and personnel requiring access to the Work Area must follow the rules and regulations set out in this plan at all times. Any failure to comply with the rules and regulations will result in immediate removal of personnel from the site and the termination of site access privileges of that individual.

No vehicles and/or equipment will have access to aircraft movement. Construction vehicles and equipment shall be stored within the designated laydown area, delineated with orange snow fencing; they shall travel along the perimeter road east of Runway 11-29. All vehicles shall operate only within those defined routes or areas. See Drawing C102 for designated laydown area and perimeter road.

There is no anticipated conflict in traffic movement between aircrafts and construction vehicles, however, a clear communication plan should be established and periodically audited by the Airport Operations Manager and Contractor's Representative.

3.2 Airside Procedures

The Contractor's Site Supervisor/Foreman is responsible for ensuring that construction personnel at the Airport operate construction equipment and service vehicles in a safe manner and in accordance with Airport procedures.

Prior to the start of construction, Airport Operations and the Contractor shall be responsible for briefing all personnel about access to/from the Work Area, security regulations, and applicable Airport rules.

Vehicles or personnel shall not proceed outside the designated Work Area without approval from the Airport.

3.3 Escorting and Security Requirements

Access gates to the airside shall be secured by the Contractor. At the pre-construction meeting, the Contractor will be provided a clicker to get access to the speed gate and a key to Gate 9 which they will need to lock up daily to get access to/from the project site.

3.4 Radios

The Contractor shall supply non-aviation radios to the Contractor Foreman/Safety Representative and the Airport. These radios shall be monitored at all times and will be used for direct communication between the Airport and the Contractor in order for the Airport to provide notification/direction regarding aircraft traffic.

3.5 Construction Equipment Storage and Stockpiling Area

Storage of equipment or materials shall meet all Transport Canada regulations and shall be stored within laydown area noted in Drawing C102. Materials and equipment must not be stored in a location that would violate any Obstacle Limitation Surface. Overnight storage of vehicles and equipment such as cranes or excavators will be required be parked in a way to minimize height.

3.6 Underground Utilities

Before work commences, the Contractor shall confirm the location and extent of any existing service lines within the Work Area (if any). Drawings and information provided in the Contract are for planning purposes only. It is the responsibility of the Contractor to ensure that services are properly located.

For any shut down of an airport lighting system or visual aid, the Contractor must submit a schedule and obtain prior permission from the Airport. The Contractor will be responsible for notifying and scheduling site inspections as required for provision of certification for service connections.

Where unknown services are encountered, the Contractor will immediately notify the Airport. The Contractor will mark all deviations from the original approved proposal and the location of unknown services discovered during construction activities clearly in red on-site plans to be incorporated into the airport data base plans.

During excavation, the Contractor will carefully locate underground services (if any) with excavating equipment, hand shovels, rakes, etc. as required to ensure that no damage is done to existing lines. The Contractor will provide the maximum space required to make connections in accordance with applicable codes and manufacturer's recommendations.

The Contractor will be responsible for restoring, replacing or repairing any services damaged as a result of construction activities at no extra cost to the Airport.

3.7 Open Trenches/Stockpiles

Absolutely no open excavations, stock piling of materials or equipment shall be permitted overnight on or adjacent to the perimeter road. All stockpiled material shall meet the requirements of the Obstacle Limitation Surface and be stored in the designated laydown area that is identified with orange snow fencing.

3.8 Erection of Cranes, Towers, or Other Structures

Prior permission must be obtained before operating any crane or constructing any work tower, platform or other structure.

The height of Contractor's equipment is restricted for any activity within the Airport. Prior to crane operation or erection of a structure the Contractor will submit a detailed plan outlining the estimated height of the structure (shall not exceed 23 m), location of the work and the anticipated duration of the operation. The Airport will notify any affected parties and make arrangements for temporary closure of obstructed surfaces and issue appropriate NOTAM.

Cranes must be equipped with red flashing lights at the top of booms in accordance with Standard 621 – Obstruction Marking and Lighting – Canadian Aviation Regulations (CARs) published by Transport Canada.

3.9 F.O.D Control

The Contractor must maintain a clean jobsite at all times. Particular attention must be paid in order to keep all areas free of all objects such as paper, paper cups, plastic lunch bags, screws and nails, and construction packing material and waste. Constant monitoring will be required by the Contractor to ensure no loose gravel and material on, or adjacent to the perimeter road.

Secure or containerize all materials that are prone to blowing away, i.e.; dry soil, to include the tarping of all vehicles used for hauling. Dust control on Airport property is paramount. It is the Contractor's responsibility for controlling dust. Dust control shall be achieved through the application of water to ensure all turned surfaces are kept to a minimum. No calcium products are permitted.

During activities involving the hauling of materials onto and/or off site via the perimeter road, the Contractor shall keep the road clear. The Contractor will be required to maintain a mechanical sweeper that is in good working condition on site to pick up such materials along with brooms and shovels.

Any noted items will be brought to the attention of the Contractor for immediate remedial action. In the event that the contractor does not take immediate action, the area will be cleared by Airport staff and all associated costs will be back charged to the contractor. Failure to comply may also result in the suspension of work until the site is made safe/secure.

3.10 Safety

An overview of the responsibilities will be reviewed at the pre-construction meeting and also at regular weekly construction update meetings.

In the event of an Airport Emergency, all construction activities may be suspended, and all non-authorized personnel will be required to leave the Work Area. All access points to the Airport must be kept clear of equipment, vehicles, and material at all times.

The Contractor shall ensure all personnel are aware of the relevant requirements of the Airport's Safety Management System.

MEDICAL EMERGENCIES AND FIRES

Medical or Fire Services are available by calling 911. Off-site Emergency Response unit(s) will respond.

The Airport staff shall be notified immediately in the event of any incidents.

3.11 Workplace Injuries

Any work-related injury must be reported to the proper authority having jurisdiction to investigate in accordance with current Labour Laws, and Regulations. The Airport must be made aware of any incidents.

3.12 Jet Blast and Prop Wash

The contractor and all assigned personnel working within the Airside area or directly adjacent to this area must be aware and use caution when Aircraft are maneuvering on active airside areas. Winds in excess of 120 miles per hour can be experienced causing stones, construction material and dust to become dangerous projectiles which could injure workers.

The Contractor should ensure all personnel are informed of the hazards of jet blast and prop wash.

3.13 NOTAMS

The Airport Staff is responsible for originating, revising and canceling any NOTAMs required for closures. A minimum of 72 hours' notice will be required to file a NOTAM, and all applicable NOTAMs must be in place prior to the start of any construction activities. For significant runway impacts including temporary closure, 10 days' notice shall be provided.

Any deviation in operation, level of service or construction activity affecting the regulatory requirements shall be published by NOTAM and be provided by voice notification to NAV Canada.

4.0 COMMUNICATION PLAN

4.1 Port Hardy Airport Project Contacts

Communication during the construction period will occur between the contractors, clients/users, Port Hardy Airport/TC, and NAV CANADA. A list of project contacts is identified in the table on the following page:

TITLE (*COMPANY*)	CONTACT	PHONE
Transport Canada – Airport Manager	Jason Tran	250.902.8275
Transport Canada – Supervisor, Surface and Mobile	Radford Smith	250.902.8519
PSPC Project Manager	Trever Greer	778.808.7606
WSP Project Manager	Matthew Bowser	250.734.4692
Contractor Project Manager	TBC	
Contractor Site Supervisor	TBC	
NavCanada at CYZT Tower	Andrew Luttrell	250.902.2653
NavCanada	NOTAM	866.577.0247

The proposed Communication Plan is shown in Figure 1.

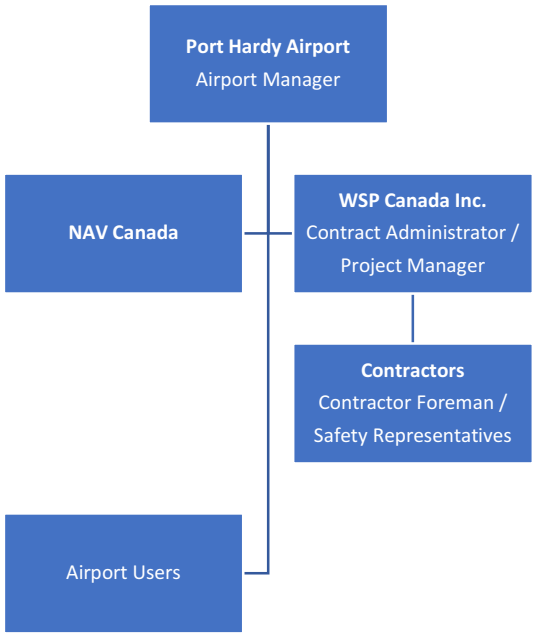
4.2 Planning and Pre-Construction Phase

Prior to start of construction, a pre-construction meeting will be coordinated and attended by representatives from the Airport and Contractor/Consultant. The scope of work, airside operations, procedures, Contractor responsibilities, safety and security and other relevant issues will be discussed.

4.3 Construction Phase

Regular construction meetings will take place during the construction period to exchange information regarding progress of the project, safety and security, operational issues, contractual items, and deficiencies of the project. The meetings will be attended by the Port Hardy Airport, and Contractor/Consultant, and other representatives involved in the project. Should the frequency of the meetings require change, the Project Manager will revise accordingly.

Figure 1



4.4 Post-Construction Phase

Once construction is completed, deficiencies will need to be addressed and commissioning of the completed project will occur. A post-construction meeting is to take place to discuss the above items.

Following substantial completion of the project, an on-site meeting will be held to determine and resolve any site deficiencies by a visual walk-through which will be attended by the Contractor, Consultant, and the Airport.

APPROVAL OF PLAN CONSTRUCITON OPERATIONS

PROJECT:

Keogh Bridge Replacement

AIRPORT NAME:

Port Hardy Airport (CYZT)

AIRPORT OPERATOR AND CERTIFICATE HOLDER:

AIRPORT MANAGER:

CERTIFICATE NUMBER:

DATE OF ISSUE:

I undertake to meet the obligations set out in this plan of construction; and I hereby certify that the information in this plan is complete and accurate and no relevant information has been omitted.

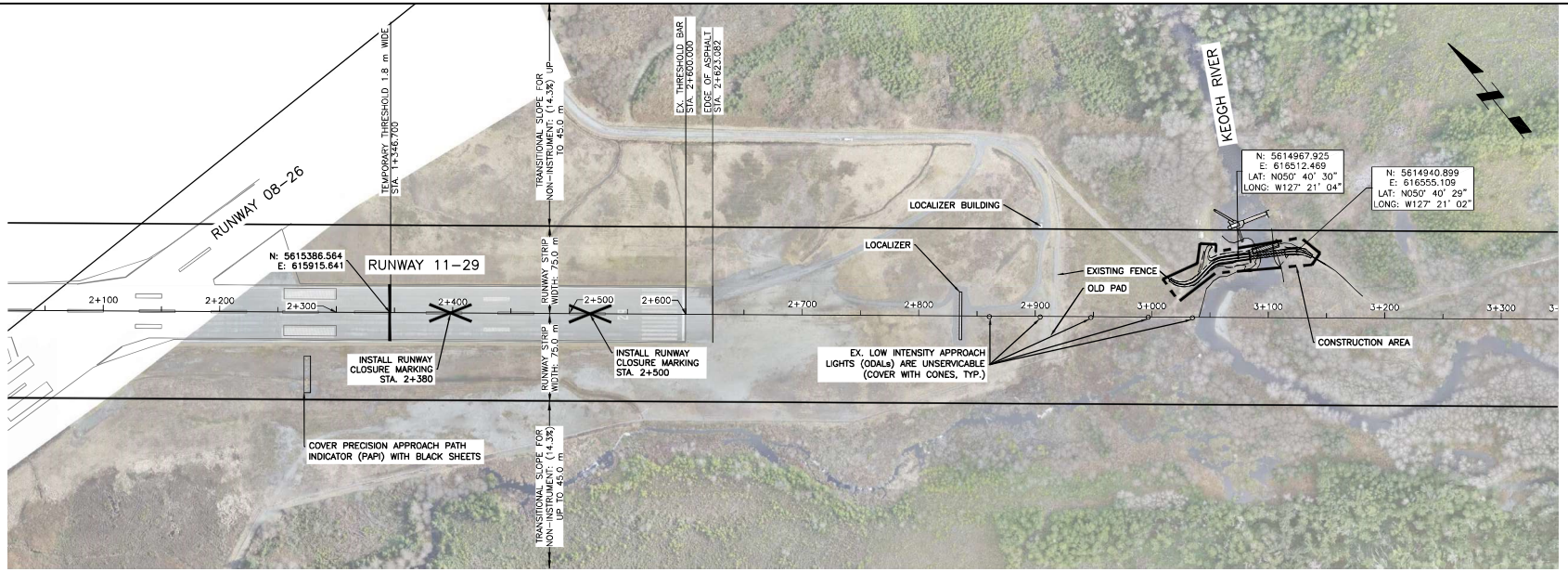
Date (YYYY-MM-DD) Signature of Airport Operator/Certificate Holder

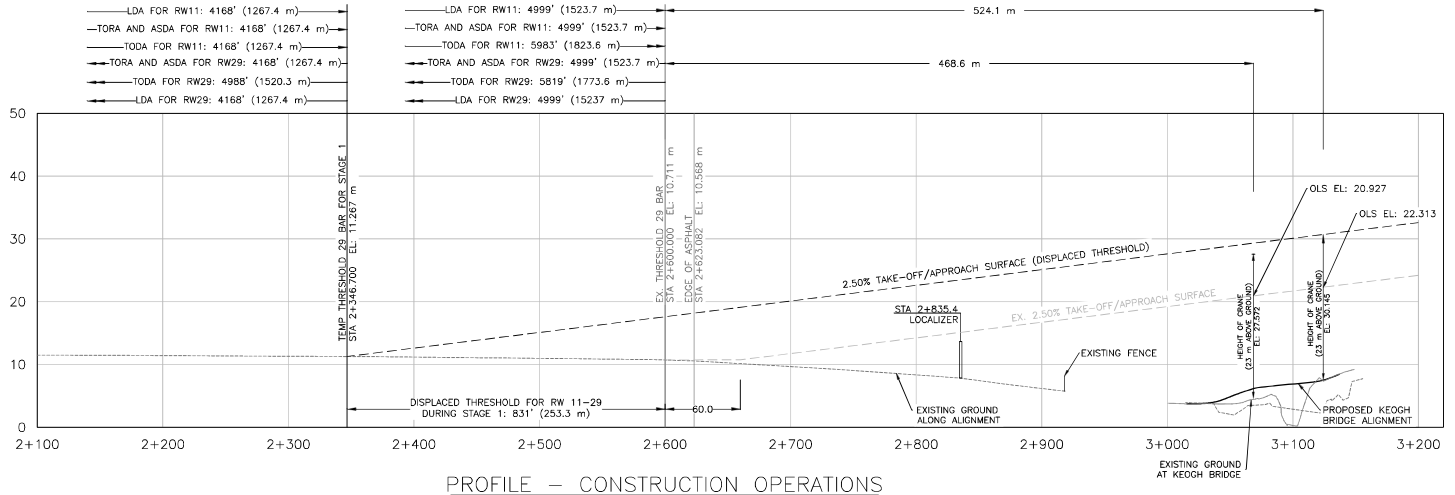
This Plan of Construction Operations Manual/Amendment is approved.

Date (YYYY-MM-DD) For Minister of Transport

APPENDIX A

Plan of Construction
Operations Drawings





PROFILE – CONSTRUCTION OPERATIONS

SCALE 1:2000H
1:400V

DECLARED DISTANCES	RUNWAY	
	11	29
TORA	4168' (1270.4 m)	4168' (1270.4 m)
TODA	4168' (1270.4 m)	4988' (1520.3 m)
ASDA	4168' (1270.4 m)	4168' (1270.4 m)
LDA	4168' (1270.4 m)	4168' (1270.4 m)
THRESHOLD DISPLACEMENT	0	831' (253.3 m)

RWY DATE RWY 11 (113 DEG)/ 29 (293 DEG) 4999' X 150' ASPHALT AGN III B
RUNWAY 29 NON-INSTRUMENT

LEGEND

- PROJECT AREA
- RUNWAY STRIP WIDTH (FROM RUNWAY CENTRELINE)
- TRANSITIONAL SLOPE LIMIT
- APPROACH SURFACE SLOPE
- CONSTRUCTION ACCESS ROUTE
- CLEARWAY PLANE
- CONSTRUCTION LAYDOWN AREA

0 10 20 30 40 50 60 70 80 90 100mm

GENERAL NOTES

1) ALL UNITS ARE IN METRES UNLESS NOTED OTHERWISE.
2) CONTRACTOR SHALL MAINTAIN ROADS IN USABLE CONDITION DURING AND AFTER CONSTRUCTION COMPLETION.
3) CONTINUOUSLY CLEAN, SWEEP, DUST, AND REMOVE MUD OFF EXISTING ROAD TO THE SATISFACTION OF THE DEPARTMENT REPRESENTATIVE.
4) ALL AIRPORT GATES MUST REMAIN UNBLOCKED AT ALL TIMES FOR EMERGENCY ACCESS.
5) SEE DWG. C103 FOR LOCATION AND EXTENT OF CONTRACTOR STAGING AND STOCKPILE AREA.
6) ESCORTS REQUIRED FOR ALL CONSTRUCTION WITHIN AIRSIDE.
7) ANY CONTRACTOR FLAGGING OPERATION ACROSS ACTIVE AREAS TO BE CONTROLLED BY AIRSIDE RADIO ESCORT.
8) CONSTRUCTION IS LIMITED TO THE AREAS SHOWN.
9) CONTRACTOR SHALL ENSURE ALL LOOSE MATERIAL IS SECURED.
10) CONTRACTOR SHALL ENSURE AIRFIELD LIGHTING AND VISUAL AIDS REMAIN ENERGIZED AT ALL TIMES EXCEPT AS NOTED IN THESE PCO.
11) CONTRACTOR IS RESPONSIBLE TO PROVIDE APPURTENANCE FOR TEMPORARY WORKS, WHICH INCLUDE BARRIERS, LIGHTING, ETC.
12) CONTRACTOR SHALL CLEAR 3.0m FROM SECURITY FENCE.
13) ALL VEHICLES AND EQUIPMENT ENTERING AIRSIDE SHALL BE EQUIPPED WITH OPERABLE FLASHING YELLOW LIGHTS, AND THEY SHALL DISPLAY COMPANY LOGOS ON BOTH SIDES OF THE VEHICLES.
14) ALL PROVISIONS OF TRANSPORT CANADA MANUAL TP312E MUST BE OBSERVED AND RESPECTED DURING THE CONSTRUCTION PERIOD.

0 1:2000 100

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

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

STAGE 1

CONSTRUCTION:

1. PLACE TEMPORARY THRESHOLD BAR. PLACE BLACK SHEETS OVER TOP OF INSTRUMENT LIGHTING.
2. START BRIDGE CONSTRUCTION ON **EAST / WEST SIDE, START CLEAR AND GRUB AND STRIP, WORK UNDER ADVISED NOT TO EXCEED HEIGHT NOTED IN THE PROFILE.
3. ERECTION OF PILE DRIVING CRANE UPON ACCEPTANCE OF OLS REQUIREMENT BY AIRSIDE OPERATIONS (SEE NOTE 1)

SCHEDULE:

APPROXIMATELY 10 TO 15 WORKING DAYS

UNSERVICEABLE / CLOSURE:

1. THE FIRST 831' (253.3 m) OF RW 29 (BEHIND TEMPORARY THRESHOLD) WILL BE CLOSED TO AIRCRAFT TRAFFIC. RUNWAY REDUCED TO THE NOTED TABLE ON THIS DRAWING.
2. TEMPORARY "X" RUNWAY CLOSURE MARKING TO BE PLACED BEHIND THE DISPLACED THRESHOLD BAR.
3. EXISTING EDGE LIGHTS, THRESHOLD LIGHTS AND RUNWAY END LIGHTS WILL BE COVERED. PAPI (2) AND ODALS FOR RUNWAY 29 TO BE DISCONNECTED OR COVERED. THESE LIGHT INSTRUMENTS WILL BE UNSERVICABLE DURING THIS STAGE.

NOTE: THE HORIZTONAL DATUM USED FOR THIS DRAWING IS IN REFERENCE TO UTM (NAD 83) ZONE 9.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA C. RADU # 34275
2021-07-16

Revision	Description	Date
C	ISSUED FOR PERMIT	21/07/16
B	ISSUED FOR TC REVIEW	21/04/22
A	ISSUED FOR DISCUSSION	21/02/26

Client / client

wsp

Project title / Projet
BRITISH COLUMBIA
PORT HARDY

KEOGH RIVER BRIDGE REPLACEMENT

Designed by / Conçu par	V. LIA, P.ENG.
Drawn by / Dessiné par	K.YANG, EIT
Approved by / Approuvé par	C.RADU, P.ENG.
PWGSC Project Manager / Administrateur de Projets TPSGC	L.GREER, P.ENG.

Drawing title / Titre du dessin

PCO
OBJECT LIMITATION OVERVIEW
APPROACH SURFACE
STAGE 1

Project no./No. du projet	Drawing no./No. du dessin	Revision no.
R.109401.001	C100 of S12	C

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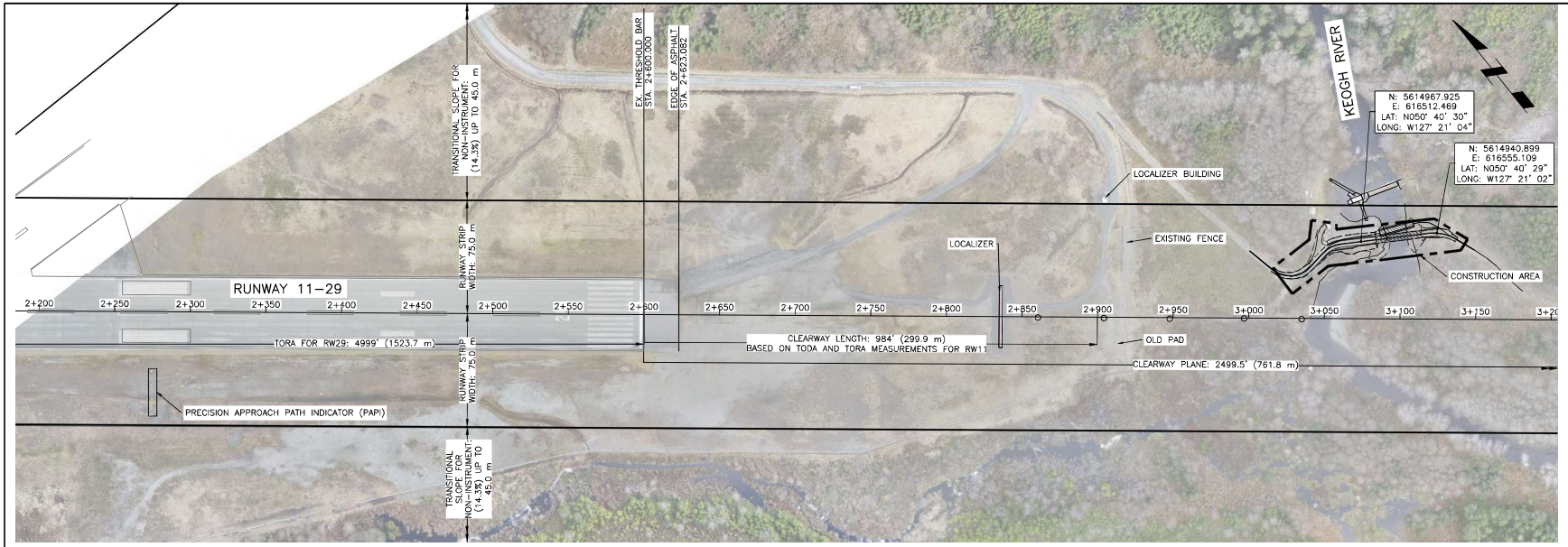

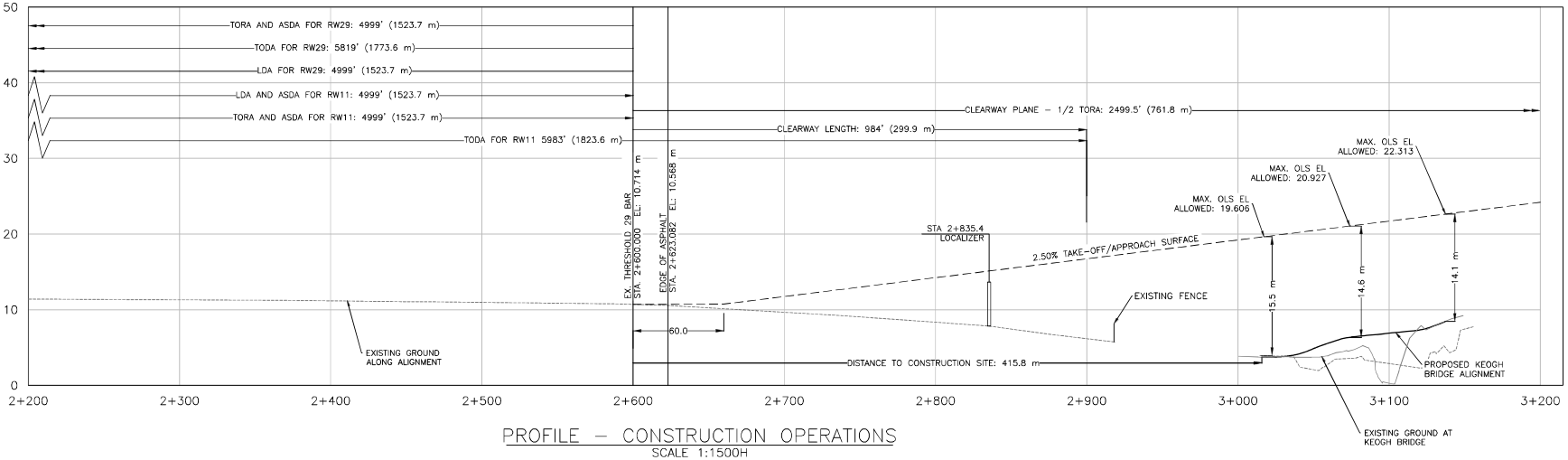

PROFILE – CONSTRUCTION OPERATIONS

SCALE 1:1500H
1:300V

EXISTING DECLARED DISTANCES	RUNWAY	
	11	29
TORA	4999'	4999'
TODA	5983'	5819'
ASDA	4999'	4999'
LDA	4999'	4999'
THRESHOLD DISPLACEMENT		

RWY DATE RWY 11 (113 DEG)/ 29 (293 DEG) 4999' X 150' ASPHALT AGN III B
RUNWAY 29 NON-INSTRUMENT

LEGEND

- PROJECT AREA
- RUNWAY STRIP WIDTH (FROM RUNWAY CENTRELINE)
- TRANSITIONAL SLOPE LIMIT
- APPROACH SURFACE SLOPE
- CONSTRUCTION ACCESS ROUTE
- CLEARWAY PLANE
- CONSTRUCTION LAYDOWN AREA

GENERAL NOTES

1) ALL UNITS ARE IN METRES UNLESS NOTED OTHERWISE.
2) CONTRACTOR SHALL MAINTAIN ROADS IN USABLE CONDITION DURING AND AFTER CONSTRUCTION COMPLETION.
3) CONTINUOUSLY CLEAN, SWEEP, DUST, AND REMOVE MUD OFF EXISTING ROAD TO THE SATISFACTION OF THE DEPARTMENT REPRESENTATIVE.
4) ALL AIRPORT GATES MUST REMAIN UNBLOCKED AT ALL TIMES FOR EMERGENCY ACCESS.
5) SEE DWG. C103 FOR LOCATION AND EXTENT OF CONTRACTOR STAGING AND STOCKPILE AREA.
6) ESCORTS REQUIRED FOR ALL CONSTRUCTION WITHIN AIRSIDE.
7) ANY CONTRACTOR FLAGGING OPERATION ACROSS ACTIVE AREAS TO BE CONTROLLED BY AIRSIDE RADIO ESCORT.
8) CONSTRUCTION IS LIMITED TO THE AREAS SHOWN.
9) CONTRACTOR SHALL ENSURE ALL LOOSE MATERIAL IS SECURED.
10) CONTRACTOR SHALL ENSURE AIRFIELD LIGHTING AND VISUAL AIDS REMAIN ENERGIZED AT ALL TIMES EXCEPT AS NOTED IN THESE PCO.
11) CONTRACTOR IS RESPONSIBLE TO PROVIDE APPURTENANCE FOR TEMPORARY WORKS, WHICH INCLUDE BARRIERS, LIGHTING, ETC.
12) CONTRACTOR SHALL CLEAR 3.0m FROM SECURITY FENCE.
13) ALL VEHICLES AND EQUIPMENT ENTERING AIRSIDE SHALL BE EQUIPPED WITH OPERABLE FLASHING YELLOW LIGHTS, AND THEY SHALL DISPLAY COMPANY LOGOS ON BOTH SIDES OF THE VEHICLES.
14) ALL PROVISIONS OF TRANSPORT CANADA MANUAL TP312E MUST BE OBSERVED AND RESPECTED DURING THE CONSTRUCTION PERIOD.

0 15 1:1500 75m

0 10 20 30 40 50 60 70 80 90 100mm

PWGSC – A1 – 841x594

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PLOT: 1:1

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

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

STAGE 2

CONSTRUCTION:

1. REMOVE TEMPORARY THRESHOLD BAR AND RUNWAY CLOSURE MARKNIGS. REMOVE BLACK SHEETS OVER TOP OF INSTRUMENT LIGHTING.
2. CONTINUE BRIDGE AND ROAD CONSTRUCTION. WORK EQUIPMENT SHALL NOT EXCEED HEIGHT NOTED IN THE PROFILE.

SCHEDULE:

APPROXIMATELY 15 TO 20 WORKING DAYS

UNSERVICEABLE / CLOSURE:

1. NONE.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
C. RADU
34275
2021-07-16

NOTE: THE HORIZTONAL DATUM USED FOR THIS DRAWING IS IN REFERENCE TO UTM (NAD 83) ZONE 9.

Revision	Description	Date
B	ISSUED FOR PERMIT	21/07/16
A	ISSUED FOR TC REVIEW	21/04/22

Client / client

wsp

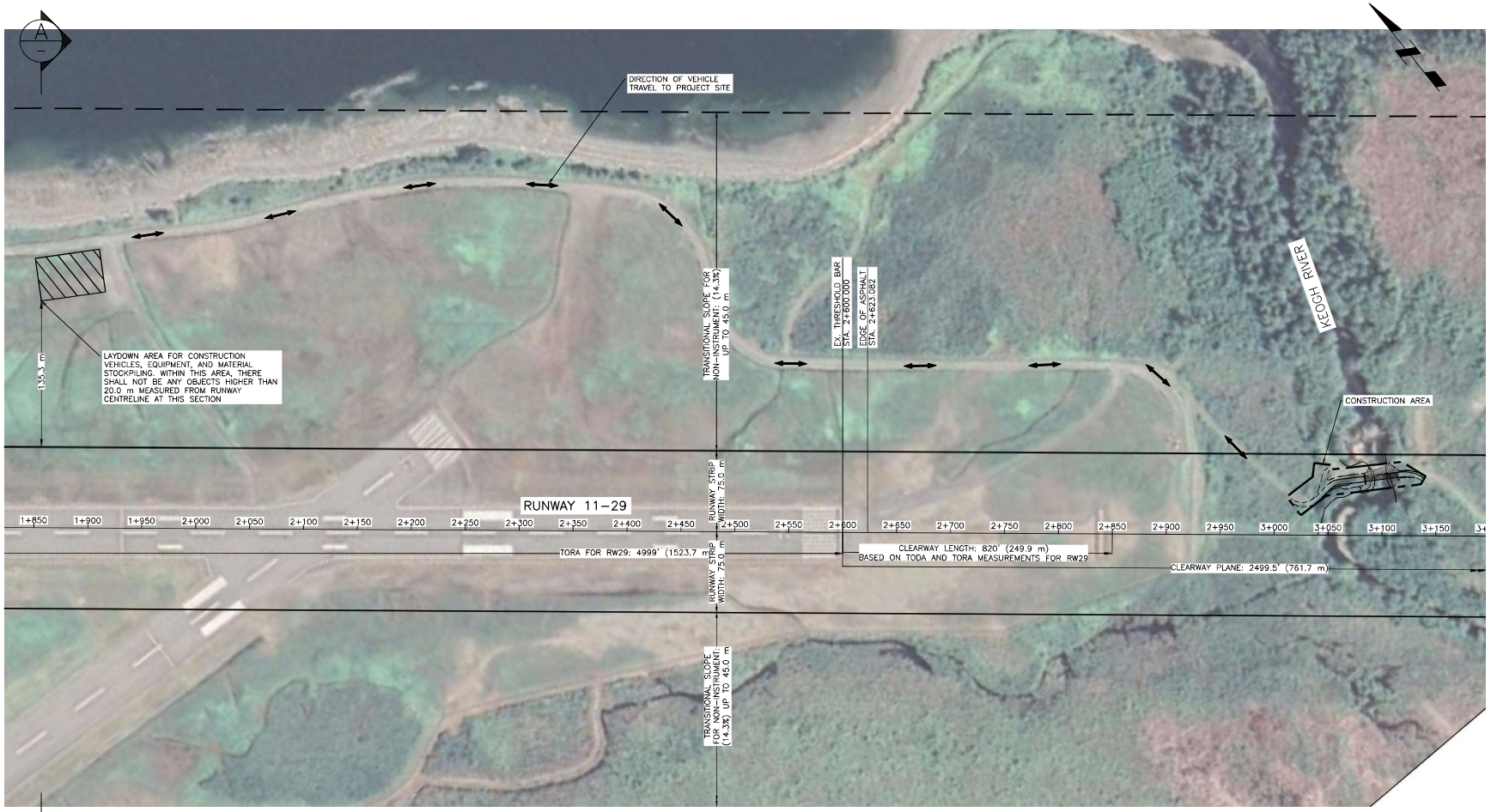
Project title / Projet

BRITISH COLUMBIA
PORT HARDY

KEOGH RIVER BRIDGE REPLACEMENT

Designed by / Conçu par	V. LIA, P.ENG.
Drawn by / Dessiné par	K.YANG, EIT
Approved by / Approuvé par	C.RADU, P.ENG.
PWGSC Project Manager / Administrateur de Projets TPSGC	L.GREER, P.ENG.
Drawing title / Titre du dessin	PCO OBJECT LIMITATION OVERVIEW APPROACH SURFACE STAGE 2

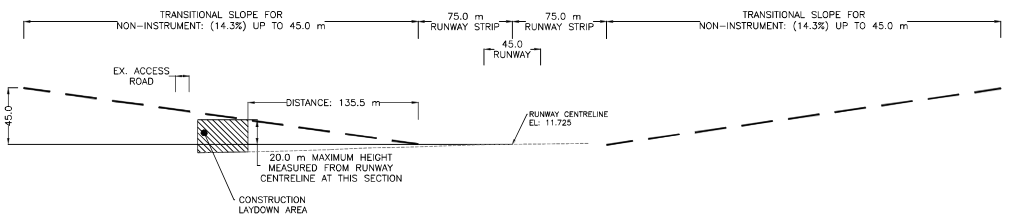
Project no./No. du projet	Drawing no./No. du dessin	Revision no.
R.109401.001	C101 of S12	B



PLAN – LAYDOWN AREA
SCALE 1:2000

LEGEND

- PROJECT AREA
- RUNWAY STRIP WIDTH (FROM RUNWAY CENTRELINE)
- TRANSITIONAL SLOPE LIMIT
- APPROACH SURFACE SLOPE
- CONSTRUCTION ACCESS ROUTE
- CLEARWAY PLANE
- CONSTRUCTION LAYDOWN AREA



SECTION A
SCALE 1:2000

RWY DATE RWY 11 (113 DEG)/ 29 (293 DEG) 4999' X 150' ASPHALT AGN III B
RUNWAY 29 NON-INSTRUMENT

0 20 1:2000 100m

0 10 20 30 40 50 60 70 80 90 100mm

PWGSC – A1 – 841x594

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CAD FILE: C102

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

C. RADU
34275
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
2021-07-16

NOTE: AERIAL IMAGERY OBTAINED FROM GOOGLE EARTH PRO ON 21/02/17.

THE HORIZONTAL DATUM USED FOR THIS DRAWING IS IN REFERENCE TO UTM (NAD 83) ZONE 9.

Revision	Description	Date
C	ISSUED FOR PERMIT	21/07/16
B	ISSUED FOR TC REVIEW	21/04/22
A	ISSUED FOR DISCUSSION	21/02/26

Client / client

wsp

Project title / Projet
BRITISH COLUMBIA
PORT HARDY

KEOGH RIVER BRIDGE REPLACEMENT

Designed by / Conçu par	V. LIA, P.ENG.
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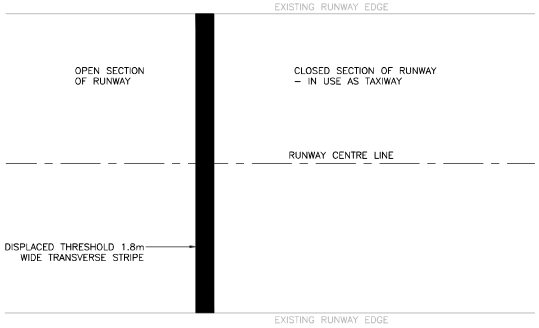
PWGSC Project Manager / Administrateur de Projets TPSGC	L.GREER, P.ENG.
Drawing title / Titre du dessin	PCO OBJECT LIMITATION OVERVIEW TRANSITIONAL SURFACE

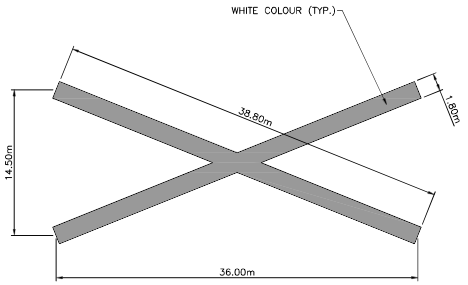
Project no./No. du projet	Drawing no./No. du dessin	Revision no.
R.109401.001	C102 of S12	C



NOTES:

1. THESE MARKINGS ARE NOT TO BE PAINTED ON PAVEMENT SURFACES. THEY ARE TO BE CONSTRUCTED TO ALLOW FOR MOVING AND RELOCATING OF MARKINGS.
2. POLYETHYLENE ROLLS C/W WHITE SAND BAGS ARE ACCEPTABLE MATERIALS.

1 – DETAIL – TEMPORARY THRESHOLD BAR
N.T.S.



NOTES:

1. THESE MARKINGS ARE NOT TO BE PAINTED ON PAVEMENT SURFACES. THEY ARE TO BE CONSTRUCTED TO ALLOW FOR MOVING AND RELOCATING OF MARKINGS.
2. POLYETHYLENE ROLLS C/W WHITE SAND BAGS ARE ACCEPTABLE MATERIALS.
3. MAXIMUM SPACING BETWEEN MARKINGS 300.00m

2 – DETAIL – RUNWAY CLOSURE MARKING
N.T.S.

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

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – C. RADU # 34275
2021-07-16

Revision	Description	Date
B	ISSUED FOR PERMIT	21/07/16
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Client / client

wsp

Project title / Projet
BRITISH COLUMBIA
PORT HARDY

KEOGH RIVER BRIDGE REPLACEMENT

Designed by / Conçu par	V.TJIA, P.ENG.
Drawn by / Dessiné par	K.YANG, EIT
Approved by / Approuvé par	C.RADU, P.ENG.
PWGSC Project Manager / Administrateur de Projets TPSGC	T.GREER, P.ENG.

Drawing title / Titre du dessin
PCO
OBJECT LIMITATION OVERVIEW
DETAILS

Project no./No. du projet	Drawing no./No. du dessin	Revision no.
R.109401.001	C103 OF S12	B

DATE: 2021-07-16 – 12:59pm (CAN7064882)
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CAD FILE: C103

PWGSC – A1 – 841x594

0 10 20 30 40 50 60 70 80 90 100mm

APPENDIX B

Contractor Information – Will be Available for Review Onsite

APPENDIX B:

PRELIMINARY HAZARD ASSESSMENT FORM

PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	R.109401.001
Location:	Keogh River Bridge, Port Hardy, B.C.
Date:	2020-06-17
Name of Departmental Representative:	Trevor Greer, PSPC

Site Specific Orientation Provided at Project Location **Yes** ☒ **No** ☐

Notice of Project Required **Yes** ☒ **No** ☐

NOTE:
PWGSC requires "**A Notice of Project"** for all construction work related activities.

NOTE:
OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the Contractor of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the Contractor.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
Examples: Chemical, Biological, Natural, Physical, Psychosocial, and Ergonomic	PWGSC, Other Government Departments, and Inmates		General Public or other provincial contractors		Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	**Yes**	**No**	**Yes**	**No**	

Typical Construction Hazards					Comments
Concealed/Buried Services (electrical, gas, water, sewer, etc)					TBD by contractor
Slip Hazards or Unsound Footing	Yes		Yes		
Working at Heights **(2.4m)**	Yes		Yes		In a federal work environment the fall protection requirement is **2.4m NOT 3m** as per WBC OHSR
Working Over or Around Water	Yes			Yes	Unpredictable water levels, Swift Water Rescue should be considered within the Site Specific Safety Plan
Heavy overhead lifting operations, mobile cranes etc.	Yes		Yes		TBD by contractor

PRELIMINARY HAZARD ASSESSMENT FORM

Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.	Yes		Yes		
Fire and Explosion Hazards	Yes		Yes		
High Noise Levels	Yes		Yes		Heavy construction equipment, adjacent to airport and jet engine noise
Excavations	Yes		Yes		
Blasting		No		No	
Construction Equipment	Yes		Yes		
Pedestrian Traffic (site personnel, tenants, visitors, public)	Yes		Yes		
Multiple Employer Worksite	Yes		Yes		Federal and provincial employees may be on site.

Electrical Hazards					**Comments**
Contact With Overhead Wires					TBD by contractor
Live Electrical Systems or Equipment	n/a		n/a		
Other: Arc Flash	n/a		n/a		

Physical Hazards					**Comments**
Equipment Slippage Due To Slopes/Ground Conditions	Yes		Yes		
Earthquake	Yes		Yes		
Tsunami	Yes		Yes		
Avalanche		No		No	
Forest Fires	Yes		Yes		
Fire and Explosion Hazards	Yes		Yes		
Working in Isolation		No		No	
Working Alone		No		No	
Violence in the Workplace	Yes		Yes		
High Noise Levels	Yes		Yes		Construction machinery and the site is adjacent to an airport
Inclement weather	Yes		Yes		High winds, and rain
High Pressure Systems		No		No	
Other:					

Hazardous Work Environments					**Comments**
Confined Spaces / Enclosed Spaces					Follow Worksafe B.C. Confined Space Regulations
Suspended / Mobile Work Platforms	TBD		TBD		TBD by contractor
Other:					
Biological Hazards					**Comments**
Mould Proliferations		No		No	

PRELIMINARY HAZARD ASSESSMENT FORM

Accumulation of Bird or Bat Guano		No		No	
Bacteria / Legionella in Cooling Towers / Process Water		No		No	
Rodent / Insect Infestation		No		No	
Poisonous Plants		No		No	
Sharp or Potentially Infectious Objects in Wastes	Yes		Yes		
Wildlife	Yes		Yes		Deer, coyotes
Other					
COVID 19	Yes		Yes		Reference: CSA National COVID 19 Standardized Protocol, Province of B.C. Construction - Business PHO, Worksafe, B.C.

Chemical Hazards					**Comments**
Asbestos Materials on Site		N/A		N/A	
Designated Substance Present		N/A		N/A	If "yes" a pre-project designated substance survey report is required.
Chemicals Used in work **(see comments)**	Yes		Yes		WHMIS 2015 SDS for all products being used
Lead in paint **(See comments)**	Yes		Yes		Contractor shall follow federal and provincial regulations. Reference: Aquaterra Fish Habitat Assessment Report, Dated March 03, 2021
Creosote **(See comments)**	Yes		Yes		Contractor shall follow federal and provincial regulations. Reference: Aquaterra Fish Habitat Assessment Report, Dated March 03, 2021
Application of Chemicals or Pesticides		N/A		N/A	
PCB Liquids in Electrical Equipment		N/A		N/A	
Radioactive Materials in Equipment		N/A		N/A	
Other: Silica **(See comments)**	Yes		Yes		Reference Worksafe B.C. silica and rock dust regulations

Contaminated Sites Hazards					**Comments**
Hazardous Waste		No		No	
Hydrocarbons		No		No	
Metals		No		No	
Other:					
Security Hazards					**Comments**
Risk of Assault	Yes		Yes		
Other:					

Other Hazards	**Comments**

PRELIMINARY HAZARD ASSESSMENT FORM

Other Compliance and Permit Requirements[1]	YES	NO	Notes / Comments[2]
Is a Building Permit required?		**n/a**	
Is a Electrical permit required?		**n/a**	
Is a Plumbing Permit required?		**n/a**	
Is a Sewage Permit required?		**n/a**	
Is a Dumping Permit required?	**TBD**		Contractor shall follow federal/provincial regulations
Is a Hot Work Permit required?	Yes		Mandatory for any hot work process
Is a Permit to Work required?		No	
Is a Confined Space Entry Permit required?	Yes		Mandatory for all Confined Spaces
Is a Confined Space Entry Log required?	Yes		Mandatory for all Confined Spaces
Discharge Approval for treated water required?	n/a	n/a	

Notes:

(1) Does not relieve Contractor from complying with all applicable federal, provincial, and municipal laws and regulations.
(2) TBD means To Be Determined by Contractor.
(3) Contractor and employees (including sub-trades) must attend a CSC/PSPC Security and Safety Orientation prior to gaining any access to institutional property prior to work commencing.

Prime Contractor Acknowledgement: We confirm receipt and review of this Preliminary Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.			
Contractor Name			
Signatory for Contractor		**Date Signed**	
RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE.			

APPENDIX C:

PRIME CONTRACTOR'S MAIN RESPONSIBILITIES

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

Confirmation of Prime Contractor's Main Responsibilities Under the Worksafe B.C. Occupational Health and Safety Regulations and *Worker's Compensation Act*

Name of Project:

Owner: Crown Owned

Contractor:

Consulting Engineer:	YES	NO
1.The Contractor acknowledges appointment as Prime Contractor on the construction project noted below	☐	☐
2.The name of the Prime Contractor's Qualified Coordinator of occupational health and safety activities for this project has been submitted to the Owner and is as shown below.	☐	☐
3. The Prime Contractor understands that in any conflict of directions, WCB OH&S Regulations and/or the Worker's Compensation Act shall prevail.	☐	☐
4. The Prime Contractor understands and will direct that all supervisors/coordinators must immediately report any apparent conflict as described above.	☐	☐
5. The Prime Contractor agrees that their supervisor shall immediately notify the consulting Engineer's representative of any reported conflict.	☐	☐
6. The Prime Contractor has requested and received information from the Owner regarding any known hazards to the health and safety of persons pre-existing at the workplace.	☐	☐
7. The Prime Contractor has conducted an inspection of the workplace to verify the presence of any hazards.	☐	☐
8. The Prime Contractor will communicate hazards information to any persons who may be affected and ensure that appropriate measures are taken to effectively control or eliminate the hazards.	☐	☐
9. The Prime Contractor accepts that written documentation such as notes, records, inspections, meeting minutes, etc., on all health and safety issues must be available upon request to the PWGSC departmental representatives and/or to a WCB officer at the workplace.	☐	☐
10. The Prime Contractor will confirm that all workers are suitably trained and competent to perform the duties for which they have been assigned.	☐	☐
11. The Prime Contractor confirms that safety orientation of all new workers will be conducted.	☐	☐
12. The Prime Contractor's written Safety Program has been provided to the Owner's representative.	☐	☐
13. The Prime Contractor confirms that meetings to exchange information on any safety issues, concerns, hazards or safety directives will be conducted weekly or more often if required.	☐	☐
14. The Prime Contractor confirms that before the commencement of work, crews will attend a daily crew safety meeting.	☐	☐
15. The Prime Contractor confirms that their supervisor has assessed and will coordinate the workplace first-aid requirements	☐	☐
16. The Prime Contractor confirms that the procedure to transport injured workers is established	☐	☐

Prime Contractor Representative's

Name:_____

Title:_____ Signature:_____

Date:_____

Prime Contractor's OH&S Coordinator

Name:_____

Title:_____ Signature:_____

Date:_____

Canada

APPENDIX D:

ENVIRONMENTAL CHECKLIST

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 Effects Evaluation (EEE) and/or the Fish and Fish Habitat Report as supporting documents in the completion of the site Environmental Protection Plan (EPP). Applicable provincial and federal guidelines and regulations should be reviewed prior to submission of the EPP.

EPP Framework	Content Requirements	Yes	No	N/A
Project Setting and Site Activities				
Project Description	A brief description of the project and its location is provided.			
Environmental Sensitivities	Sensitive or protected features that could be impacted as a result of the Contractor's activities are described.			
Site Activities	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				
Project Schedule	A project schedule is provided, including scheduled shut-downs and restricted work periods due to environmental requirements.			
Site Drawing	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				
Potential Environmental Issues and Impacts	The potential environmental issues and impacts that may result from the construction activities are described. Environmental Reports (Environmental Effects Evaluation, Environmental Assessments; Fish and Fish Habitat and Compensation Reports, Aquatics Effects Evaluations 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 and potentially upstream and downstream of proposed works. 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).			
Permits, Approvals, and Authorizations	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 water body as part of construction activities is part of the Contractor's responsibility. Scientific Collection Permits such as licences for Fish Salvage Permits are also the responsibility of the Contractor and are obtained by the Contractor's **environmental monitor/consultant*** who will be completing the salvage.			

Mitigation Strategies	Procedures, controls or best management practices (BMPs) to prevent or reduce adverse impacts on the environment are provided. For example, all work in BC must adhere to the BC MOE "Standards and Best Practices for Instream Works" for those works that are completed below the high water mark. DFO mitigation techniques under the Fisheries Act must also be followed. One useful document that contains information on Ministry of Environment's ecosystems, guidelines and mitigation techniques is from the MOE Ecosystems Branch – Develop With Care 2014 – Environmental Guidelines for Urban and Rural Land Development in BC.			
Erosion and Sediment Control	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 30m 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.			

***Environmental Monitor/Qualified Professional as recognized by the province:** an applied scientist or technologist specializing in a relevant applied science or technology including, but not necessarily limited to, agrology, forestry, biology, engineering, geomorphology, geology, hydrology, hydrogeology or landscape architecture, and who is registered in British Columbia with their appropriate professional organization, and acting under that association's Code of Ethics and subject to disciplinary action by that association, and who, through demonstrated suitable education, experience, accreditation and knowledge relevant to the particular matter, may be reasonably relied on to provide advice within their area of expertise.

APPENDIX E:

EQUIPMENT FORMS

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Land Use Proposal Submission Form – Crane(s)

NAV CANADA file N°./ Ref N°	Transport Canada File N° / Ref N°

GENERAL INFORMATION

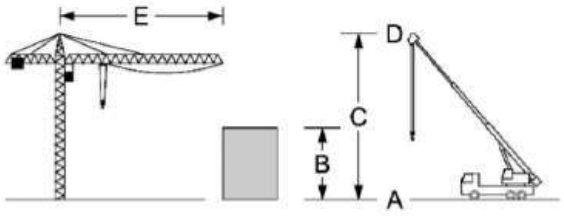
Structure - Company/Owner Name:		Contact Person:	
Address:		City:	Prov: BC	Postal Code:
Tel:	Cell:	Email:	
Crane Company/Applicant:		Contact Person:	
Address:		City:	Prov: BC	Postal Code:
Tel:	Cell:	Email:	

DETAILS OF PROPOSAL

- Please provide the data in the highest degree of accuracy available.
- For geographic coordinates, provide up to four (4) decimal places of a second.
- For ground elevation and tower height, provide up to four (4) decimal places.

Project Identification: Street Address, etc.:	Nearest Town: Province: BC

Geographic Coordinates of Site in NAD 83: Lat. N (Degrees / Minutes / Seconds) Long. W (Degrees / Minutes / Seconds) **For submissions containing more than one set of coordinates, please complete the *Multiple Obstacle Template* and return in Excel format.**

Crane Type:	New Structure? ☐Yes ☐No Type of Structure:		
	**A.** Ground Elevation (Above Sea Level)		☐ft ☐m
	B. Structure Height (Above Ground Level)		☐ft ☐m
	C. Maximum Crane Height (Above Ground Level)		☐ft ☐m
	D. Maximum Elevation (**A** + **C**)		☐ft ☐m
	E. Swing Radius		☐ft ☐m

Note: For Luffing crane, we require the height of the crane at rest.
If installation and/or dismantlement crane exceed the height of the operating crane, this height is required.

Proposed Construction Start Date: 19-Jul-21	Times if Daily use: From hrs To: hrs
Approximate Duration of Construction:	If Temporary Structure, indicate Removal Date: Select

Comments:

Known co-location with/on NAV CANADA Site: ☐Yes ☐No A Third-Party Submission Form may be required for complex applications, fee applicable.

Applicant/Representative Signature	**Print Name**	**Date** 12-Apr-21
Acknowledgement of reading *Detailed Land Use Proposal Guidelines* (Submitter's Initials)		

For a detailed description on NAV CANADA's requirements and additional information, refer to the NAV CANADA website at www.navcanada.ca > Aeronautical Information > Land Use Program.

NAV CANADA's land use evaluation is based on information known as of the date of this letter and is valid for a period of up to 18 months, subject to any legislative changes impacting land use submissions. Our assessment is limited to the impact of the proposed physical structure on the air navigation system and installations; it neither constitutes nor replaces any approvals or permits required by Transport Canada, other Federal Government departments, Provincial or Municipal land use authorities or any other agency from which approval is required. Innovation, Science and Economic Development Canada addresses any spectrum management issues that may arise from your proposal and consults with NAV CANADA Engineering as deemed necessary.

Please submit by email to landuse@navcanada.ca

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Construction Start Notification

File Information

NC File No	TC File No	Proponent File No
21-1757		CYZT - Keogh Bridge Replacement (3675 Byng Rd)

To:	**NAV CANADA, Land Use** 1601 Tom Roberts Ave. Ottawa, ON K1V 1E5 **Email: landuse@navcanada.ca** Fax: 613-248-4094	***From:***	Mr. Jason Tran Transport Canada 3675 Byng Rd; Port Hardy, BC Port Hardy, BC V0N 2P0

Site Information:	***Nearest town:***	Port Hardy, BC
	Latitude (N)	This form must be returned with a completed Excel format spreadsheet.
	Longitude (W)	
	Ground (above sea level)	***ft***
	Structure Height (above ground level)	***ft***
	Total Height (above sea level)	***ft***

Construction Timeline

In the interest of aviation safety, NAV CANADA must be notified at least 10 days in advance of the start of construction. Please enter the construction start date (and end date if required) in the space provided below along with any lighting and marking information (as required by Transport Canada).

Construction start date:
(permanent structures)

Construction dates/times:
(temporary structures or cranes)
From: ***To:***

Daily Usage Times – Indicate date/times for which the crane will be in operation up to the maximum height.

Structure Lighting and/or Marking

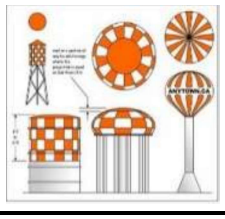
All objects, regardless of their height, that have been assessed by Transport Canada as constituting a hazard to air navigation require marking and/or lighting in accordance with the *Canadian Aviation Regulations* (CARs) and should be marked and/or lighted to meet the standards specified in CAR 621.

Structure will have temporary lighting during construction: ***Yes*** ☐ ***No*** ☐

If no, please provide anticipated date for permanent lighting system to be operational:

Structure will have permanent lighting upon completion:
Yes ☐ ***No*** ☐


Structure will be marked upon completion:
Yes ☐ ***No*** ☐




I hereby certify that the location, height/elevation, construction dates, as well as lighting and marking information contained herein to be true and accurate.

Name	***Signature***
Title	***Date***

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Z-LDU-100 Version 18.6 3 October 2018

Obstacle Information for Assessment

Upon completion

Obstacle ID	LAT dd mm ss.ss	LOG -ddd mm ss.ss	Ground Elevation (Feet)	Structure Height (Feet)	Total Height (Feet)	Crane Swing Radius (Feet)	Lighted Y/N	Painted Y/N	Construction Date
Example 1	60 39 16.59	-110 36 14.01	2162.5001	463.0001	2625.5002		Y	N	15-Jun-07

Transport Canada | Transports Canada

AERONAUTICAL ASSESSMENT FORM
for obstacle notice and assessment

Transport Canada number	
Applicant number	

Owner (company name)		
City	Province/Territory	Postal code (A1A 1A1)
Telephone number (999-999-9999)	Email Address	

Applicant (company name)		
City	Province/State	Postal code (A1A 1A1)
Telephone number (999-999-9999)	Email Address	

Geographic Coordinates ☐ NAD83 ☐ NAD27 ☐ WGS84

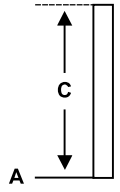
For extensive structures submit geographical coordinates separately (e.g. windturbines, transmission lines, building corners).

N Latitude deg _____ min _____ sec _____

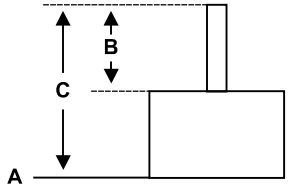
W Longitude deg _____ min _____ sec _____

HEIGHTS	Feet	Metres
A Ground Elevation (AMSL)		
B Height of an addition to a structure		
C Total structure height including **B** (AGL)		
Overall height (**A** plus **C**) (AMSL)		

Structure alone



Structure with an addition



Is the location on lands affected by ***Airport Zoning Regulations (AZRs)***? ◯ Yes ◯ No

Where the object is on lands affected by ***AZRs***, a legal survey attesting conformance is required.

Nearest Aerodrome	Have you contacted the aerodrome? ◯ Yes ◯ No

Description of Project (or attached)

Notice of ◯ New Structure ◯ Change to existing structure

Duration ◯ Permanent ◯ Temporary

Proposed Construction Date: From (yyyy-mm-dd): _____ To (yyyy-mm-dd): _____

Applicant Name	Telephone (999-999-9999)	Date (yyyy-mm-dd)

TRANSPORT CANADA ASSESSMENT (Transport Canada use only)

Marking and lighting required (as per Standard 621)

☐ Night Protection ☐ Day Protection ☐ Temporary Lighting ☐ No protection required

Completion of this form does not constitute authorization for construction nor replace other approvals or permits.

Transport Canada Civil Aviation Inspector Name	Date (yyyy-mm-dd)

Note 1: This assessment expires 18 months from the date of assessment unless extended, revised, or terminated by the issuing office.

Note 2: If there is a change to the intended installation, a new submittal is required.

Canada

INSTRUCTIONS FOR COMPLETING FORM

Submittal: An Aeronautical Assessment Form (AAF) is submitted, If requested by Transport Canada or if there is intent for installation of the following types of construction or alteration, including any appurtenance of more than 12m in height:

(a) of an overall height that exceeds 90 m AGL at the site;

(b) of a height that exceeds an airport OIS (obstacle identification surface) or OLS (obstacle limitation surface) as specified in *Aerodrome Standards and Recommended Practices - TP312*;

(c) for aerodromes (including airports), of a height that exceeds an imaginary surface extending outward and upward at a slope of 2%, from the nearest point of the nearest runway for a horizontal distance of 4500 m and thereafter exceeds a 90m height out to 6km;

(d) for water aerodromes, as (c) except a slope of 4% with the start of the imaginary surface taken as the GPS location published in the Canada Water Aerodromes Supplement (CWAS);

(e) for a heliport, of a height that exceeds an imaginary surface extending outward and upward at a slope of 4%, from the nearest point of the nearest landing and takeoff area, for a horizontal distance of 2250 m and thereafter exceeds a 90 m height out to 6 km;

(f) for catenaries and similar crossings (e.g. bridges), of a height such that any portion of the object exceeds 60 m AGL above the crossed river or valley bottom; or

(g) on lands affected by an Airport Zoning Regulation (AZR) a legal land survey is required with the submittal proving conformance to the AZR.

Completed applications are to be forwarded to the applicable Transport Canada Regional office listed in Standard 621, Appendix A.

Nav Canada: A separate submittal is made to NAV CANADA. Refer NAV CANADA Land Use Program website http://www.navcanada.ca/EN/products-and-services/Pages/land-use-program.aspx

Note: Transport Canada and NAV CANADA Land Use are notified, if the proposed construction does not take place.

Geographic Coordinates: Provide GPS coordinates [in degrees, minutes and seconds] of the object. For extensive objects (e.g. windfarms), provide a separate listing of GPS coordinates for each element of the object (e.g. each windturbine). For buildings, provide coordinates for each corner, and coordinates of the dominant structure on the roof.

Heights: Provide height of the ground elevation Above Mean Sea Level (AMSL), the total structure height Above Ground Level (AGL) and the combined overall height AMSL. For extensive obstacles composed of several objects, provide a separate listing of heights corresponding to GPS coordinates.

Description of Project:

(a) Indicate the type of structure. (e.g. antenna, crane, building, power line, landfill, water tank, wind farm, moored balloon, kite, catenary/cable crossing, etc.)

(b) For catenaries [e.g. electrical power transmission line crossings], include a drawing of the configuration of the wires and the supporting structures with their heights. Indicate the placement of marking/lighting [if used] on the wires.

(c) For existing structures, explain the reason for notifying Transport Canada (e.g. corrections, request for new assessment, etc.).

(d) If the object is on lands affected by Airport Zoning Regulations (AZRs), provide a legal land survey indicating conformance to AZR surfaces.

(e) For a wind farm, include a spreadsheet with individual turbine identification numbers [ID], geographic coordinates [in minutes, degrees and seconds], ground elevation AMSL and the overall height of the object AGL. Identify those windturbines which will have lighting.

(f) Indicate what obstacle marking, lighting and monitoring will be applied. It is the responsibility of the owner to apply the appropriate lighting/marking/monitoring in accordance with Standard 621.

Nearest Aerodrome: Identify the nearest aerodrome. Certified / registered land aerodromes/heliports are contained in the Canada Flight Supplement (CFS) and certified / registered water aerodromes in the Canada Water Aerodrome Supplement (CWAS); both available directly from NAV CANADA.

This form does not constitute authority for construction. Nor does this form replace any approvals, permits or assessments required by NAV CANADA, Industry Canada, other Federal Government departments, Provincial or Municipal landuse authorities or any other agency from which approval/assessment is required.

Canada

APPENDIX F:

FISH HABITAT ASSESSMENT REPORT

KEOGH (GIUYUX) RIVER

TRANSPORT CANADA
BRIDGE REPLACEMENT PROJECT
FISH HABITAT ASSESSMENT

Prepared for:
PUBLIC SERVICES AND PROCUREMENT CANADA
#219 – 800 BURRARD STREET
VANCOUVER, BC
V6Z 0B9

Prepared by:

AQUATERRA ENVIRONMENTAL LTD.

PSPC TA: 700559357; Project #: R.109401.002
AquaTerra Project No. 2016425 (10-01)
REV.0 Submitted: 31 March 2021
REV.1 Submitted: 15 May 2021

Table of Contents

1 Project Background

The Keogh River ('Giuyux'; the 'river') is a 31 km, third-order coastal stream that is situated in the traditional territory of the Kwakiutl First Nation ('Kwakiutl'). The river drains an area of approximately 129 km^2 and flows northwestward into Queen Charlotte Strait near Port Hardy on Northern Vancouver Island. The Port Hardy regional airport lands are located adjacent and northwest of the Keogh River and is serviced by an emergency secondary access point that includes an existing bridge spanning the river (**Figure 1**). The location of the bridge is in an area that is of cultural and historical significance to the Kwakiutl Nation, which included a nearby historical fish weir, stone trap, and community harvests. Transport Canada has determined that the bridge has reached the end of serviceable life and requires a full replacement including new footings and abutments.

Figure 1: Port Hardy Airport, Keogh River, and Transport Canada Bridge Location (Red Arrow).

2 Project Scope and Objectives

The existing Keogh River bridge consists of a 21 m (70 ft.) span Acrow-panel bridge. The bridge is owned by Transport Canada and provides the only means for vehicle access to the east side of the Keogh (Giuyux) River, which serves as an emergency access and provides access to fish counting facilities. The bridge, located approximately 500 m east of the airport runway terminus, was constructed in the 1970s and a recent engineering report completed by WSP (Engineering Service For Keogh Bridge Replacement – Phase 2 Options Study Report; 31 March 2020) concluded that the structural panels illustrated some signs of corrosion, with the bridge abutments constricting the width of the river channel with a risk of erosion failure. The report also noted that the existing timber crib wall abutments are rotting and showing signs of settlement and rotation. The report concluded that the bridge has an estimated live load rating of 9,100 kg, which is considerably less than the original design rating and the required load for use by emergency vehicles. As such, bridge replacement was deemed to be required to ensure continued emergency access to and from the airport.

AquaTerra was retained through PSPC to undertake a Fish Habitat Assessment report to support bridge design considerations and to evaluate potential impacts associated with new bridge construction and existing bridge disassembly. An evaluation of potential cumulative effects associated with construction of the high flow bypass channel, situated upstream of the bridge site, was also evaluated as a component of this assessment. This Fish Habitat Assessment report also serves to provide regulatory agencies (i.e., Fisheries and Oceans Canada [DFO]) with the necessary information to make a determination as a companion document for the submittal of a DFO Project Review application. TC will also review the information and complete the Environmental Effects Evaluation (EEE) in order to make a determination under S.82 of the *Impact Assessment Act*.

3 Background Documentation Review

AquaTerra personnel reviewed available Keogh River background information, as recommended by Fisheries and Oceans Canada (DFO) and the Ministry of Forests Lands and Natural Resource Operations and Rural Development (MFLNRORD) – sourced via EcoCat - as well as information made available by PSPC and the Kwakiutl Band. Pertinent details from reviewed documentation is provided chronologically in the following sections.

3.1 Evaluation of In-stream Enhancement Structures for the Production of Juvenile Steelhead Trout and Coho Salmon in the Keogh River: Progress 1977 and 1978.

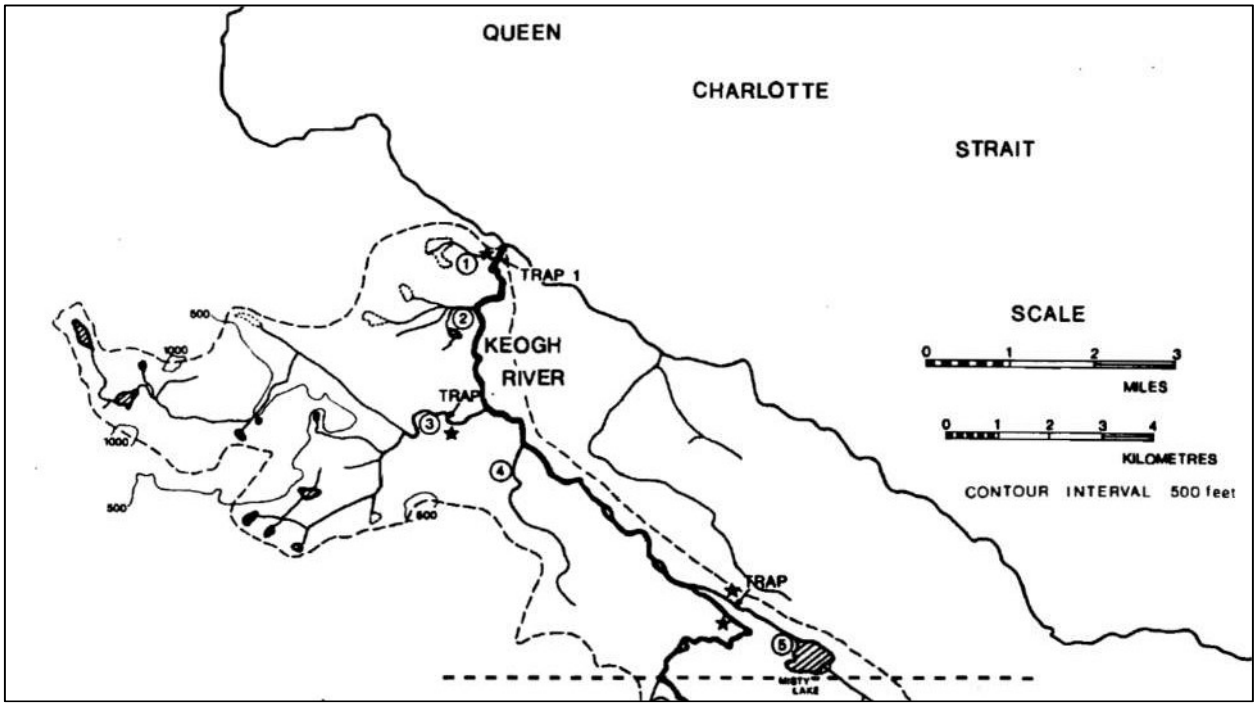
The Keogh (Giuyux) River watershed is reported as being 129 km^2 in area. Riparian habitat was documented as being dominated by Western Hemlock (*Tsuga heterophylla*), Western Redcedar (*Thuja plicata*), Sitka Spruce (*Picea sitchensis*) and Red Alder (*Alnus rubra*), with on-going deforestation in the watershed for at least the preceding 25 years. In 1979, The Ministry of Environment issued an evaluation of In-stream Enhancement Structures for the Production of Juvenile Steelhead Trout (*Oncorhynchus mykiss*) and Coho Salmon (*O. kisutch*). Seven (7) instream structures were installed within the Keogh River including boulder clusters, deflectors with log cover, deflectors, and v-notch weirs.

The Trap 1 location was situated immediately downstream of the existing bridge location (**Figure 2**). Assessed escapements included Pink Salmon (*Oncorhynchus gorbuscha*), Coho Salmon, Chum Salmon (*O. keta*), Sea-run Cutthroat Trout (*O. clarkii*), Dolly Varden (*Salvelinus malma*), Sculpin (*Cottus asper* and *C. aleuticus*), Pacific Lamprey (*Entosphenus tridentatus*), and Three-spine Stickleback (*Gasterosteus aculeatus*).

Water samples, collected at Trap 2 (situated upstream of the bridge site), indicated low nutrient levels in the river (comprised of total nitrogen, total phosphorus), inclusive of low dissolved anions (chloride, phosphate) and cations (magnesium, sodium, potassium) as well as low dissolved solids (less than 40 mg/L in any given month). The dark colouration was noted as being leachate from cedar-hemlock forest and bog habitats.

The results of the study noted that salmonid biomass was higher in boulder enhanced habitats relative to gabion structures during the summer months, with increased density of steelhead parr where increased cover objects were provided. Measured Coho Salmon biomass was highest relative to other species.

Figure 2: 1977 and 1978 Fish Sampling Areas, inclusive of Trap 1 & Trap 2 Locations.



3.2 Adult Steelhead Trout (*Oncorhynchus mykiss*) and Salmonid Smolt Migrations at the Keogh River, BC during Winter 2019 and Spring 2020.

In 2020, Instream Fisheries Research Inc., issued a report entitled 'Adult Steelhead Trout and Salmonid Smolt Migrations at the Keogh River, BC during Winter 2019 and Spring 2020' to MFLNRORD. Mean discharge annually during the reporting period was 5.6 m^3 s^{-1}. The report summarized the number of returning adult Steelhead Trout in 2019 (n=27, comprised of 25 wild; 10 female/15 male, and 2 hatchery). A total of 2,143 Steelhead smolts and 184 steelhead parr were captured in 2020, situated adjacent and downstream of the existing bridge. Mean steelhead smolt abundance from 1990 to 2020 was 2,501. Coho smolt abundance in 2020 was estimated at 80,294 individuals, which is higher than the average number of coho smolts enumerated from 1977 to 2019 (n=67,718), following several years of high smolt production that reportedly appear unrelated to adult spawner escapements.

The report, which is the 46th annual report in its series, notes that freshwater productivity, marine survival, and returning adult Steelhead counts have declined since 1990, with highly variable returns each year. Extensive habitat restoration between 1998 and 2002 in an attempt to reinvigorate Steelhead survivorship and utilization were reportedly met with limited success.

Adult Steelhead enumeration was undertaken using a fish counter between 01 December 2019 and 15 June 2020 approximately 300 m upstream of the smolt fence, near the existing bridge.

Live capture methods were also taken to estimate adult abundance, completed between 15 February and 12 April 2020. Outmigration of juveniles was assessed between 06 April and 08 June 2020, with a combined outmigration of parr and smolts on 14 May 2020 (n=205). A total of 2,143 steelhead smolts and 174 steelhead parr were captured in 2020. Hatchery strays from the nearby Quatse and Cluxewe Rivers also return to the Keogh River annually, comprising up to 28% of the total count in some years.

Coho Salmon were enumerated between 01 September and 30 November 2019. Pink Salmon migration had reportedly concluded by 15 October 2020. The 2019 population estimate for Coho Salmon returns was 684, down from 993 estimated in 2018. Coho smolt abundance and survival had been previously decreasing, reportedly influenced by extensive dry condition reducing utilizable habitat area and increased water temperature during rearing, as well as marine conditions that negatively affect growth and ocean survival.

The presence of both adult Steelhead and Coho Salmon as well as outmigrating juveniles in the vicinity of the bridge indicate utilization by salmonids during migration, rearing and overwintering life stages.

3.3 Keogh River Historic Outflow Channel Restoration

On 01 September 2020, Instream Fisheries Research Inc., issued a report to DFO, Transport Canada, and MFLNRORD relating to the summer 2020 progress associated with the spring 2020 works to restore a historic overflow channel in the lower reaches of the Keogh River. The historical overflow channel was originally constructed along with the Port Hardy Airport with the intended function of distributing water during high flow events that were creating an oxbow and putting airport infrastructure at risk.

The resulting overflow channel was not maintained and became infilled with gravel, large woody debris and vegetation. Over time, a 1.5 m high gravel berm accumulated at the upstream end of the bypass channel, resulting in the resumption of scour and gravel transport in the mainstem during high flow events. Channel restoration efforts were undertaken between 21 July and 26 August 2020. Works included reducing the accumulated gravel within the overflow channel, excavation of the ‘gravel island’ at the fish fence concrete sill (**Figure 3**), reconfiguring large boulders downstream of the fish fence, and restoring the historic channel between the counter site and fish fencing.

Figure 3: 2020 Outflow Channel Restoration Works – adapted from Instream Fisheries Research Inc. Report.

Following completion of the works near the bridge, the overflow channel was constructed, commencing with excavation of the overflow channel at the downstream end with a slight increase in elevation relative to the mainstem to ensure the channel is only active during high flow events (**Figure 4**). The entrance to the restoration channel is to be reinforced with boulders and a rock groyne pending funding in 2021.

Figure 4: 2020 Overflow Channel Restoration Details – adapted from Instream Fisheries Research Inc. Report.

The channel was reportedly completed as a flat-bottomed U-shaped channel with limited channel complexity (**Figure 5**). Presumably this was intended to provide flow conveyance and localized detention capacity only and to reduce the potential for fish stranding. The report confirms this assertion noting that the channel was excavated with a steady downstream gradient to mitigate potential risks associated with stranding and to facilitate fish returning to the mainstem following high flow events.

During channel restoration works, concrete material was uncovered and excavated, which was reportedly used for original channel construction. The material was broken up and re-purposed as bank stabilization along the left bank of the excavated overflow channel. Grass seed and willow (*Salix* sp.) whips were installed to enhance bank stabilization and recruitment of pioneer species.

Figure 5: Restored Channel looking Upstream – adapted from Instream Fisheries Research Inc. Report.

4 Regulatory Correspondence

On 08 March 2021, AquaTerra attended a conference call attended by Trevor Davies, Ph.D., a fisheries stock assessment scientist from the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO), Matt Clarke – Stock Assessment Biologist with DFO, and Mark Tilley, RPBio (Kwakiutl).

Matt Clarke noted that there is a small amount of salmon spawning habitat when conditions are atypical and Pink Salmon redds have been historically observed downstream of the bridge during high returns. Other salmon species likely utilize spawning areas >100 m upstream of the bridge, whereas Cutthroat Trout have been observed utilizing the bridge interface habitat areas. Typical adult migration periods were estimated as early as August 6th for Pink Salmon, early September for Coho Salmon, and Chum Salmon often entering the river along with Coho Salmon. No

Steelhead redds have been reported in the vicinity of the bridge, noting that Steelhead tend to spawn in upper, non-tidal reaches of the river.

Historically, a ford was constructed within 50 m downstream of the bridge (downstream of the counting sill). Excavators have historically crossed the river at this location, which remains shallow and is the recommended crossing location, if an instream crossing is required.

Trevor Davies noted that the Keogh River is a 'flashy system', where water levels can fluctuate rapidly contingent on rainfall. A few decades ago, the airport reportedly constructed an overflow channel with an alternative discharge upstream of the bridge. The absence of maintenance resulted in flooding on airport lands and associated sedimentation. Upstream activities, including forestry/deforestation has increased the bedload movement, which was the primary purpose for the construction of the overflow channel. Gravel removal downstream of the bridge via excavator have occurred every 1-2 years as a result of on-going bedload deposition.

5 Fish Habitat Assessment

On 15-16 March 2021, AquaTerra and Kwakiutl personnel attended the site to evaluate Keogh River fish, aquatic and riparian habitat parameters as well as to evaluate existing bridge conditions, potential impacts associated with the prospective alignment(s), and to collect samples of the bridge and abutments for lead paint and creosote, respectively. Initially, the river was assessed from the bridge deck, evaluating the river flow dynamics, morphology, banks, and riparian vegetation assemblage downstream and upstream of the existing bridge (Photos 1 & 2).

5.1 Substrate Composition

A Remotely Operated Vehicle (RoV) was deployed to the northwest of the bridge. Given the depth and elevated flow rate of the river, the intent of deploying the RoV was to evaluate substrate composition in the vicinity of the bridge. The RoV was fitted with LED lights given the heavily tannin stained water (Photo 3), which limited substrate composition visibility from upland areas and the existing bridge.

Photo 1: Keogh (Giuyux) River looking downstream from the existing bridge.

Photo 2: Keogh (Giuyux) River looking upstream from the existing bridge.

Photo 3: Visibility of Water Column near Existing Bridge.

Substrate downstream of the bridge included isolated boulders (<5%) with cobble (70%) and gravel (25%) (Photo 4). Within the northwestern corner of the bridge, substrate was dominated by coarser cobble (40-50%) with lesser gravel (20-30%) and fines (20-30%) (Photo 5). Kwakiutl personnel noted that some of this material had been reportedly imported to facilitate access to the bridge for pre-construction survey work. Under the bridge (west side), the material was dominated by gravel (60-70%) with 10-20% cobble and fines (Photo 6). To the southwest of the bridge is a localized backwater area where flow is reduced. At this location, substrate was dominated by fines and gravel with some minor Small Woody Debris (SWD). Similarly, the substrate beneath the east side of the bridge was comprised of cobble (10-20%), gravel (40-60%) and fines (20-30%) with SWD present sporadically (Photo 7).

Photo 4: Substrate Downstream of the Existing Bridge - <5% boulders, 70% cobble and 25% gravel.

Photo 5: Substrate – Northwest Corner of the Bridge. 40-50% cobble, 20-30% gravel and 20-30% fines.

Photo 6: Substrate Under the Bridge – West Side. 60-70% gravel, 10-20% cobble and fines.

Photo 7: Substrate Under the Bridge – East Side. 10-20% cobble, 40-60% gravel and 20-30% fines.

5.2 Riparian Habitat

Riparian vegetation in proximity to the bridge (i.e., from the interface of the water to those areas 15 m beyond the top of bank), included Red Alder (*Alnus rubra*), Western Hemlock (*Tsuga heterophylla*), Western Redcedar (*Thuja plicata*), Salmonberry (*Rubus spectabilis*), Hardhack (*Spiraea douglasii*), Willow (*Salix* sp.) and Swordfern (*Polystichum munitum*) (Photo 8). Given the time of the assessment (15-16 March 2021), some dormant species may also be present that weren't readily observed.

Photo 8: Riparian Area Adjacent to the Bridge. Western Hemlock in Foreground and Salmonberry on Right (East) Bank with Sporadic Swordfern Beneath Bridge Deck.

5.3 Fish Sampling and Results

Four (4) Gee / minnow traps were installed on each of the four corners of the bridge (Photo 9) in lower velocity flow areas, and were baited with salmon roe. Traps were set on 15 March 2021 and left to soak overnight and retrieved the following day, after approximately 24 hours. Each trap was slowly retrieved; however, none of the traps resulted in any captures (Photo 10). The timing of the trapping, coinciding with cold water temperatures (4°C on March 15 and 3.5°C on March 16), and occurring prior to salmon fry emergence and smolt/parr outmigration and during a low salmonid productivity/activity period, are anticipated to be the predominant factors contributing to the null captures, and does not indicate an absence of fish utilizing the river at the existing bridge location.

Photo 9: Deployed Gee / Minnow Trap

Photo 10: Empty Retrieved Trap Upstream of the Bridge.

6 Paint and Wood Sampling and Analytical Results

6.1 Sampling Methodology

The bridge railings were sampled for lead paint at two locations (**Figure 6**). Additionally, the abutments were sampled at two locations for creosote (**Figure 6**). The sampling methodology for lead paint consisted of using nitrile gloves and a paint scraping tool to loosen and remove paint from the bridge railings. The resulting paint chips were placed into laboratory-provided sampling bags and subsequently labelled and sealed.

To collect wood samples from the bridge abutments, AquaTerra personnel wore Personal Floatation Devices (PFDs) and located portions of the abutments above the typical High Water Mark (HWM) given that prolonged submergence could reduce the prevalence of creosote at the wood surface-water interface, over time. A boring tool was used to remove the top layer of wood so that the underlying, dry layer could be sampled. Wood samples were collected from the east abutment and the end of the abutment on the west abutment. Approximately 10-20 grams (g) of material were placed into laboratory-provided sampling bags and subsequently labelled and sealed.

Figure 6: Paint (Red Icon) and Wood (Orange Icon) Sampling Locations

6.2 Analytical Results

Table 1 summarizes the analytical results for the paint sample (KRB21-01 and KRB21-02) tested for lead and the wood samples (KRB21-03 and KRB21-04) tested for creosote. Results were compared to the BC Contaminated Sites Regulation Residential Land-use (RL) standard. The results confirm an elevated concentration of lead in the paint samples, approximately 58-60x the RL threshold. With the exception of 2-Methylphenol is sample KRB21-03, the components of creosote were all below detection limits. 2-Methylphenol is also known as *o*-Cresol, and can be a natural component of cedar, or may result from burning or from dipping the ends of wooden abutments in a creosote product. Given that the other constituents were below the detection limits for constituents associated with creosote, the potential for creosote in the wooden abutments are deemed to be 'low'. Although creosote may have been washed away from the surface layers of the wood over time, wood samples were collected above the typical HWM and below the surface of the wood and are therefore anticipated to be representative. Contingent on the ultimate use-case for the wooden abutments, a follow-up sampling event(s) may be warranted at currently inaccessible portions of the abutments.

Table 1: Keogh River Bridge Paint and Wood Abutment Sample Results.

Analyte	Sample ID CSR RL Standard	KRB21-01	KRB21-02	KRB21-03	KRB21-04
Lead	550	**32200**	**33800**		
Phenol	7.5			<0.090	<0.500
2-Methylphenol	1			0.051	<0.200
3 & 4-Methylphenol	-			<0.054	<0.300
2,4-Dimethylphenol	1			<0.072	<0.400

Table 1: Con't.

Analyte	Sample ID CSR RL Standard	KRB21-01	KRB21-02	KRB21-03	KRB21-04
2-Nitrophenol	1			<0.090	<0.500
4-Nitrophenol	1			<0.090	<0.500
2,4-Dinitrophenol	1			<0.143	<0.800
2-Methyl-4,6-dinitrophenol	1			<0.143	<0.800
Acenaphthene	950			<0.090	<0.330
Acenaphthylene	-			<0.090	<0.330
Anthracene	2.5			<0.090	<0.330
Benz(a)anthracene	1			<0.090	<0.330
Benzo(a)pyrene	5			<0.090	<0.330
Benzo(b+j)fluoranthene	1			<0.090	<0.330
Benzo(g,h,i)perylene	-			<0.090	<0.330
Benzo(k)fluoranthene	1			<0.090	<0.330
2-Chloronaphthalene	1500			<0.090	<0.330
Chrysene	200			<0.090	<0.330
Dibenz(a,h)anthracene	1			<0.090	<0.330
Fluoranthene	50			<0.090	<0.330
Fluorene	600			<0.090	<0.330
Indeno(1,2,3-cd)pyrene	1			<0.090	<0.330
1-Methylnaphthalene	250			<0.090	<0.330
2-Methylnaphthalene	60			<0.090	<0.330
Naphthalene	0.6			<0.090	<0.330
Phenanthrene	5			<0.090	<0.330
Pyrene	1000			<0.090	<0.330
Quinoline	2.5			<0.090	<0.330

7 Fish Habitat Assessment Conclusions

7.1 Salmonid Utilization Potential

Based on the review of available background information and the field assessment completed by AquaTerra and Kwakiutl, the project team concludes that the area within 25 m upstream and downstream of the bridge provides suitable rearing and overwintering habitat for juvenile Steelhead and Coho Salmon and all life history stages of Cutthroat Trout given the deep pool at the bridge crossing, eddies, functional instream woody debris and overstorey vegetation. The pool at the bridge crossing was reported to provide holding habitat and high stream velocity refugia for all life stages of Cutthroat Trout and upstream migrating pre-spawn adult Steelhead and Pink,

Chum and Coho Salmon. There is a possibility that, despite the Keogh river backwatering and becoming inundated with sea water at very high tides, Pink Salmon may successfully spawn in the vicinity of the bridge given that developing embryos and possibly alevins can tolerate periodic, low levels of salinity. It is possible that even at very high tide levels, little-to-no seawater reaches the gravels suitable for spawning downstream of the bridge.

8 Potential Fish Habitat Impact Evaluation

8.1 Bridge Construction

Based on the 30 March 2021 meeting with WSP design engineers, AquaTerra understands that the existing bridge can be constructed without requiring any machinery / excavators in the water, and can be accomplished via temporarily reinforcing the existing bridge to accommodate equipment. Given that the new bridge abutments are situated near the top-of-bank, and that there are no pilings or other in-water structures associated with the new bridge design, the impacts associated with the physical construction of the new bridge is anticipated to be 'low'. The design does include a large volume of rip-rap, to be placed on both banks both upstream and downstream of the new bridge to accommodate the new bridge elevation and approaches. The estimated rip-rap area for the left and right banks are 210 m^2 and 200 m^2, respectively. Approximately 80% of the area to be rip-rapped is already occupied by the existing bridge infrastructure. As such, rip-rap coverage in new areas necessitating riparian vegetation removal comprise an area of approximately 80 m^2, which is predominantly within the southwest (left) upstream corner of the new bridge alignment. As such, in the absence of mitigation, there will be a reduction in riparian vegetation (i.e., indirect fish habitat loss) cover in the immediate area of the new bridge. If the design methodology changes and access to the right (east) bank necessitates crossing the channel, there is a potential for direct impact to fish and fish habitat in the absence of appropriate mitigation (discussed in Section 10).

During construction, placement of rip-rap will potentially result in temporary increases in turbidity. Additionally, there is a 'low' potential that fish mortality may result, in the absence of mitigation, if fish are entrained in active work areas during rip-rap placement.

8.2 Bridge Demolition

During existing bridge demolition, potential fish and fish habitat impacts are anticipated to include works associated with timber abutment removal, which have the potential to destabilize the banks and result in localized water quality issues, as well as a low potential for direct mortality during removal. Moreover, there is a potential for impact associated with bridge deck removal, given the confirmed presence of lead paint. Additionally, although 2-methylphenol may be naturally present in natural cedar, it may also be indicative of creosote residue. Appropriate mitigation strategies are discussed in Section 10.

9 Cumulative Effects – High Flow Bypass Channel

The high flow bypass channel is designed to receive flow predominantly during high flow events, increasing instantaneous flow capacity for the system locally and reducing erosive forces via the dissipation of flow energy between the main stem and bypass channel (Photo 11). During the assessment, only a minor inflow into the channel was observed, with a uniform gradient from the upstream-to-downstream portion of the bypass. Observed pools were assessed for fish presence; however, no fish were observed. There is a potential that during summer low-flow events, the bypass channel will become dewatered, resulting in fish stranding, given a number of isolated shallow pools (Photo 12). Although the channel appears to have been designed to minimize this potential, changes in channel morphology over time, and the natural sorting and erosion/deposition within the channel may increase stranding risk.

The upstream end of the bypass channel is not armoured, which poses a risk for erosion during high flow events. Willow had been staked along the right bank and localized portions of the left bank near the top-of-bank and appeared viable. Near the bottom of the bypass channel, AquaTerra and Kwakiutl personnel noted concrete debris placed along the right bank, which was reportedly excavated from the channel and part of the original 'flume' design. As a cost-savings measure, the rip-rap was broken up and used as bank armouring (Photo 12).

In summary, AquaTerra does not anticipate any significant cumulative effects as a result of the high flow bypass channel works as it relates to bridge works.

Photo 11: High Flow Bypass Channel looking downstream (northward).

Photo 12: Broken concrete from the original bypass channel used to armour the banks near the downstream end of the bypass channel.

10 MITIGATION RECOMMENDATIONS

This section provides an overview of mitigation recommendations to minimize potential impacts associated with new bridge construction and existing bridge demolition.

1. The reduced risk window (i.e., the window in which the potential impacts to salmonids are minimized, that accounts for all species – is June 15th to September 15th. Generally, the potential risk of working beyond September 15th incrementally increases as adult salmonids return, necessitating supplementary mitigation measures. The specific windows, by key species are as follows: June 15 to Aug 15 for Pink Salmon, June 15 to Sept 01 for Dolly Varden and Aug 15 – Sept 15 for Cutthroat / Rainbow Trout.

2. Turbidity thresholds are to be monitored / maintained over the duration of instream works within unisolated portions of the river, limited to 8 Nephelometric Turbidity Units (NTUs) above background within a 24 hour period, or <10% of an increase in turbidity when the

background is >50 NTU per the BC Water Quality Guidelines. Fisheries and Oceans Canada (DFO) recommends a maximum of 25 NTU during dry weather conditions and 100 NTU during wet conditions (i.e., >25 mm within a 24 hour period)[1].

3. Bridge installation and bridge demolition must not impede Indigenous fishing activities and unfettered access is to be maintained both during and post-construction.

4. An overarching Environmental Management Plan (EMP) and contractor, site-specific Environmental Protection Plan (EPP) are recommended to ensure compliance with environmental mitigation strategies and adherence to industry Best Management Practices (BMPs). These BMPs include items relating to spill response, re-fueling procedures, and Erosion & Sediment Control (ESC).

5. A Qualified Environmental Professional (QEP) or designated Qualified Environmental Monitor (QEM) under direction of the QEP should be on-site to monitor instream works on a full-time basis, and riparian/bank works on a part-time basis over the duration of works.

6. A fish salvage (two salvage methods, at a minimum) following site isolation are recommended during bridge deconstruction / abutment removal works, and during any instream works (i.e., rip-rap placement) associated with new bridge construction.

7. If equipment / excavators are required to cross the river channel, the crossing is to be designated approximately 20 m downstream at the shallowest point immediately downstream of the fence isolation infrastructure, as this area has been utilized previously by an excavator(s) associated with accumulated gravel removal. Equipment should only enter the water following appropriate isolation of the active work area with rebar and mesh and a fish salvage. Biodegradable lubricants and hydraulic fluids (e.g. vegetable-based lubricants fluids) should be used whenever possible.

[1] I.K. Birtwell, M. Farrell, and A. Jonsson. 2008. The Validity of Including Turbidity Criteria for Aquatic Resource Protection in Land Development Guideline. Fisheries and Oceans Canada. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2852.

8. During rip-rap placement below the high water mark on the new bridge and abutment removal at the existing bridge, silt / turbidity curtains are to be installed parallel to the banks and secured via lead line / chains. Efforts must be made to prevent the silt curtain skirt from getting buried by rip-rap during placement. The area between the curtain and bank is to be isolated and fish, amphibians, snakes and semiaquatic mammals are to be salvaged prior to the onset of works.

9. Contractor shall provide a debris containment system (if required) during removal of the existing bridge to reduce the risk of paint chips or debris from entering the watercourse. Any resulting paint chips and paint on the bridge span should be appropriately managed and disposed of off-site.

10. Advise DFO of the timing of the bridge restoration works, such that any prospective Phase 3 & 4 overflow channel upgrade works could potentially occur concurrently to reduce the disturbance to the Keogh River.

11. If any vegetation removal to accommodate rip-rap placement, new bridge alignment, or existing bridge demolition is required during the peak bird nesting season (15 March – 31 August), a bird nest survey is to be conducted in advance of vegetation clearing. Generally, the nest survey results are valid for 48 hours after the last survey, with the potential to extend up to 5 days contingent on bird activity. Any culturally or ecologically significant plants occurring within areas where vegetation may be removed are to be identified and, if feasible, relocated.

12. A wildlife salvage is to occur prior to rip-rap placement in areas between the high water mark and top-of-bank given the noted amphibian presence in the vicinity of the works.

11 CLOSURE

This report provides comprehensive assessment of fish habitat, with a focus on salmonid species, at the Keogh River Bridge. In the absence of mitigation measures, there is anticipated to be a loss of approximately 80 m^2 of riparian habitat, deemed as an indirect impact to fish habitat. The report has been prepared by Qualified Environmental Professionals from AquaTerra with input from Kwakiutl First Nation, with experience in fish habitat assessments and habitat restoration/enhancement design. Please contact the undersigned if you have any questions.

Digitally signed by Chris Lee
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