Public Services and Procurement Canada

Requisition No: _____

DRAWINGS & SPECIFICATIONS
for

KM485-KM520 BST to Asphalt Conversion

Alaska Highway, British Columbia

Project No. R.116662.002 **January 28, 2022**

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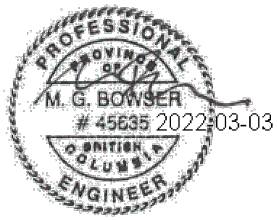

Engineers & Geoscientists BC Permit #1000200

END OF SECTION

DRAWING	DESCRIPTION	REVISION
C000	COVER SHEET	1
C001	DRAWING INDEX	1
C002	LOCATION PLAN	1
C101	PLAN AND PROFILE - STA. 484+485 TO ST. 485+100	1
C102	PLAN AND PROFILE - STA. 485+100 TO ST. 485+760	1
C103	PLAN AND PROFILE - STA. 485+760 TO ST. 486+420	1
C104	PLAN AND PROFILE - STA. 486+420 TO ST. 487+060	1
C105	PLAN AND PROFILE - STA. 487+060 TO ST. 487+700	1
C106	PLAN AND PROFILE - STA. 487+700 TO ST. 488+340	1
C107	PLAN AND PROFILE - STA. 488+340 TO ST. 488+980	1
C108	PLAN AND PROFILE - STA. 488+980 TO ST. 489+620	1
C109	PLAN AND PROFILE - STA. 489+620 TO ST. 490+260	1
C110	PLAN AND PROFILE - STA. 490+260 TO ST. 490+900	1
C111	PLAN AND PROFILE - STA. 490+900 TO ST. 491+540	1
C112	PLAN AND PROFILE - STA. 491+540 TO ST. 492+180	1
C113	PLAN AND PROFILE - STA. 492+180 TO ST. 492+820	1
C114	PLAN AND PROFILE - STA. 492+820 TO ST. 493+460	1
C115	PLAN AND PROFILE - STA. 493+460 TO ST. 494+100	1
C116	PLAN AND PROFILE - STA. 494+100 TO ST. 494+740	1
C117	PLAN AND PROFILE - STA. 494+740 TO ST. 495+380	1
C118	PLAN AND PROFILE - STA. 495+380 TO ST. 496+020	1
C119	PLAN AND PROFILE - STA. 496+020 TO ST. 496+660	1
C120	PLAN AND PROFILE - STA. 496+660 TO ST. 497+300	1
C121	PLAN AND PROFILE - STA. 497+300 TO ST. 497+940	1
C122	PLAN AND PROFILE - STA. 497+940 TO ST. 498+580	1
C123	PLAN AND PROFILE - STA. 498+580 TO ST. 499+220	1
C124	PLAN AND PROFILE - STA. 499+220 TO ST. 499+860	1
C125	PLAN AND PROFILE - STA. 499+860 TO ST. 500+500	1
C126	PLAN AND PROFILE - STA. 500+500 TO ST. 501+140	1
C127	PLAN AND PROFILE - STA. 501+140 TO ST. 501+780	1
C128	PLAN AND PROFILE - STA. 501+780 TO ST. 502+420	1
C129	PLAN AND PROFILE - STA. 502+420 TO ST. 503+060	1
C130	PLAN AND PROFILE - STA. 503+060 TO ST. 503+700	1
C131	PLAN AND PROFILE - STA. 503+700 TO ST. 504+340	1
C132	PLAN AND PROFILE - STA. 504+340 TO ST. 504+980	1
C133	PLAN AND PROFILE - STA. 504+980 TO ST. 505+620	1
C134	PLAN AND PROFILE - STA. 505+620 TO ST. 506+260	1
C135	PLAN AND PROFILE - STA. 506+260 TO ST. 506+900	1
C136	PLAN AND PROFILE - STA. 506+900 TO ST. 507+540	1
C137	PLAN AND PROFILE - STA. 507+540 TO ST. 508+180	1
C138	PLAN AND PROFILE - STA. 508+180 TO ST. 508+820	1
C139	PLAN AND PROFILE - STA. 508+820 TO ST. 509+460	1
C140	PLAN AND PROFILE - STA. 509+460 TO ST. 510+100	1
C141	PLAN AND PROFILE - STA. 510+100 TO ST. 510+740	1
C142	PLAN AND PROFILE - STA. 510+740 TO ST. 511+380	1
C143	PLAN AND PROFILE - STA. 511+380 TO ST. 512+020	1
C144	PLAN AND PROFILE - STA. 512+020 TO ST. 512+660	1
C145	PLAN AND PROFILE - STA. 512+660 TO ST. 513+300	1
C146	PLAN AND PROFILE - STA. 513+300 TO ST. 513+940	1

C146	PLAN AND PROFILE – STA. 513+300 TO ST. 513+940	1
C147	PLAN AND PROFILE – STA. 513+940 TO ST. 514+580	1
C148	PLAN AND PROFILE – STA. 514+580 TO ST. 515+220	1
C149	PLAN AND PROFILE – STA. 515+220 TO ST. 515+860	1
C150	PLAN AND PROFILE – STA. 515+860 TO ST. 516+500	1
C151	PLAN AND PROFILE – STA. 516+500 TO ST. 517+140	1
C152	PLAN AND PROFILE – STA. 516+500 TO ST. 517+140	1
C153	PLAN AND PROFILE – STA. 517+780 TO ST. 518+420	1
C154	PLAN AND PROFILE – STA. 518+420 TO ST. 519+060	1
C155	PLAN AND PROFILE – STA. 519+060 TO ST. 519+700	1
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C201	TYPICAL SECTIONS – SHEET 1	1
C202	TYPICAL SECTIONS – SHEET 2	1
C203	TYPICAL SECTIONS – SHEET 3	1
C204	CULVERT TABLE	1

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Codes, Bylaws, Standards.

.2 Contract Documents.

.3 Other Contracts.

.4 Division of Specifications.

.5 Time of Completion.

.6 Summary of Work.

.7 Contractor's Responsibility.

.8 Hours of Work.

.9 Work Schedule.

.10 Cost Breakdown.

.11 Documents Required.

.12 Regulatory Requirements.

.13 Examination.

.14 Existing Services.

.15 Location of Equipment and Fixtures.

.16 Departmental Representative's Lab and Office Trailer.

.17 Setting Out Work.

.18 Survey.

.19 Quality of Work.

.20 Works Coordinated.

.21 Review of Product Data and Samples.

.22 Project Meetings.

.23 Testing and Inspections.

1.1 Section Includes (Cont'd)

.24 As-Built Documents.

.25 Cleaning.

.26 Environmental Protection.

.27 Additional Drawings.

.28 System of Measurement.

.29 Familiarization with Site.

.30 Submission of Tender.

.31 Measurement and Payment.

1.2 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 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.

1.3 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.

1.4 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.

.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.

1.5 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.

1.6 Time of Completion

.1 Achieve Substantial Performance by September 30, 2022. Achieve Project Completion by October 31, 2022.

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

1.7 Summary of Work

.1 The project scope of works encompasses the conversion of the existing Bituminous Surface Treatment (BST) to a hot-mix asphalt pavement from approximately Km 485 to Km 520 of the Alaska Highway (Highway 97) in Northern British Columbia.

.2 Work under this Contract generally includes, but is not limited to, the following services:
.1 Widening of the roadway embankment and the construction of ditches as indicated on the contract drawings;
.2 Break-up and grading of the existing BST surfacing and asphalt milling of the existing bridges;
.3 Supply and installation of earthworks, granular materials, and asphalt;
.4 Topsoiling and seeding embankments;
.5 Removal and installation of roadway signs and barriers;
.6 Installation of pavement markings and rumble strips;
.7 Installation of culvert extensions
.8 Traffic control;
.9 Other miscellaneous tasks required to complete the works.

.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.

1.8 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 Use of site:
.1 Complete access for execution of work.
.2 Assume responsibility for assigned premises for performance of this work.

1.8 Contractor's Responsibility (Cont'd)

.3 (Cont'd)

.3 Be responsible for coordination of all work activities on site.

.4 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.

.5 Do not unreasonably encumber site with material or equipment.

1.9 Hours of Work

.1 Notify Departmental Representative of all after hours work, including weekends and holidays.

1.10 Work Schedule

.1 Carry on work as follows:

.1 Within 15 days after 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 Commencement and completion of Work of each section of the specifications or drawings as outlined.

.2 On-site works.

.3 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 Management 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.

.7 Traffic Management Plan.

.8 Construction Staging Plan.

.9 Waste Management Workplan.

.10 Construction Equipment List and Rate.

.11 Granular Materials Certificates.

1.10 Work Schedule (Cont'd)

.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.

1.11 Cost Breakdown

.1 Before submitting the first request for a progress payment, submit a breakdown of the Contract lump sum amounts in detail as directed by the Departmental Representative and aggregating the total Contract price.

1.12 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.

1.13 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.

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

1.13 Regulatory Requirements (Cont'd)

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

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.

.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 Departmental Representative's Lab and Office Trailer

.1 Lab Trailer: Provide power and laydown area in vicinity of Contractor's asphalt plant or other location (if desired by the Departmental Representative) suitable for the Departmental Representative's lab testing trailer. Ensure Departmental Representative has vehicle access to the lab and power source as requested by Departmental Representative. If needed, the Contractor shall arrange and pay for an electrician to connect the Departmental Representative's lab testing trailer to the Contractor's generator. Cost associated with providing power to the Departmental Representative's lab testing trailer is considered incidental to the work.

1.17 Departmental Representative's Lab and Office Trailer (Cont'd)

.2 Office Trailer: See Item 1.09 – Departmental Representative's Office Trailer of Section 01 52 00 for requirements for the Departmental Representative's office trailer. Office trailer to be supplied and maintained by the Contractor.

1.18 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.

1.19 Survey

.1 Prior to starting affected work, complete a check of the survey control monument coordinates and elevations for any discrepancies relative to the design and existing conditions. Provide results to the Departmental Representative for review and acceptance as soon as they are discovered. Should a discrepancy be found, await written approval from the Departmental Representative prior to proceeding. If deemed necessary by the Departmental Representative, design adjustments may be made by the Departmental Representative to suit the findings of the survey monument checks undertaken.

.2 Prior to starting on-site construction work, the Contractor is required to complete a check and update of the Full Depth Reclamation Design (Pre-construction Full Depth Reclamation Design Verification). The Contractor's Pre-construction Full Depth Reclamation Design Verification shall be as follows:
.1 The Contractor's Pre-construction Full Depth Reclamation Design Verification shall include an existing ground survey, a comparison to the existing and proposed ground elevations, and updates to the Full Depth Reclamation Regrading proposed cut / fill design provided in the Finished Grading Tables.

1.19 Survey (Cont'd)

.2 (Cont'd)

.2 The Contractor shall document any discrepancies or changes needed to the Finished Grading Tables to achieve the Full Depth Reclamation Regrading design which maximizes the reuse of existing gravels (with minimal side casting), utilizes imported material only where needed (as indicated on the Contract Drawings), provides for a smooth and comfortable ride, achieves the design crossfall and superelevations and achieves the design requirements as provided in Table 01 10 01 – 01. The Contractor shall provide updates to the Finished Grading Tables to the Departmental Representative for review and acceptance a minimum of 7 days prior to starting the work.

.3 The Full Depth Reclamation Design will require the reshaping and repositioning (cut high areas and fill low areas) of BST/granular material resulting from base preparation process, including the repositioning of existing gravels from one side of the highway to the other.

.4 In all instances, the Contractor remains responsible for achieving the Hot Mix Asphalt Concrete Pavement smoothness requirements shown in Table 32 12 16 –11 (see Item 4.8 – Smoothness in Section 32 12 16 – Hot Mix Asphalt Concrete Pavement for details).

Table 01 10 01–01: Full Depth Reclamation Design Criteria

Design Element	Criteria
Proposed Cut/Fill (Original Ground to FDR Regrading Surface)	+/– 20 mm from the values shown for FDR Regrading: Proposed Cut/Fill in the Finished Grading Tables(1)
K Factor for Posted Speed in Region Posted Speed=Design Speed)	Transportation Association of Canada Design Guide for Canadian Roads: 1. Table 3.3.2 K Factors to Provide Stopping Sight Distance on Crest Vertical Curve 2. Table 3.3.5 K Factors to Provide Minimum Stopping Sight Distance on Sag Vertical Curve Based on Comfort Control

Table Note: 1) The Contractor shall provide justification and preapproval from the Departmental Representative for any deviations exceeding these criteria.

.5 If deemed necessary by the Departmental Representative, design adjustments may be made by the Departmental Representative prior to commencement of the Full Depth Reclamation.

1.19 Survey (Cont'd)

.2 (Cont'd)

.6 The Pre-construction Full Depth Reclamation Design Verification shall be incidental to the work. All survey requirements found elsewhere in these specifications shall apply to the survey performed for this design verification.

.7 This process will be completed for the section of Full Depth Reclamation (Km 485 – Km 520).

.3 The Contractor shall be responsible for all layout surveys to complete the work per the design lines and grades, surveys to verify the work is completed to the design requirements for the purposes of verifying progress payment quantities (cu.m, sq.m, or L.S.), and as-built surveys (see Section 01 78 00 – Closeout Submittals). All surveys shall achieve the following:

.1 Be completed / collected to an accuracy of +/-0.02 m horizontal and +/-0.02 m vertical or better and shall be referenced / tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.2 Use industry standards, methods, equipment, and the survey requirements of Item 1.4 – Survey of Section 01 29 00 – Payment Procedures, and other approaches (if necessary) as preapproved by the Departmental Representative.

.4 All layout surveys, quantity surveys, and as-built surveys shall be measured for payment as per Item 1.4.1 – Survey of Contract Specifications Section 01 29 00 – Payment Procedures.

.5 All layout surveys, quantity surveys, monitoring surveys, and quantity calculations for the purposes of progress payments shall be completed by a Professional Engineer, an Applied Science Technologist or Certified Engineering Technician, or other qualified surveyor, with the knowledge, skills and abilities acceptable to the Departmental Representative. The surveyor or person(s) used for these tasks shall have a minimum of 5 years' experience working on projects of similar size, scope and cost. A resume detailing this experience shall be provided to the Departmental Representative for review and acceptance if requested.

1.19 Survey (Cont'd)

.6 Establish working control points based on survey control monuments provided (other monuments not listed shall not be used). Report to the Departmental Representative when a working control point is lost or destroyed because of necessary work. Replace working control points from the project survey control monuments.

.7 Establish / layout the proposed alignment(s) and grades using paint lines and survey stakes based on working control points and survey control monuments provided. Construction work shall not begin until the Departmental Representative has reviewed and accepted the grades shown on the stakes.

.8 The Departmental Representative may elect to verify surveys. Verification of the survey by the Departmental Representative does not abdicate the Contractor's responsibility for the correctness and accuracy of the survey.

.9 Maintain a complete, accurate log of control and survey work as it progresses. On request of the Departmental Representative, submit documentation to verify the accuracy of the field engineering work.

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

.11 The Departmental Representative may, but shall not be obligated to, survey and record the condition of the Work Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If a survey is undertaken and if requested by the Contractor, the Departmental Representative will provide a copy of the survey records to the Contractor for reference.

1.19 Survey (Cont'd)

.12 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.

.13 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractors responsibility to exercise proper care to prevent damage to all property within or adjacent to the Work Site, whether all such property is covered by the survey or not.

1.20 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.

1.21 Works Coordinated

.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.

1.21 Works Coordinated (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.

1.22 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.

1.23 Project Meetings

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

.2 Refer to Section 01 31 19 – Project Meetings for more information on frequency of progress meetings and the Contractor's responsibility.

1.24 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 1.23).

1.24 Testing and Inspections (Cont'd)

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

1.25 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.

1.26 Cleaning

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

1.27 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.

1.28 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.

1.29 System of Measurement

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

1.30 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.

1.31 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.

1.32 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 NOT USED

.1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Mobilization, Demobilization and General Conditions of Contract.

.2 Measurement and Payment.

1.2 Mobilization, Demobilization and General Conditions of Contract

.1 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.

.2 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.

1.3 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.

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 Section Includes

.1 Terms of Payment.

.2 Basis of Payment.

.3 Survey.

1.2 Terms of Payment

.1 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 Progress Payment Request, completed and signed by the Contractor's representative.
.3 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 (Departmental Representative may waive this requirement).
.4 Updated construction progress schedule (accepted project schedule shown as the baseline and actual start dates / completion dates / percent complete shown for each task, see Section 01 32 16 – Construction Progress and Reporting.
.5 All survey information (digital csv file with xyz data and breaklines in DXF file format) for each payment item claimed on the progress payment and measured by survey as defined in the Contract Specifications. For each payment item claimed on the progress payment and measured by survey, provide a Measurement for Payment Survey Details.

1.2 Terms of Payment (Cont'd)

.3 Upon achieving Substantial Performance per GC1.1.4, provide a schedule for the completion of any remaining defects, faults, incomplete work etc. 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, incomplete work etc. 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 Tender Form.

.3 For unit price items in the Tender Form, progress payments shall be made based on the quantities of work in place (prior to excavation or following placement and compaction), compacted (if required), surveyed, and accepted by the Departmental Representative in the field.

.4 For lump sum items in the Tender Form, progress payments shall be made based on the percent of work completed and accepted by the Departmental Representative at the time of the monthly progress payment (excluding Mobilization and Demobilization which is paid per Section 01 25 20).

1.3 Basis of Payment (Cont'd)

.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 (including adjustment to quantities on previous progress payments) shall be made (excluding items resulting from changes to the work made by the Departmental Representative during the work and brought to the attention of the Departmental Representative by the Contractor at the time of the change).

.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.

.9 Measurement for Payment will be at the Departmental Representative's discretion using one or more of the following methods:

.1 Based upon the survey data collected by the Contractor – when the materials have been excavated or placed within the specified tolerances of the design lines and grades shown on the Contract Drawings but not uniformly high or low.

.2 Based upon the survey data collected by the Contractor – when the Contractor's or Departmental Representative's survey data indicates that less materials were excavated or placed than called for by the design lines and grades on the Contract Drawings.

1.3 Basis of Payment (Cont'd)

.9 (Cont'd)

.3 By the design grade / design drawing neat lines – when the Contractor's or Departmental Representative's survey data indicates that materials were excavated or placed outside /beyond the specified tolerances of the design lines and grades on the Contract Drawings.

.10 At any point throughout the project, the Departmental Representative may compile and review the survey data (individual surveys or multiple surveys of particular items of work) to reconcile the total quantities of items of work to date on the project. Adjustments to quantities on future progress payments may then be made per GC5.2 – Amount Payable.

1.4 Survey

.1 Surveys shall be undertaken by the Contractor to verify quantities for payment purposes, or in the case of lump sum items to verify that work has been completed to the design requirements. Survey will be paid as described in Item 1.5 – Measurement and Payment in this Contract Specification Section.

.2 All quantity surveys, quantity calculations, and surveys to verify the work is completed to the design requirements for the purposes of verifying progress payment quantities (cu.m, sq.m, or L.S.) shall be completed to the design requirements by a Professional Engineer, an Applied Science Technologist or Certified Engineering Technician, or other qualified surveyor, with the knowledge, skills, and abilities acceptable to the Departmental Representative. The surveyor or person(s) used for these tasks shall have a minimum of 5 years' experience working on projects of similar size, scope and cost. A resume detailing this experience shall be provided to the Departmental Representative for review and acceptance if requested.

.3 Survey data collected shall be of sufficient density to fully characterize the work. Survey methods and location of surveyed cross sections is subject to prior approval of the Departmental Representative. At a minimum the Contractor shall survey all features at 20 m station intervals (may be reduced to 10 m in locations with grade changes at the discretion of Departmental Representative) and the location of all treatment boundaries including changes in material type / placement, changes in surface treatment, and changes in the terrain.

1.4 Survey (Cont'd)

.4 A survey of the existing ground surfaces, riverbanks, riverbed, stream channels, and other topographic features shall be undertaken by the Contractor prior to initiation of construction, but in areas designated for Clearing and Grubbing after the Clearing and Grubbing has been completed to the satisfaction of the Departmental Representative. The survey shall be provided to the Departmental Representative for review and acceptance. During construction no material shall be placed unless the applicable surveys on the completed surfaces have been carried out and the data accepted by the Departmental Representative, and the completed surface has been inspected and accepted by the Departmental Representative. At the Departmental Representative's sole discretion, payment for work completed and measured by survey may not be made should the Contractor fail to complete necessary surveys, or the surveys be of insufficient quality or detail. All construction layout survey shall be the contractors responsibility and if there is any discrepancy between the contractors Projects existing conditions survey prior to construction and the construction drawings the contractor should immediately present the survey data to the Departments Representative.

.5 Survey data shall be collected at an accuracy of +/–0.02 m horizontal and +/–0.02 m vertical or better and shall be referenced / tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.6 Survey data for each payment line item in the Tender Form and area of work shall be provided to the Departmental Representative as follows:
.1 Digital csv files with the xyz data and an appropriate descriptor code as to the type of material surface or feature being surveyed.
.2 Breaklines for all survey data in DXF file formation or another format pre-approved by the Departmental Representative.
.3 A list of all point descriptors used in the survey data.

.7 Whenever survey data is provided, provide to the Departmental Representative the completed Measurement for Payment Survey Details for each payment line item in the Tender Form and area of work.

1.4 Survey (Cont'd)

.8 Where surveys of an item of work or location of work have been completed multiple times (ex. multiple progress payments), compile individual survey point files into one complete survey file free of overlapping points and other inconsistencies resulting from the completion of individual surveys.

.9 The Contractor shall complete detailed volume calculations using average end area determination or electronic surface to surface comparisons. Details of volume calculations shall be provided to the Departmental Representative for review upon request.

.10 Surveys may be subject to verification by the Departmental Representative. In case of discrepancy, the Departmental Representative's survey will govern.

1.5 Measurement and Payment

.1 Payment for the cost of Survey will be made on the basis of the Price per Unit Bid for Survey in the Tender Form. The Price per Unit Bid shall include all aspects of survey required for the project including layout surveys, quantity surveys, quantity calculations, check of survey control monuments,checksand updates for the Full Depth Reclamation Design (completion of the Pre-construction Full Depth Reclamation Design Verification), as-built surveys, monitoring surveys, and all other survey requirements for the successful completion of the work.

.2 Measurement for Payment for completion of the Survey will be made by Lump Sum based on the percentage of work completed and accepted by the Departmental Representative.

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 Section Includes

.1 Description.

.2 Construction Progress Meetings and Project Meetings.

.3 Construction Organization and Start-Up.

.4 Schedules.

.5 Submittal.

.6 Closeout Procedures.

.7 Measurement and Payment.

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 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.

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

.3 The Contractor shall provide physical space and make arrangements for meetings.

.4 The Contractor is required to attend all bi-weekly progress meetings, and is to ensure the Contractor's on-site supervisor is able to call into the meetings. The Contractor shall make adequate arrangements for the on-site supervisor to call in by being within reliable cell coverage, travelling to utilize a land-line telephone, or by use of a satellite phone.

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

.6 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.

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

.4 (Cont'd)

.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.

.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 and 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 Progress 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.

.3 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

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.

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 Section Includes

.1 Project Schedule.

.2 Schedule Format.

.3 Submission of Schedules

.4 Project Schedule Reporting During the Work

.5 Measurement and Payment.

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 As-built Survey and As-Built Drawing Mark-ups.
.3 Testing and Laboratory Reports
.4 Product Data Sheets
.4 Mobilization.
.5 Work activities and material purchases by segment / locations (unless accepted otherwise, at a minimum each line item of work identified in the tender form shall be identified seperately on the project schedule).
.6 Site Clean-up / De-mobilization.
.7 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 Tender Form 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.

1.6 Measurement and Payment

.1 There will be no measurement for 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 NOT USED .1 Not used.

PART 3 – EXECUTION

3.1 NOT USED .1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Administrative.

.2 Product Data.

.3 Survey and Quality Testing Reports.

.4 Quality Management Plan.

.5 Measurement and Payment.

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 Survey and Quality Testing Reports

.1 Submit certified survey and quality testing reports with progress reports.

1.5 Quality Managment Plan

.1 Prepare and submit to Departmental Representative for review and approval of a Quality Management 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.

1.6 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 Quality Management item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

1.6 Measurement and Payment (Cont'd)

.3 Payment of 10% of the Lump Sum Amount for the Quality Management item shall be authorized after the Contractor has submitted the Quality Management Plan and once this submission has been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 References.

.2 Submittals.

.3 Protection of Public Traffic.

.4 Informational and Warning Devices.

.5 Control of Public Traffic.

.6 Operational Requirements.

.7 Measurement and Payment.

1.2 References

.1 BC Ministry of Transportation and Infrastructure:
.1 2020 Standard Specifications for Highway Construction.
.2 2020 Traffic Management Manual for Work on Roadways.

1.3 Submittal

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

.2 Contractor to submit a Traffic Management Plan complete with Traffic Control Drawings and a Construction Staging Plan to the Departmental Representative for review and approval prior to construction. The entire submission shall conform to the specifications listed in Section 194 – Traffic Management for Work Zones of BC MoTI's Standard Specifications for Highway Construction.

.3 The Traffic Management Plan shall be stamped by a Proffesional Engineer registered in the province of British Columbia.

1.4 Protection of Public Traffic

.1 Comply with the 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 One-way alternating traffic will be permitted. 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" and as approved by the Departmental Representative. Ensure a smooth riding surface during work.

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

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

.6 Provide well-graded, signed, and maintained detours or temporary roads to facilitate passage of vehicle and pedestrian traffic around restricted construction areas.

.7 Provide and maintain reasonable access to property in vicinity of Work and in other areas as specified on Contract Drawings or required by Departmental Representative.

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.

1.5 Informational and Warning Devices (Cont'd)

.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, and miscellaneous warning devices, except those shown on plans as supplied by others, as specified in "2020 Traffic Management Manual for Work on Roadways".

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

.6 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.

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.

.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.

1.6 Control of Public Traffic (Cont'd)

.2 (Cont'd)

.3 (Cont'd)

.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, existing conditions for traffic may be restricted.

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

.3 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.

1.7 Operational Requirements (Cont'd)

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

1.8 Measurement Payment

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

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

.3 Payment of 10% of the Lump Sum Amount for the Traffic Management item shall be authorized after the Contractor has submitted the Traffic Control Plan and Traffic Management Plan and both submissions have been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 PWGSC Update on Asbestos Use.

.2 COVID-19.

.3 References.

.4 Related Sections.

.5 Workers.

.6 Compliance with Regulations.

.7 Submittals.

.8 Responsibility.

.9 Health and Safety Coordinator.

.10 General Conditions.

.11 Project/Site Conditions.

.12 Utility Clearances.

.13 Regulatory Requirements.

.14 Work Permits.

.15 Filing of Notice.

.16 Site Specific Health and Safety Plan.

.17 Emergency Procedures.

.18 Hazardous Products.

.19 Asbestos Hazard.

.20 PCB Removals.

.21 Electrical Safety Requirements.

.22 Electrical Lookout.

.23 Confined Spaces.

1.1 Section Includes (Cont'd)

.24 Powder-Actuated Devices.

.25 Fire Safety and Hot Work.

.26 Fire Safety Requirements.

.27 Fire Protection and Alarm System.

.28 Unforeseen Hazards.

.29 Posted Documents.

.30 Meetings.

.31 Correction of Non-Compliance.

.32 Measurement and Payment.

1.2 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.

1.3 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.

1.4 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 S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
.2 CSA Z1006-16 (R2020) Management of Work in Confined Spaces.

1.4 References (Cont'd)

.4 (Cont'd)
.3 CSA Z462-21 Workplace Electrical Safety Standard
.4 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

.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)

1.5 Related Sections

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

1.6 Workers

.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.

1.7 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.

1.8 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.
.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.

1.9 Responsibility

.1 Assume responsibility as the Prime Contractor for work under this contract.

1.9 Responsibility (Cont'd)

.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.

1.10 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.

1.11 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.

1.12 Project/Site Conditions

.1 Work at site will involve contact with:

.1 Multi-employer work site.

1.12 Project/Site Conditions (Cont'd)

.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.

1.13 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.

1.14 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.

1.15 Work Permits

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

1.16 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.

1.17 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.

.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.

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

.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.

1.18 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.
.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.

1.18 Emergency Procedures (Cont'd)

.3 (Cont'd)
.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.

1.19 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 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.

1.20 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.

1.21 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.

1.22 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, listening 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 Confined Spaces

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

1.25 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.

1.26 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.

1.27 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.

1.28 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.

1.29 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.

1.30 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 Floor plans or site plans. Must be posted in a non-inmate access area and locked up when not being used.
.7 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.
.8 Workplace Hazardous Materials Information System (WHMIS 2015) documents.
.9 Material Safety Data Sheets (SDS).
.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
.11 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.

.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.

1.31 Meetings

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

1.32 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".

1.33 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 NOT USED

.1 Not used.

PART 3 – EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Related Sections.

.2 Definition.

.3 Measurement Procedures.

.4 Regulatory Overview.

.5 Submittals.

.6 Environmental Effects Evaluation.

.7 Site Access and Parking.

.8 Protection of Work Limits.

.9 Erosion Control.

.10 Pollution Control.

.11 Equipment Maintenance, Fueling and Operation.

.12 Operation of Equipment.

.13 Managing Invasive Plant Vegetation.

.14 Fire Prevention and Control.

.15 Wildlife.

.16 Relics and Antiquities.

.17 Waste Materials Storage and Removal.

.18 Wastewater Discharge Criteria.

.19 Camp Wastewater Discharge Criteria.

.20 Drainage.

.21 Site Cleaning and Plant Protection.

.22 Blasting.

.23 Environmental Protection Supplies.

1.1 Section Includes (Cont'd)

.24 Notification.

.25 Environmental Monitoring.

1.2 Related Sections

.1 Section 01 33 00 – Submittal Procedures

.2 Section 02 81 00 – Hazardous Materials

1.3 Definition

.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 habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.3 Environmental Protection Plan: 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.

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

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

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

1.3 Definition (Cont'd)

.7 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.

.8 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.html.

.9 Riparian area – for a stream, 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).

.10 Species at risk: a species that has been defined as at risk of extirpation by either the federal or provincial government.

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

.12 Culturally Modified Trees (CMTs): a CMT is a tree that has been altered by aboriginal people as part of their traditional use of the forest. For more information please see the Handbook for the Identification and Recording of Culturally Modified Trees prepared by the Archaeology Branch B.C. Ministry of Business, Tourism and Culture.

1.3 Definition (Cont'd)

.12 (Cont'd)

.1 Qualified Environmental Professional (QEP): Individuals that may act as QEPs under the Riparian Areas Protection Regulation are defined under Section 21 of the regulation. The QEP must be acting under their professional associations code of ethics and subject to the organizations disciplinary action. QEPs may hold the following designations: Agrologist, Applied technologist or technician, Professional biologist, Professional engineer, Professional forester, Professional geoscientist or Registered forest technologist. 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.

1.4 Measurement Procedures

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

1.5 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 as may be required.

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

.3 Pay specific attention to the provincial BC Land Use Permit, Water License and Quarry Permit.

.4 Pay specific attention to the most current version of the Migratory Birds Convention Act and BMPs surrounding species at risk within project limits.

1.5 Regulatory Overview (Cont'd)

.5 Pay specific attention to the most current version of the provincial BC guidelines under Northeast Region: Terms and Conditions and Timing Windows.

.6 Pay specific attention to most current version of the provincial BC ENV guidelines in Standards and Best Practices for the protection of Caribou, birds and bats.

.7 Pay specific attention to most current version of the ENV Develop with Care Northeast Region.

.8 Where works are anticipated in proximity to watercourses, pay specific attention to the most current version of the BC Water Quality Guidelines.

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 should 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 and approval by the Departmental Representative. The EPP will require the Contractor to carefully think through the entire project, including identifying what activities as works will be occurring, both generally and at specific sites, and by what methods. The Environmental Protection Plan shall be completed by a P.Biol or RPBio, or other qualified professional, and shall, at a minimum include the following:

.1 The specifics of a detailed monitoring program. This includes details and rational concerning sampling locations, timing, duration, and methods, and identification of the person(s) who will be carrying out the monitoring program.

.2 The process and protocol for ensuring that supervisors and individual staff employed by the Contractor are very clear on which environmental standards need to be achieved, how they will be achieved, and establishing how the Contractor will ensure that this is successfully occurring.

1.6 Submittals (Cont'd)

.1 (Cont'd)

.3 Erosion, drainage, and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with the requirements of the applicable ENV Approval or Notification for instream work or under ENV guidelines, and all other applicable regulations including the requirements of these specifications.

.4 Drawings should show locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of any excess or spoil materials including methods to control runoff and to contain materials on-site.

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

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

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

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

.9 Invasive Plants Management Plan that limits the introduction of invasive plant via seed or runners, provides early detection and eradication of small patches of invasive plants, maintains desired plant communities through good management, the revegetating disturbed sites with desired plants and, Evaluates the effectiveness of prevention efforts and adapting plans for the following year.

.10 Outline the avoidance, mitigate measures and Best Management Practices which the Contractor will undertake and implement to ensure compliance with the environmental regulations applicable to the project.

1.6 Submittals (Cont'd)

.1 (Cont'd)

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

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

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

1.7 Environmental Effects Evaluation

.1 N/A.

1.8 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. In consultation with the Departmental Representative, the contractor shall formulate an agreement for worker transportation to and from the work site and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 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.

1.9 Protection of Work Limits

.1 The Contractor shall include in the Environmental Protection Plan (EPP) details on the work limits, how these shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative.

1.10 Erosion Control

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

.2 All applicable on-site sediment control measures shall be constructed and functional prior to initiating activities associated with the construction activities. The Contractor shall prepare an Erosion Control Plan, to be part of the EPP, to the satisfaction of the Departmental Representative.

.3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively, they are to be replaced. The Departmental Representative will monitor the Contractors erosion control performance.

.4 Erosion control measures must be in compliance with both Federal and Provincial legislation. Contractors should be referencing the provincial ENV Standards and Best Practices for the protection of Caribou, birds and bats.

1.11 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.

.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.

1.11 Pollution Control (Cont'd)

.3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 meters from any surface water.

.4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative. If fuel tanks larger than 250L are present within a berm, the contained area should have a holding capacity equal to 125% of the capacity of the largest tank. 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, bridge decks and on-site work such as rock drilling and blasting by methods that are approved by the Departmental Representative. The contractor will install a catchment system so debris from barrier removal and replacement is captured before entering the watercourse.

.6 The Contractor shall provide spill kits, to the satisfaction of the Departmental Representative, at re-fuelling, lubrication and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

.7 Storage and maintenance facilities should have Medical Safety Data Sheets (MSDS) for any hazardous substances, emergency contact list and emergency response and spill-reporting procedures.

1.11 Pollution Control (Cont'd)

.8 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 and environmental monitor shall be notified immediately of any spill as well as the Provincial Emergency Program (1-800-663-3456) and any other provincial authorities. Basic instructions and phone numbers shall be part of the Contractors EPP.

.9 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 as quick as possible.

.10 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative and all relevant inspection agencies (ENV/DFO authorities).

1.12 Equipment Maintenance, Fueling and Operation

.1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing, wheel wash etc.) before delivery to the work site.

.2 Equipment fuelling sites will be identified by the Contractor to the satisfaction of the Departmental Representative. Any fuelling closer than 100 meters to any surface water (streams, wetlands, water bodies or watercourses) including above waterbodies shall require discussion and prior agreement with 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 at with immediate attention to the fuelling operations.

1.12 Equipment Maintenance, Fueling and Operation (Cont'd)

.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 1.11.4 of Pollution Control.

.5 Equipment use on the project shall be fuelled with E10, and low sulphur diesel fuels at only approved areas, and shall conform to local emission requirements. Equipment should also only use biodegradable hydraulic fluid; The Contractor is to ensure that unnecessary idling of the vehicles is avoided.

.6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations satisfactory to the Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in 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. Any equipment that develops a leak should be immediately removed and not allowed to work within or above any watercourses. Before commencing work, all equipment should be steam-cleaned to remove oil, grease and other substances deleterious to aquatic life.

.8 Equipment left on-Site overnight should be equipped with a drip tray.

.9 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.

1.13 Operation of Equipment

.1 Equipment movements shall be restricted to the footprint of the construction area. The work limits shall be identified by stake and ribbon or other methods to the satisfaction of the Departmental Representative. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourse, nor damage aquatic and riparian habitat or trees and plant communities. Where construction activities require working close to surface water, the Contractor is required to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) does not enter any surface water areas.

.2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or top soils) in the trees bordering the right-of-way or into surface water.

.3 When, in the opinion of PSPC, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative.

.4 Restrict vehicle movements to the work limits.

.5 Workers vehicles are to remain within the construction footprint.

1.14 Managing Invasive Plant Vegetation

.1 Keep equipment clean and avoid parking, turning around or staging equipment in known invasive species infested areas, or mow prior to use that will require addressing in an invasive plant management plan provided by the contractor and approved by the QEP.

.2 Wash equipment prior to mobilization to site.

.3 Minimize unnecessary disturbance of roadside aggregates or soil, and retain desirable roadside vegetation whenever possible.

1.14 Managing Invasive Plant Vegetation (Cont'd)

.4 Where possible, begin mowing or brushing in invasive plant free areas and end in infested areas.

.5 Where possible, use only clean fill material from an invasive plant free source.

.6 Whenever possible, re-seed with grass mixtures that are free of weeds, locally adapted, non-invasive, and quick to establish. Spread seed in the early spring or late fall to ensure successful establishment.

.7 Evaluate the effectiveness of prevention efforts and adapting plans for the following year.

1.15 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. Basic firefighting equipment recommended (e.g. a water truck; minimum 2276 litres with 150m of fire hose and a pump capable of producing 172.3 kPa water pressure at the nozzle, three shovels, two Pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all Contractors staff. Contactors 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.

1.15 Fire Prevention and Control (Cont'd)

.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.

1.16 Wildlife

.1 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, elk, buffalo or moose that display aggressive behavior or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.

.2 Notify the Departmental Representative immediately about dens, litters, nests. Carcasses (road kills), bear activity or encounters on or around the site or crew accommodations. Other wildlife related encounters are to be reported within 24 hours.

.3 A Caribou Protection Plan (CPP) should be available during construction to avoid or mitigate any adverse effects on caribou for the duration of the Project. This should include critical risk periods during which the species is especially vulnerable, strategies, best management practices and key roles in implementing the CPP.

.4 Within the EPP there should guidance documents, BMPs guidelines and mitigation measures to avoid death of fish or the harmful alteration, disruption or destruction of fish habitat (HADD).

1.17 Relics and Antiquities

.1 Artifacts, relics, antiquities, and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and any objects found on the work site that may be considered artifacts shall be reported to the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.

1.17 Relics and Antiquities (Cont'd)

.2 All historical or archaeological objects found on the Project site are protected under Federal and Provincial Acts and regulations. The Contractor and workers shall protect any articles found and request direction from the Departmental Representative.

1.18 Waste Materials Storage and Removal

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

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

.3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried, or discarded at the construction site. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the work area. Debris piles at a minimum should be 30 m away from the edge of the Prochniak Creek and Kledo River and referenced in the EPP.

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

.5 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition.

1.19 Wastewater Discharge Criteria

.1 Any waste water discharged to the ground will conform to the discharge requirements set out in the provincial Water Act, or per any Permit obtained for this Project. Any suspect contaminated wastewater or groundwater should be contained and tested for potential contaminants to determine appropriate measures of discharge or removal.

.2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.

1.20 Camp Wastewater Discharge Criteria

.1 Camp wastewater 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 and conform to the discharge requirements set out in the provincial Water Act or applicable Permits.

.2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.

.3 Treat all camp wastewater to conform to the discharge requirements set out in the Water Act Permit.

.4 No direct discharge is allowed to wetland or surface waters.

.5 Contractor must obtain approval from the Water Act Officer prior to discharging treated wastewater.

1.21 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water. Management of drainage should be part of the EPP.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements such as the provincial Water Act.

.4 Where required, water quality should be tested for potential contaminants (turbidity) and the results compared to the BC Water quality Guidelines for aquatic life.

.5 Provide an erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

1.21 Drainage (Cont'd)

.6 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative for review and approval prior to commencing Work in fisheries sensitive areas or in areas that may affect fisheries sensitive areas and specifically address the protection of water bodies, water courses, and the following:
.1 Details of grading Work to prevent surface drainage into or out of Work areas.
.2 Details of erosion control works and materials to be used, including the deployment of silt fencing and other relevant ESC 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.

.7 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.

.8 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.

1.22 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 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.

.4 Minimize stripping of topsoil and vegetation.

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

1.22 Site Clearing and Plant Protection (Cont'd)

.6 Vegetation clearing should be conducted outside of the least-risk timing window for nesting birds , as per federal Nesting Zone B6.

.7 The Contractor should 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.

1.23 Blasting

.1 The Departmental Representative will identify a magazine location for explosives should a factory site or `ready to use` explosive site be required.

.2 The sweep of the blast area shall include looking for wildlife that may be in the area. If any are found, they shall be hazed out of the area by the Environmental Monitoring personnel.

.3 The Contractor shall ensure that all work activities meet or exceed the standards outlined in DFO`s Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters; Canadian Technical Report of Fisheries and Aquatic Sciences 2107, 1998.

.4 The Contractor shall, whenever explosives are used, use the Provincial and Workers Compensation Laws and Regulations, and all respective Agencies Having Jurisdiction over them, such as DFO.

.5 Steps shall be taken to minimize fly-rock and dust. Vegetation outside of the designated area shall not be damaged or destroyed.

.6 In order to stabilize slopes of the cut, these shall be scaled of all loose material. Ditches shall be formed and cleaned upon the completion of the blasting, and the natural drainage shall be restored as specified by the Contract or as directed by the Departmental Representative.

.7 The Contractor shall describe the proposed type and quantities of explosives to be used on the project, to the satisfaction of the Departmental Representative. Some blasting products – such as those very high in nitrogen, may have some limitations imposed for environmental protection purposes.

1.24 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 30 m or more and as required of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. This will be used as necessary to prevent sediment transport into water bodies.

.3 Provide a minimum of 50 lineal 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 81 00 – Hazardous Materials.

.6 Unused Erosion, Sediment and Drainage Control supplies will remain the property of Departmental Representative until the completion of the Contract.

.7 Provide inventory of environmental protection supplies prior to mobilization.

1.25 Notification

.1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.

.2 Contractor: after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.

1.25 Notification (Cont'd)

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.26 Environmental Monitoring

.1 At a minimum the environmental monitoring shall be completed by P.Biol, RPBio, or Qualified Environmental Professional (QEP). If a QEP completes the monitoring, the QEP must work under the direction of the P.Biol or RPBio who completes the Environmental Protection Plan.

.2 The monitoring program must be anticipatory and responsive to construction practices or environmental changes, reflecting the site-specific conditions, level of sensitivity of the receiving environment, potential adverse effects, and level of environmental risk. Submitted documents regarding the proposed monitoring program should clearly identify how monitoring will adhere to this approach.

.3 The monitoring program shall satisfy all regulatory requirements and terms of these specifications. The onus is on the Contractor to monitor and ensure compliance, to identify arising problems, and to subsequently take responsibility and all necessary measures in response.

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 Section Includes

.1 Quality Management Plan.

.2 Inspection.

.3 Independent Inspection Agencies.

.4 Access to Work.

.5 Procedures.

.6 Rejected Work.

.7 Reports.

.8 Test Certificates.

.9 Measurement and Payment.

1.2 Quality Management Plan

.1 Prepare and submit to Departmental Representative for review and approval a Quality Management Plan in accordance with Section 01 33 00 – Submittal Procedures, prior to project startup.

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.

1.3 Inspection (Cont'd)

.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 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.

.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.

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

.3 Payment of 10% of the Lump Sum Amount for the Quality Management item shall be authorized after the Contractor has submitted the Quality Management Plan and once this submission has been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 Installation and Removal.

.2 Water Supply.

.3 Sanitary Facilities.

.4 Heating and Ventilation of Work Area and Enclosures.

.5 Temporary Power and Light.

.6 Temporary Communication Facilities.

.7 Fire Protection.

.8 Measurement and Payment.

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 Sanitary Facilities

.1 Provide sanitary facilities for construction use in accordance with governing regulations and ordinances.

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

1.5 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.

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

.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.
.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.

1.6 Temporary Power and Light

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools and for construction use.

.2 Arrange for connection with appropriate utility company. Pay all costs for installation maintenance and removal.

1.6 Temporary Power and Light (Cont'd)

.3 Provide and maintain temporary lighting throughout project, if applicable.

1.7 Temporary Communication Facilities

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

1.8 Fire Protection

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

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

1.9 Measurement and Payment

.1 There will be no measurement for work covered 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 NOT USED

.1 Not used.

PART 3 – EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Installation and Removal.

.2 Site Storage/Loading.

.3 Construction Access and Parking.

.4 Construction Signage.

.5 Departmental Representative's Office Trailer

.6 Measurement and Payment.

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 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.

1.4 Construction Access and Parking

.1 Parking will be permitted onsite provided it does not impede public traffic.

.2 Provide and maintain adequate access to project site. Refer to Section 01 35 00 – Traffic Control for more details.

.3 If authorized to use existing roads for access to project sites, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads. Provide snow removal within the project limits during period of Work.

1.5 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.

.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.

1.6 Departmental Representative's Office Trailer

.1 Provide Departmental Representative with office trailer positioned in a location on or near highway right-of-way selected by the Departmental Representative between Km 485 and Km 520.

.2 Departmental Representative's Office Trailer shall be of I-beam frame with exterior aluminum or wood siding and panel wall (or similar) interior finish. An office trailer constructed from a sea container with steel walls will not be accepted.

.3 Departmental Representative's Office Trailer shall have:

.1 Outside dimensions measuring a minimum 4.8 m long(excluding hitch) x 2.4 m wide x 2.1 m high, with floor min 0.3 m above grade, complete with 4 windows capable of opening 50% and one lockable door.

.2 Insulation and heating system to maintain 22 degrees C inside temperature at -10 degrees C outside temperature.

.3 Power for the on-site trailer shall be available at all times by means of a generator, supplied and maintained by the Contractor, or by other hook-ups as accepted by the Departmental Representative.

.4 Finished inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.5 Equip office with 1 x 2 m table, 3 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, and one coat rack and shelf.

1.6 Departmental Representative's Office Trailer (Cont'd)

.3 (Cont'd)

.6 Install electric lighting system to provide min 750 1x using surface mounted, shielded commericial fixtures with 10% upward light component.

.7 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet and maintain supply of paper towels and toilet tissue.

.4 If requested by the Departmental Representative, the Contractor is required to move the Departmental Representative's Office Trailer(s) during the project,a maximum of one (1) time per trailer (excluding mobilization and demobilization). Any costs associated with this relocation of the Departmental Representative's Office Trailer(s) is the responsibility of the Contractor. The new location will be directed by the Departmental Representative on or near the highway right-of-way between Km 485 – Km 520.

1.7 Measurement and Payment

.1 Measurement for Payment for completion of the Departmental Representative be made per month, based on the number of months the trailer(s) is required on-site.

.2 Payment for the cost of the Departmental Representative Lump Sum Amount for the Departmental Representative's Office Trailer item. This payment shall include the supply, installation, and maintenance of the Departmental Representative related washroom facilities and all other items necessary for the successful completion of the task.

.3 Payment of 10% of the Lump Sum Amount for the Departmental Representative's Office Trailer item shall be authorized after the Contractor has mobilized the trailer to site. Payment of 80% of the Lump Sum shall be made as a series of monthly payment, based on the number of months the trailer(s) is required on-site. Payment of the remaining 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

.4 There will be no measurement for work (excluding the Departmental Representative's Office Trailer) covered in this Section.

1.7 Measurement and Payment (Cont'd)

.5 Payment for work in this Section (excluding the Departmental Representative's Office Trailer) will be under the Lump Sum Amount for the Traffic Management item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.6 Payment of 10% of the Lump Sum Amount for the Traffic Management item shall be authorized after the Contractor has submitted the Traffic Control Plan and Traffic Management Plan and both submissions have been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 Installation and Removal.

.2 Protection for Trees.

.3 Guard Rails and Barricades.

.4 Dust Tight Screens.

.5 Public Traffic Flow.

.6 Protection for Off Site and Public Property.

.7 Protection of Structure Finishes.

.8 Measurement and Payment.

1.2 Installation and Removal

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from all sites all such work after use.

1.3 Protection for Trees

.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.2 Replace any trees designated for saving in kind that are damaged during construction.

1.4 Guard Rails and Barricades

.1 Provide as required by governing authorities.

1.5 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 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 Section 01 35 00 – Traffic Control for more details.

1.7 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.

1.8 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.

1.9 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 Traffic Management item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.3 Payment of 10% of the Lump Sum Amount for the Traffic Management item shall be authorized after the Contractor has submitted the Traffic Control Plan and Traffic Management Plan and both submissions have been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 Products/Material and Equipment.

.2 Quality of Products.

.3 Availability of Products.

.4 Manufacturer.

.5 Contractor.

.6 Substitution After Contract Award.

.7 Transportation.

.8 Quality of Work.

.9 Coordination.

.10 Remedial Work.

.11 Measurement and Payment.

.12 Acceptable Products.

1.2 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 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.

1.2 Products/Material and Equipment (Cont'd)

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

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

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

.9 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.

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

.11 Store products in accordance with suppliers' instructions.

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

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

.14 Remove and replace damaged products during installation at own expense and to satisfaction of Departmental Representative.

1.3 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.

1.3 Quality of Products (Cont'd)

.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.

1.4 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.

.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.

1.5 Manufacturer

.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.

1.5 Manufacturer (Cont'd)

.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.

1.6 Contractor

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

.2 Products specified under "Acceptable Products": select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.

.3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.4 Products 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.

1.7 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.

1.7 Substitution After Contract Award (Cont'd)

.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.

1.8 Transportation

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

1.9 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.

1.10 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.

1.11 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.

1.12 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.

PART 3 – EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Project Cleanliness.

.2 Final Cleaning.

.3 Measurement and Payment.

1.2 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from sites at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials onsite.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

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 clean and orderly condition.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

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.

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 Section Includes

.1 Definitions.

.2 Documents.

.3 Use of Site and Facilities.

.4 Submittals.

.5 Waste Management Workplan.

.6 Waste Processing Sites.

.7 Disposal of Wastes.

.8 Storage and Handling.

.9 Scheduling.

.10 Measurement and Payment.

.11 Application.

.12 Cleaning.

.13 Diversion of Materials.

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.

1.2 Definitions (Cont'd)

.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.

1.6 Waste Management Workplan (Cont'd)

.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. Refer to Section 01 35 43 – Environmental Procedures for more details on waste material storage.

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 Unit Price Items in the Removals section of the Tender Form 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 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.

3.2 Cleaning

.1 Source seperate materials to be reused/recycled into specific sort areas. Refer to Section 01 74 00 – Cleaning for more details.

3.3 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 Inspection and Declaration.

.2 Measurement and Payment.

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 Quality Management item and such payment shall be full compensation for all labour, equipment and materials necessary to complete the Work.

.3 Payment of 10% of the Lump Sum Amount for the Quality Management item shall be authorized after the Contractor has submitted the Quality Management Plan and once this submission has been reviewed by the Departmental Representative and returned with no comment. Payment of 80% 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 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 Submissions.

.2 Recording As-built Conditions (As-Built Drawings).

.3 As-Built Survey.

.4 Measurement and Payment.

1.2 Submissions

.1 Submit submissions for Departmental Representative review. Following each review, the submission will be returned with the Departmental Representative's comments. Revise and re- submit submission per the comments provided.

.2 Provide the following submissions to the Departmental Representative within two (2) weeks of substantial performance:
.1 As-built drawing mark-ups.
.2 As-built survey.

1.3 Recording As-built Conditions (As-built Drawings)

.1 The Departmental Representative will provide one set of Issued for Construction (or Issued for Tender) drawings for use by the Contractor to record as-built conditions and submit at the completion of the project as the "As-built Drawings".

.2 Record information concurrently with construction progress on the Issued for Construction (or Issued for Tender) drawings. Do not conceal work until the required information is recorded.

.3 Legibly mark each item on the Issued for Construction (or Issued for Tender) drawings and Shop Drawings in red ink to record actual construction conditions and any changes made by addenda and change orders.

.4 Maintain record documents in clean, dry, and legible condition.

.5 Keep record documents available for inspection by the Departmental Representative.

1.3 Recording As-built Conditions (As-built Drawings) (Cont'd)

.6 Submit to the Departmental Representative one copy of Issued For Construction (or Issued for Tender) drawings which have been marked by the Contractor up to include all "as-built" conditions.

1.4 As-Built Survey

.1 At the completion of the work complete an as-built survey of the works. At a minimum the survey shall include.

.1 Topo of all areas disturbed and modified during construction (between limits of clearing including cut and fill slopes, embankment and gravels placed).
.2 Signage (new and modified).
.3 Concrete barriers.
.4 Edge of asphalt.
.5 Pavement markings.
.6 Gravel shouldering.
.7 Any other feature or elements of work incorporated into the project.

.2 The survey to include sufficient point density to adequately characterize the work. Survey methods and point density is subject to prior approval of the Departmental Representative. At a minimum the Contractor shall survey all features at 20 m station intervals and the location of all treatment boundaries including changes in material type / placement, changes in surface treatment, and changes in terrain.

.3 Survey data shall be collected at an accuracy of +/- 0.020 m horizontal and +/- 0.020 m vertical or better and shall be referenced /tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.4 The following files shall comprise the as-built survey provided to the Departmental Representative:

.1 Digital csv file with the xyz data and an appropriate descriptor code as to the type of material surface or feature being surveyed.
.2 Breaklines for all survey data in DXF file formation or another format pre-approved by the Departmental Representative.
.3 A list of all point descriptors used in the survey data.

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 Quality Management item and such payment shall be full compensation for all labour, equipment and materials necessary for complete the Work.

.3 Payment of 10% of the Lump Sum Amount for the Quality Management item shall be authorized after the Contractor has submitted the Quality Management Plan and once this submission has been reviewed by the Departmental Representative and returned with no comment. Payment of 80% of the Lump Sum shall be made as a series of monthly payments, calculated on the basis of expected schedule. If the Work falls behind or gets ahead of schedule, these payments will be adjusted accordingly. Payment of the remaining 10% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

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 Section Includes

.1 Related Sections.

.2 References.

.3 Action and Information Submittals.

.4 Delivery, Storage and Handling.

.5 Measurement and Payment.

.6 Examination.

.7 Preparation.

.8 Removal of Hazardous Wastes.

.9 Demolition/Removal.

.10 Stockpiling.

.11 Restoration and Cleaning.

1.2 Related Sections

.1 Section 01 35 33 – Health and Safety.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 02 81 00 – Hazardous Materials.

1.3 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.

1.4 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.

1.5 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 24 14 – Excavation, Embankment and Compaction.
.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.
.4 Store and protect in accordance with requirements for maximum preservation of material.
.5 Handle salvaged materials as new materials.

1.6 Measurement and Payment

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

.2 Payment will be under the Unit Price Items in the Removals section of the Tender Form 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 if required to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

.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, Section 01 35 43 – Environmental Procedures, and Section 02 81 00 – Hazardous Materials.

3.4 Demolition / Removal

.1 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.

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

.3 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.

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

3.4 Demolition / Removal (Cont'd)

.5 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.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 35 43 – Environmental Procedures.

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

3.6 Restoration and Cleaning (Cont'd)

.5 Waste Management: separate waste materials for reuse 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.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Related Sections.

.2 References.

.3 Definition.

.4 Submittals.

.5 Storage and Handling.

.6 Transportation.

.7 Measurement and Payment.

.8 Materials.

.9 Disposal.

1.2 Related Sections

.1 Section 01 33 00 – Submittal Procedures

.2 Section 01 35 43 – Environmental Procedures

1.3 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).

1.4 Definition

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

1.4 Definition (Cont'd)

.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.

1.5 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.

1.6 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.

1.6 Storage and Handling (Cont'd)

.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.
.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.

1.7 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:

1.7 Transportation (Cont'd)

.3 (Cont'd)

.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.

.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.

1.8 Measurement and Payment

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

.2 Payment will be under the under the Unit Price Items in the Removals section of the Tender Form 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.

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

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Measurement and Payment.

.3 Wood Posts and Hardware.

.4 Existing Sign and Post Removal.

.5 Wood Post Installation.

.6 Sign Mounting.

1.2 References

.1 British Columbia Ministry of Transportation and Infrastructure (BC MoTI):
.1 Manual of Standard Traffic Signs & Pavement Markings (September 2000, or latest edition).
.2 British Columbia MoTI – 2020 Standard Specifications for Highway Construction.

.2 Transportation Association of Canada (TAC):
.1 Manual of Uniform Traffic Control Devices for Canada (January 2020, or latest edition).

1.3 Measurement and Payment

.1 Payment for Regulatory Sign Removals will be made on the basis of the Price per Unit Bid for Regulatory Sign Removals in the Tender Form. The Price per Unit Bid shall include all costs for the removal of existing signs as noted on the Contract Drawings, removal and offsite disposal of existing sign posts, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for Regulatory Sign Removals will be made the count of each Traffic Sign removed and accepted by the Departmental Representative.

1.3 Measurement and Payment (Cont'd)

.3 Payment for Regulatory Sign Relocations will be made on the basis of the Price per Unit Bid for Regulatory Sign Relocations in the Tender Form. The Price per Unit Bid shall include all costs for the removal and reinstallation of existing signs as noted on the Contract Drawings, removal and offsite disposal of existing sign posts, supply and installation of timber posts, field cut of posts to size, hardware, post hole drilling, and all other items necessary for successful completion of the work. Should existing signs be damaged during removal, or are deemed unsuitable for reinstallation by the Departmental Representative, the Price per Unit Bid shall also include all costs for the supply and installation of new signs.

.4 Measurement for Payment for Regulatory Sign Relocations will be made the count of each Traffic Sign installed and accepted by the Departmental Representative.

.5 Payment for New Signage and Posts will be made on the basis of the Price per Unit Bid for New Signage and Post in the Tender Form. The Price per Unit Bid shall include all costs for the supply and installation of signs as noted on the Contract Drawings, supply and installation of timber posts, field cut of posts to size, hardware, post hole drilling, and all other items necessary for successful completion of the work.

.6 Measurement for Payment for New Signage and Posts will be made the count of each Traffic Sign installed and accepted by the Departmental Representative.

PART 2 – PRODUCTS

2.1 Wood Posts and Hardware

.1 The sign posts and hardware shall be in accordance with the BC MoTI 2016 Standard Specification for Highway Construction, Section 635, Subsection 635.27 and the following requirements.

.1 The sign posts shall be 6" Douglas Fir / Larch, No. 1 Grade. Posts shall be straight, free of cracks and supplied in complete lengths without any splices.

PART 3 – EXECUTION

3.1 Existing Sign and Post Removal

.1 Remove existing signs from posts and set aside for later reinstallation. Ensure existing signs are protected from damage during removal. The Contractor shall take necessary precautions to prevent damage to the signs during the removal, transport and temporary stockpiling process. The order and timing of sign removal shall be completed in conjunction with the Contractor's accepted Traffic Management Plan to ensure necessary signage for the protection and control of public traffic is available throughout the construction.

.2 Remove and dispose of existing sign posts at an offsite facility permitted to accept the materials, and acceptable to the Departmental Representative.

3.2 Wood Post Installation

.1 Wood post sign structures shall be installed in accordance with BC MoTI Manual of Standard Traffic Signs & Pavement Markings and BC MoTI Standard Specifications for Highway Construction, see Section 635, subsection 635.27 and subsection 635.32 and the following requirements.

.1 Post embedment depth shall be 1600 mm.

.2 Green and white paint not required.

.3 The post hole shall be made via an auger with a diameter 100 mm or smaller than the post dimensions.

.4 Wood posts shall be installed plumb and at the proper offset and elevation, in accordance with the Contract Drawings and to the satisfaction of the Departmental Representative.

3.3 Sign Mounting

.1 Reinstall existing signs in accordance with BC MoTI Standard Drawings SP635-3.5.6 through SP635-3.5.9 and SS 635.32.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Definitions.

.3 Submittals.

.4 Quality Management.

.5 Measurement and Payment.

.6 Aggregate Source.

.7 Aggregates General.

.8 Crushed Base Course and Base Levelling Course.

.9 Granular Subbase Course.

.10 Embankment.

.11 Common Fill.

.12 Asphalt Mix Aggregate.

.13 Preparation.

.14 Processing.

.15 Handling and Transportation.

.16 Stockpiling.

.17 Cleaning.

1.2 References

.1 British Columbia Ministry of Transportation and Infrastructure (BC MoTI):
.1 2020 Standard Specifications for Highway Construction.

.2 American Society for Testing and Materials (ASTM), latest edition.
.1 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.2 References (Cont'd)

.2 (Cont'd)

.2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D2216, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

.4 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.5 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 Definitions

.1 Asphalt Mix Aggregate: the processed crushed aggregate just prior to the addition of the asphalt cement.

1.4 Submittals

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

1.5 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Control.

.2 The Contractor shall not produce aggregate until the Contractor's Quality Management Plan has been reviewed and accepted per Section 01 45 00 – Quality Control by the Departmental Representative and has in place testing facilities for aggregate production that are in accordance with the accepted Quality Control Plan.

.3 In addition to the Quality Control undertaken by the Contractor, the Departmental Representative may undertake, through an independent testing firm, random sampling, inspection, and testing for the purpose of Quality Assurance.

.4 Provide access to all portions of the work for sampling by the Departmental Representative.

.5 If requested, install sampling facilities at discharge end of production conveyor to allow the Departmental Representative to obtain representative samples of items being produced. Stop or slow conveyor belt when directed by the Departmental Representative to permit full cross-section sampling.

1.5 Quality Management (Cont'd)

.6 Aggregates which do not meet specified tolerances or quality for intended use are subject to rejection by the Quality Control and Quality Assurance processes.

1.6 Measurement and Payment

.1 Payment for Aggregate Materials shall not be made and shall be considered incental to Section 32 11 24 – Crushed Base, Granular Subbase and Base Levelling Course, Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, and any other section as required by these specifications.

PART 2 – PRODUCTS

2.1 Aggregate Source

.1 The Contractor shall provide his own source(s) for all aggregate materials for this project. The Contractor will be solely responsible for ensuring that the aggregate source(s) selected by the Contractor continuously achieve all aggregate material properties, quality and gradation requirements as outlined in this contract specification for the material intended use.

.2 The Contractor will be responsible for the manufacture, screening, blending, aeration or drying, or any other required processing to achieve all material requirements.

.3 A minimum of seven (7) calendar days prior to supply or commencement of manufacture of materials from the Contractor's selected aggregate source(s), provide to the Departmental Representative for review and acceptance the location, name, and owner of material source(s) and test results confirming source(s) meet this Contract's required aggregate material properties and quality.

.1 If the material source has been used in the past as a source of Asphalt Mix Aggregate material for the production of Asphalt Concrete Pavement, the approximate number of past projects and the names / locations of past paving projects most similar in size to this project. Additionally, provide the following for each project: a) Type of asphalt mix provided and tonnage. b) Name, phone number of client site representative for the project.

2.1 Aggregate Source (Cont'd)

.3 (Cont'd)
.2 For Asphalt Mix Aggregate, provide test results for the following tests listed in Table 32 12 16 – 01: Requirements for Coarse Aggregates. The frequency and schedule for the submission of test results shall be per the requirements of Table 01 45 00 – 01.

2.2 Aggregates General

.1 All aggregate materials on the project (regardless of the source) shall at a minimum achieve the following requirements. Should more stringent requirements for a specific aggregate be provided elsewhere in this Contract Specification, the more stringent requirement shall apply.
.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals or other substances that would act in deleterious manner for use intended.
.2 Flat and elongated particles of coarse aggregate (ASTM D4791) to:
.1 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
.3 Fine aggregates to be one or a blend of the following.
.1 Natural sand.
.2 Manufactured sand.
.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
.4 Coarse aggregates to be one or a blend of the following.
.1 Crushed rock.
.2 Gravel comprised of naturally formed particles of stone.
.3 Light weight aggregate, including slag.

2.3 Crushed Base Course and Base Levelling Course

.1 Crushed Base Course and Base Levelling Course shall be manufactured /supplied by the Contractor to ensure the material conforms with the following requirements:
.1 The material shall consist of hard durable particles free from clay lumps, organic matter, and other deleterious materials.

2.3 Crushed Base Course and Base Levelling Course (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.1 Where Crushed Base Course and Base Levelling Course contains some frozen material acceptable to the Departmental Representative and/or the air temperature during placement and compaction is less than or equal to 0°C, the moisture content of the Crushed Base Course and Base Levelling Course when tested in accordance with ASTM D2216 shall be less than or equal to 4%.

.2 When tested in accordance to ASTM C136 / C136M, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 01: Gradation Limits: Crushed Base Course and Base Levelling Course

Sieve Size (mm)	Percent Pssing (%) Sieve Size WGB (25mm)
75	–
50	–
37.5	–
25	100
19	80 – 100
12.5	–
9.5	50 – 85
6.3	–
4.75	35 – 70
2.36	25 – 50
1.18	15 – 35
0.600	–
0.300	5 – 20
0.075	0 – 5

.3 Grading of material shall not show marked fluctuations from opposite extremes of the limits given in Table 31 05 16 – 01, and the curve plotted from the sieve analysis shall flow in a smooth manner free from acute changes in direction.

.4 Even though particle sizes are within the limits of the grading sizes herein provided, materials will be considered unsuitable if particle shapes are thin or elongated or exhibit other characteristics precluding satisfactory compaction.

.5 Liquid limit when tested in accordance to ASTM D4318, maximum 25.

2.3 Crushed Base Course and Base Levelling Course (Cont'd)

.6 Plasticity index when tested in accordance to ASTM D4318, maximum 6.

.7 Los Angeles degradation when tested in accordance to ASTM C131/C131M, maximum percent loss by weight 35.

.8 Fracture: at least 60% of particles by mass retained on 4.75 mm sieve to have at least one fractured face.

2.4 Granular Subbase Course

.1 Granular Subbase Course shall be manufactured / supplied by the Contractor to ensure the material conforms with the following requirements:

.1 The material shall consist of hard durable particles free from clay lumps, organic matter, and other deleterious materials.

.1 Where Granular Subbase Course contains some frozen material accepted by the Departmental Representative and/or the air temperature during placement and compaction is less than or equal to 0 degree Celsius, the moisture content of the Granular Subbase Course when tested in accordance with ASTM D2216 shall be less than or equal to 4%.

.2 When tested in accordance with ASTM C136 /C136M, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 02: Gradation Limits: Granular Subbase Course

Sieve Size (mm)	Percent Passing (%) Sieve Size SGSB
75	100
50	–
37.5	–
25	–
19	15 – 100
12.5	–
9.5	0 – 100
6.3	–
4.75	–
2.36	–
1.18	–
0.600	0 – 100
0.300	0 – 15
0.075	0 – 5

2.4 Granular Subbase Course (Cont'd)

.3 Grading of material shall not show marked fluctuations from opposite extremes of the limits given in Table 31 05 16 – 02, and the curve plotted from the sieve analysis shall flow in a smooth manner free from acute changes in direction.

.4 Even though particle sizes are within the limits of the grading sizes herein provided, materials will be considered unsuitable if particle shapes are thin or elongated or exhibit other characteristics precluding satisfactory compaction.

.5 Liquid limit when tested in accordance with ASTM D4318, maximum 25.

.6 Plasticity index when tested in accordance with ASTM D4318, maximum 6.

.7 Fracture: at least 20% of particles by mass retained on a 4.75 mm sieve to have at least one freshly fractured face.

2.5 Embankment

.1 Embankment shall be in conformance with Section 31 24 14 – Excavation, Embankment and Compaction.

2.6 Common Fill

.1 Common Fill shall be in conformance with Section 31 24 14 – Excavation, Embankment and Compaction.

2.7 Asphalt Mix Aggregate

.1 Asphalt Mix Aggregate shall be in conformance with Item 2.1 – Aggregate (and other sections which may be applicable) of Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

PART 3 – EXECUTION

3.1 Preparation

.1 Prior to excavating materials for aggregate production, strip off and stockpile unsuitable surface material.

3.1 Preparation (Cont'd)

.2 Strip area ahead of quarrying of excavating operation sufficient to prevent contamination of aggregate by deleterious material.

3.2 Processing

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

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified in these Specifications. Use methods and equipment approved by Departmental Representative.

.3 Wash aggregates, if required, to achieve requirements of these specifications. Use only equipment and water approved by Departmental Representative.

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

3.3 Handling and Transportation

.1 Avoid segregation, contamination, and degradation of aggregate during handling and transporting.

.2 Load limit restrictions will be in accordance with British Columbia Highway Motor Vehicle Act pertaining to registered weight limits and vehicle size.

.3 Repair and maintain stockpile / laydown areas as necessary to a condition equal to or better than when work began.

.4 The Contractor shall be responsible for all haul roads required to access aggregate sources. All haul roads used shall be maintained at the Contractor's expense and at the conclusion of the works, left in a condition acceptable to the haul road owner.

3.4 Stockpiling

.1 Stockpile aggregates in locations approved by the Departmental Representative and not closer than 5 m from the edge of the excavation slopes. Do not stockpile on asphalt pavement or BST surfaces.

3.4 Stockpiling (Cont'd)

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

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

.4 Except where stockpiled on acceptably stabilized areas, provide compacted Crushed Base Course, Granular Subbase Couse or Base Levelling Course not less than 300 mm in depth to prevent contamination of aggregate. Do not incorporate compacted base of pile into work.

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

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative.

.7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpiles as required to prevent segregation.

.8 Do not cone piles or spill material over edges of piles.

.9 Do not use conveying stackers.

.10 Prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.5 Cleaning

.1 Any stockpiles temporarily placed on the highway right-of-way or on PSPC property shall be completely removed by the Contractor and the site restored to its natural condition.

.2 The Contractor shall be responsible for any cleanup of aggregate sources.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Definitions.

.2 Protection.

.3 Measurement and Payment.

.4 Preparation.

.5 Clearing.

.6 Grubbing.

.7 Removal and Disposal.

.8 Finished Surfaces.

1.2 Definitions

.1 Clearing: cutting off trees, brushing vegetative growth to ground level and disposing of felled trees, previously uprooted trees and stumps and surface debris. All materials to be removed offsite. Disposal of material by burning will not be accepted.

.2 Grubbing: excavating and disposing stumps and roots to 150 mm below existing ground surface.

.3 License to Cut: License required under Province of British Columbia's Forest Act that authorizes a Contractor to salvage and remove timber from Crown Land.

1.3 Protection

.1 Prevent damage to natural features and man-made structures which are to remain.

.2 Repair any damage caused by Clearing and Grubbing operations and if damaged, replace any trees designated to remain.

1.4 Measurement and Payment

.1 Payment for Clearing and Grubbing will not be made and shall be considered incidental to the applicable payment items found in Section 31 24 14 – Excavation, Embankment, and Compaction.

PART 2 – PRODUCTS

2.1 Products

.1 Not used.

PART 3 – EXECUTION

3.1 Preparation

.1 Inspect the site and verify with the Departmental Representative the limits of Clearing and Grubbing and any items designated to remain.

.2 Unless advised otherwise, receive from the Departmental Representative the License to Cut prior to undertaking the work.

3.2 Clearing

.1 Clear trees, uprooted stumps, vegetative growth, and surface debris designated for removal within the limits of Clearing and Grubbing Clearing shown on the Contract Drawings and as directed by the Departmental Representative.

.2 Cut off branches and cut down trees overhanging area cleared.

3.3 Grubbing

.1 Grub out stumps and wood debris including roots and embedded logs not less than 150 mm below ground surface.

.2 In areas with highway embankment fill, grubbing requirements on the downslope side of embankment fill slope shall be altered be as follows:
.1 No grubbing of stumps flush cut with ground elevation (< 0.1 m in height of surrounding ground).
.2 Clearing of all rocks > 0.3 m in diameter required.

3.4 Removal and Disposal

.1 Dispose of cleared and grubbed materials by chipping / mulching. Chip or mulch and spread cleared vegetative materials that are onsite as directed by the Departmental Representative.

.2 Burning of cleared materials shall not be permitted.

3.5 Finished Surfaces

.1 Leave ground surface in a condition suitable for excavation of existing ground.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Definitions.

.2 Measurement and Payment.

.3 Application.

1.2 Definitions

.1 Deep Patch Repair: The process of removing the failed or unsuitable existing pavement and subgrade materials and strengthen via the installation Nonwoven Geotextile and Crushed Base Course prior to receiving the Hot Mixed Asphalt Concrete Pavement.

1.3 Measurement and Payment

.1 Measurement and Payment for Deep Patch Repair will be made at the applicable unit prices bid for Excavation to Waste, Nonwoven Geotextile and Crushed Base Course and any other sections as required by these specifications. No additional payment will be made for preparing the subgrade surface following the excavation, ready for the subsequent construction.

PART 2 – PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 – EXECUTION

3.1 Application

.1 The areas requiring Deep Patch Repair shown of the Plans, Drawings and Contract Documents will be confirmed via a joint site investigation between Departmental Representative and Contractor prior to the start of Deep Patch Repair.

.2 Deep Patching shall be completed prior to the Variable Depth Reclamation and in conjunction with Crushed Base Course application, but prior to the Hot Mixed Asphalt Concrete Pavement Paving.

3.1 Application (Cont'd)

.3 The work will include excavation and disposal of the existing failed or unsuitable pavement and/or subgrade materials to a 1 m minimum depth followed by compact and preparation of the excavated exposed surface as appropriate for the type of materials. Any loose debris or other excess materials shall be removed from the prepared surface.

.4 Install Nonwoven Geotextile per the applicable section of this specification.

.5 Installation Crush Granular Base Course in accordance with Section 32 11 24, ready for the subsequent Hot Mixed Asphalt Concrete Pavement Paving. The thickness of the Crushed Granular Base Course shall be equal to the depth of excavation and the finished granular surface shall be levelled with the adjacent pavement surface.

.6 The Work shall be done in accordance with the applicable sections of the Specifications and to the satisfaction of the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Definitions.

.2 References.

.3 Measurement and Payment.

.4 Embankment Material.

.5 Excavation to Waste.

.6 Nonwoven Geotextile.

.7 Topsoil.

.8 Stripping of Topsoil.

.9 Excavation and Compaction.

.10 Topsoil Placement.

.11 Ditch and Channel Construction.

1.2 Definitions

.1 Stripping: excavation of organic material covering the original ground.

.2 Excavation: excavation of materials that are not rock excavation or stripping.

.3 Embankment: imported fill and placed above stripped surface.

.4 Rock excavation:
.1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpillar D9L or equivalent and considered integral with parent mass.
.2 Boulder or rock fragments measuring in volume one cubic metres or more.

.5 Imported Fill Material: Fill Material from an approved Off-site Source. The procurement of the Imported Fill is the contractor responsibility.

1.2 Definitions (Cont'd)

.6 Topsoil: organic material free of rocks greater than 150 mm diameter and other debris hindering good vegetative growth.

1.3 References

.1 American Society for Testing and Materials (ASTM), latest edition:

.1 ASTM D4318-10 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.3 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

.4 ASTM D2167-08 Standard Test Methods for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

.5 ASTM D6938-10 Standard Test Methods for In- Place Density and Water Content of Soil and Soil- Aggregate by Nuclear Methods.

.6 ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

.2 Alberta Transportation Testing (ATT):

.1 ATT-58/96 Density Test, Control Strip Method.

1.4 Measurement and Payment

.1 Payment for stripping of topsoil will be made on the basis of the Price per Unit Bid for Stripping (100mm Depth) in the Tender Form. The Price per Unit Bid shall include all costs for the stripping of organic materials, loading, hauling, and stockpiling at an approved stockpiling area, and all other items necessary for successful completion of the work. Measurement of stripping will be the surveyed stripped area by the actual thickness of organic material removed.

.2 No separate payment for Clearing and Grubbing will be made under this contract and all excavation, loading, hauling, removal from the site and all other items necessary for successful completion of the Clearing and Grubbing and will be incidental to the work.

1.4 Measurement and Payment (Cont'd)

.3 Payment for Imported Fill for Embankment construction will include, procurement of acceptable fill material from an approved source, the excavation, transport, and placement of Embankment and will be made on the basis of the Price per Unit Bid for Imported Fill for Embankment in the Tender Form. The Price per Unit Bid shall include all costs for, procurement, excavation, loading, hauling, benching into existing soils, placement as Embankment, compaction, and all other items necessary for successful completion of the work. No separate payment for benching, procurement, hauling or excavation of imported fill material will be made.

.4 Measurement for Payment for completion of Embankment will be made on the volume of material surveyed in cubic metres incorporated into the finished highway embankment (at the completion of compaction) and accepted by the Departmental Representative. No separate measurement for payment of benching, hauling or excavation of the material will be made.

.5 Payment for Excavation to Waste for Embankment and Ditch Excavation – Haul to Waste from the Embankment and Ditch Excavation will be made on the basis of the Price per Unit Bid for Excavation to Waste in the Tender Form. The Price per Unit Bid Shall include all costs for loading of Ditch or Embankment Excavation, hauling and disposing the material at an approved disposal site or area, and all other items necessary for the successful completion of the work. The Contractor shall undertake and submit to the Departmental Representative before and after surveys of the Embankment and Ditch excavations to confirm the quantity of excavation.

.6 Payment for the supply, transport and placement of Nonwoven Geotextile in the Embankment will be made on the basis of the Price per Unit Bid for Nonwoven Geotextile in the Tender Form. The Price per Unit Bid shall include all costs for supply, transport, placement, and all other items necessary for successful completion of the work.

.7 Measurement for Payment for completion of Nonwoven Geotextile will be made on the area of geotextile placed surveyed in square metres and accepted by the Departmental Representative.

1.4 Measurement and Payment (Cont'd)

.8 Payment for placement of Topsoil will be made on the basis of the Price per Unit Bid for Topsoil in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the loading, transport, spreading, racking, and grooming of the previously stripped material being reused as topsoil, and all other items necessary for successful completion of the work.

.9 Measurement for Payment for completion of Topsoil will be made on the area of material surveyed in square metres, incorporated in the works and accepted by the Departmental Representative. Areas of spread wasted excess stripping will not be measured for payment. No separate measurement or payment for hauling of Topsoil will be made.

PART 2 – PRODUCTS

2.1 Embankment Material

.1 Material containing no organic matter by mass, weeds, sod, roots, logs, stumps, frozen lumps, snow, ice or any other unsuitable material unless otherwise directed by Departmental Representative, excavated from a sources provided by the Contractors as detailed in this specification section.

.2 The Contractor may utilize embankment material sourced from the following locations and acceptable to the Departmental Representative:
.1 Suitable imported material from an off-site source.

2.2 Excavation to Waste

.1 All Surplus Embankment Widening and Ditching Excavation Material.

2.3 Nonwoven Geotextile

.1 The Nonwoven Geotextile shall achieve or exceed the following minumum requirement.

Table 31 37 00 – 02: Nonwoven Geotextile

Property	Test	Unit	Value
Grab Tensile Strength	ASTM-D4632	N (lb.)	1335 (300)
Elongation	ASTM-D4632	%	50
CBR Puncture	ASTM-D6241	N (lb.)	3671 (825)
Trapezoidal Tear	ASTM-D4533	195	512 (115)
Apparent Opening Size	ASTM-D4751	Mm (US Sieve)	0.150 (100)
Permittivity	ASTM-D4491	sec-1	1.0
Water Flow Rate	ASTM-D4491	1/m/m2 (gpm/ft2)	3056 (75)
UV Resistance	ASTM-D4355	% retained at 500 hrs.	70

2.4 Topsoil

.1 Material meeting the definition of Topsoil derived from Stripping on the project. Should insufficient quantities of Topsoil be available from Stripping, Topsoil may comprise of other materials from excavation as accepted by the Departmental Representative.

PART 3 – EXECUTION

3.1 Stripping of Topsoil

.1 In areas requiring Clearing and Grubbing, commence Stripping after completion of the Clearing and Grubbing.

.2 Complete Stripping of organic materials to the design lines, grades and depths indicated on the Contract Drawings, and where directed by the Departmental Representative. Stripping shall be completed to the extents as shown on the Typical Section in the Contract Drawings rather than the Cross Sections which show approximate representative stripping.

.3 Limit extent of Stripping as much as possible to facilitate completion of the work. Excessive Stripping as determined by the Departmental Representative will not be measured for payment.

.4 Stockpile Stripped material in uniform layers not greater than 1 m in thickness. During stockpiling operations, prevent ice and snow from becoming intermixed with Stripped materials.

3.1 Stripping of Topsoil (Cont'd)

.5 Ensure Stripped material is not stockpiled in ditches or interferes with the established drainage patterns. Provide drainage ditches around the perimeter of each stockpile as required to prevent ponding of water. Ensure ready runoff of surface water following stockpiling of Stripped materials, to the satisfaction of the Departmental Representative.

.6 The Contractor shall ensure that plank or protected runways shall be provided for operating trucks on stockpiles when the Departmental Representative deems them necessary to prevent dirt from being tracked onto the stockpiled material.

3.2 Excavation and Compaction

.1 Complete excavation to the design lines and grades shown on the Contract Drawings. Notify the Departmental Representative should excavated materials not achieve the requirements for Embankment Material.

.2 During excavation maintain profiles, crowns and cross slopes to provide good surface drainage. Provide ditches as shown on plans or as directed before excavating or placing embankment in adjacent area.

.3 If, during excavation, material appearing to conform to classification for rock excavation is encountered, notify Departmental Representative and provide sufficient time to enable measurements to be made to determine volume of rock. Payment for rock excavation (if required) will be completed via change order.

.4 Use benching for widening the existing embankment such that the constructed embankment becomes keyed into the original soils.

.5 Obtain Embankment materials from an alternative suitable source off site.

.6 The Contractor shall be responsible for the implementation, maintenance, removal, and restoration for all haul roads, temporary drainage structures, and access points / ramps required for the successful completion of the work.

3.2 Excavation and Compaction (Cont'd)

.7 Break material down to sizes that enable required compaction and mix to obtain uniform moisture to full depth of layer. Embankment materials which cannot be compacted to the required density due to high moisture content, or embankment materials with a natural moisture content greater than optimum, shall not be used without prior aeration and drying.

.8 Compact Embankment in accordance with the following:

.1 Where Embankment is free of frozen material and the air temperature during placement and compaction is greater than 0°C:

.1 Compact each layer to minimum 95% maximum dry density in accordance with ASTM D698, except for the top 300 mm of Embankment which shall be compacted to a density not less than 98% of the standard maximum dry density in accordance with ASTM D698. If more than 30% of the Embankment material is oversized (retained on a 19 mm sieve), test compaction of the embankment using proof rolling.

.2 Proof rolling shall require one (1) complete coverage of the entire embankment area for each lift by the tires of a loaded truck having a 9-tonne single axle dual tire or 17-tonne tandem axle group with dual tires with a tire pressure of 600 kPa.

.3 When testing the compaction of the Embankment material using proof rolling, the material shall be within +/- 2% of optimum moisture content. The Embankment material will be considered compacted when upon completing a pass over the Embankment area, the Embankment exhibits no observed unsuitable deflections or rutting.

.4 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

.2 Do not place material which is frozen nor place on frozen surfaces.

.9 Shape entire embankment to within 100 mm of design lines and grades. Finish slopes and ditch bottoms to neat condition, true to lines, grades and drawings where applicable.

.10 Remove rocks over 150 mm in any dimension from slopes and ditch bottoms.

.11 Hand finish slopes that cannot be finished satisfactorily by machine.

3.2 Excavation and Compaction (Cont'd)

.12 Run dozer tracks over slopes exceeding 3 m in height to leave grouser tracks parallel to centerline of highway.

.13 Trim between constructed slopes to provide drainage free of humps, sags, ruts, and protruding stones

.14 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.

3.3 Topsoil Placement

.1 Commence placement of Topsoil upon receipt of a signed Change Order from the Departmental Representative, and following completion and survey of preceding materials which have been accepted by the Departmental Representative.

.2 Load, haul, transport and spread previously stockpiled Stripped materials designated for reuse as Topsoil in locations shown on the Contract Drawings, and as approved by the Departmental Representative.

.3 Place Topsoil to the thicknesses shown on the Contract Drawings +/- 50 mm, but not uniformly high or low. Neatly shape outside limits of Topsoil to eliminate sharp changes in lines and grades. Ensure ready run-off of surface water.

.4 Remove rocks > 150 mm in diameter and other debris hindering good vegetative growth from the placed topsoil.

.5 Finish surface even, free of large openings and neat in appearance.

.6 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.

.7 Previously stripped material not used as Topsoil placement shall be stockpiled in conformance with Subsection 3.1 Stripping of Topsoil in this Specification section, and to the satisfaction of the Departmental Representative.

3.4 Ditch and Channel Construction

.1 Complete the ditch or channel construction to the inverts and to the lines and grades shown on the contract drawings. Ensure excavation will allow for positive drainage.

.2 Dispose of excavated waste material onsite in a condition acceptable to the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Measurement and Payment.

.3 Materials.

.4 Inspection and Survey of Underlying Surface.

.5 Placing.

.6 Compaction.

.7 Tolerances.

.8 Protection.

1.2 References

.1 American Society for Testing and Materials (ASTM).
.1 ASTM D698; Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3)

1.3 Measurement and Payment

.1 Payment for Crushed Base Course, Granular Subbase Course and Base Levelling Course will be made on the basis of the Price per Unit Bid for" Load, Haul, Place and Compact Crushed Base Levelling Course", "Load, Haul, Place and Compact Crushed Base Course" (Shoulder & Widening Structure) and "Load, Haul, Place and Compact Granular Subbase Course" (Shoulder & Widening Structure, as appropriate for the work in the Tender Form. The Price per Unit Bid shall include all costs included with the supply, manufacture, stockpilling, loading, transport, placing, shaping, watering and/or drying and compaction of the Crushed Base Course, Granular Subbase Course and Base Levelling Course and all other items necessary for succesful completion of work.

1.3 Measurement and Payment (Cont'd)

.2 Measurement for Payment for completion of Crushed Base, Granular Subbase and Base Levelling Course will be made on the quantity of material scaled by the Contractor and converted to cubic meter volume for payment purposes using a unit weight determined by quality testing of the Base, Subbase or levelling course aggregate or 2.15 tonnes/m3. Provide a copy of each weigh scale ticket to the Departmental Representative upon delivery of the Base, Subbase or levelling course aggregate to the site or at the end of each workday as directed / approved by the Departmental Representative.

PART 2 – PRODUCTS

2.1 Materials

.1 Material shall be Crushed Base Course, Granular Subbase Course and Base Levelling Course in accordance with the applicable Section of 31 05 16 – Aggregates General. Asphalt millings shall not be used as Crushed Base Gravel unless pre-approved by the Departmental Representative.

PART 3 – EXECUTION

3.1 Inspection and Survey of Underlying Surface

.1 Place Base, Subbase or levelling course aggregate after the underlying surface is surveyed by the Contractor, and inspected and approved by Departmental Representative.

3.2 Placing

.1 Place Base, Subbase or levelling course aggregate in the locations and to lines and grades shown on the contract drawings.

.2 Ensure no frozen material is placed.

.3 Pace material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.

.4 Begin spreading Base, Subbase or levelling course aggregate on the crown line or on the high side of one way slope, using methods which do not lead to segregation or degradation.

3.2 Placing (Cont'd)

.5 Place material in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) after Contractor has shown that specified compaction at 150 mm lift thickness can be achieved.

.6 Shape each layer to smooth contour and compact to specified density before the succeeding layer is placed.

.7 Remove and replace segregated material.

3.3 Compaction

.1 Compact to a density not less than 98% of the Standard Proctor maximum dry density in accordance with ASTM D698. Material shall be unfrozen and free from snow and ice during testing.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted structure.

.3 Apply water as necessary during compacting to obtain specified density. If Base, Subbase or levelling course aggregate is excessively moist, take remedial action as directed by Departmental Representative.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.5 Correct surface irregularities by loosening and adding or removing material until the surface is within the specified tolerance

.6 If prior to placement of succeeding material, the finished surface is subject to freezing temperatures, the finished surface shall be subject to retesting of compaction to the same frequency as the initial compaction testing. If necessary additional compaction effort shall be applied until minimum compaction density is achieved.

3.4 Tolerances

.1 Finished base surface to be within plus or minus 20 mm of the design lines and grades but not uniformly high or low.

3.5 Protection

.1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative. No separate payment will be made for maintenance.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Definitions.

.2 Measurement and Payment.

.3 Equipment.

.4 Variable Depth Reclamation Design Verification.

.5 Reclamation in Widening Areas.

.6 Base Preparation.

.7 Regrading.

.8 Compaction.

.9 Surface Tolerances.

.10 Protection and Cleanup.

1.2 Definitions

.1 Variable Depth Reclamation: in-place reclamation procedure in which the existing BST and a predetermined portion of the underlying granular materials are scarified, mixed, and blended into a homogeneous material and incorporated into the road base, reshaped by grading, and compacted.

1.3 Measurement and Payment

.1 Payment for Variable Depth Reclamation will be made on the basis of the Price per Unit for "100mm Depth Reclamation (Pulverize & Grade)" or "200mm Depth Reclamation at Bridge Approaches (Pulverize & Grade)", as appropriate for the treatment depth, in the Tender Form. The Price per Unit shall include all costs associated with scarifying, mixing, regrading to the design lines and grades, grading of excess materials onto shoulder /embankment, adding water and/or drying material for compaction, compaction, grading of intersecting roads (up to radii) prior to Hot Mix Asphalt Concrete Pavement, and all other items necessary for successful completion of the work. The Variable Depth Reclamation Design Verification required by the Contractor shall be considered incidental to the work.

.2 Measurement and Payment for completion of Variable Depth Reclamation will be made on the area of material surveyed in square metres, incorporated into the works, and accepted by the Departmental Representative.

.3 The limits of Variable Depth Reclamation measured for payment is defined as 0.5 m beyond the edge of existing Bituminous Surface Treatment (BST) or 0.5 m from the proposed edge of Asphalt Concrete Pavement (whichever location is furthest from the centerline). Any grading required beyond this limit (including grading at driveways at intersections) to achieve design lines and grades / positive drainage and grading of excess materials will not be measured for payment.

.4 Note that the areas of highway shown on the Contract Drawings as requiring embankment widening and import of Well-grade Base aggregate materials to achieve the design width will be included in the area measured for Variable Depth Reclamation payment.

PART 2 – PRODUCTS

2.1 Equipment

.1 The Variable Depth Reclamation process shall be completed using a pulvi-mixer or other preapproved equipment. In all cases, the equipment selected by the Contractor shall be capable of scarifying the existing BST and granular materials into constituent particles and mixing the existing BST and granular materials into a single homogeneous material.

PART 3 – EXECUTION

3.1 Variable Depth Reclamation Design Verification

.1 Prior to beginning Variable Depth Reclamation work, the Contractor shall be responsible to perform a Variable Depth Reclamation Design Verification in accordance with Contract Specification Section 01 11 55 – General Instructions Subsection 1.19 – Survey. The results of this verification shall be provided to the Departmental Representative for review and acceptance prior to starting Variable Depth Reclamation. Unless notified otherwise by the Departmental Representative, the Contractor shall proceed with the Variable Depth Reclamation layout and regrading utilizing the results from the Variable Depth Reclamation Design Verification.

.2 The Variable Depth Reclamation Design Verification shall be completed for each section of Variable Depth Reclamation

3.2 Reclamation in Widening Areas

.1 In areas where the width of the existing highway is too narrow to accommodate the Design cross-section configurations or necessary to correct cross slopes and/or superelevation, embankment widening will be required to provide the necessary subgrade width. Imported Well-grade Base aggregate materials will be placed atop the prepared subgrade ready to be blended with the pulverized materials from the existing Bituminous Surface Treatment (BST) and underlying granular layer to the specified depth (100mm or 200mm as appropriate) and compacted to provide a uniform granular base course for the subsequent Hot Mix Asphalt Pavement.

3.2 Reclamation in Widening Areas (Cont'd)

.2 Areas requiring embankment widening aggregate import and extended width reclamation shall be as shown on the Contract Drawings.

3.3 Base Preparation

.1 Complete base preparation such that Variable Depth Reclamation is completed over a maximum of 10 lane kilometers prior to the application of Hot Mix Asphalt Concrete Pavement, unless otherwise approved by the Departmental Representative In all instances, the active area of Variable Depth Reclamation (area which has not yet received a bottom lift of Hot Mix Asphalt Concrete Pavement) shall not exceed the equivalent volume of asphalt mix aggregate material stockpiled at the asphalt plant which would be required to place the bottom lift of Hot Mix Asphalt Concrete Pavement over the entire area of active Variable Depth Reclamation.

.2 Confirm limits of Variable Depth Reclamation and Hot Mix Asphalt Concrete pavement by marking out and reviewing in the field with the Departmental Representative prior to starting BST to ACP conversion works. Locating the design limits of Variable Depth Reclamation may require the use of a hand shovel and removal of surfacing in select shoulder locations.

.3 Scarify and mix the existing BST and underlying granular materials to the full width of the BST surface or as indicated on the Contract Drawings and the limits confirmed by the Departmental Representative and depth as follows:
.1 Existing BST pavement surface outside bridge approach areas: 100 mm (measured from the top of existing BST).
.2 The reclamation depth shall be increased to 200 mm depth at the bridge approaches (i.e., Kledo Creek bridge at km 509.1 and Steamboat Creek bridge at km 515.9) and extended to 100 m on either end.

.4 Reduce existing BST, and granular materials to a 50 mm maximum particle size.

.5 Scarify and mix existing BST, asphalt (where applicable), and granular materials such that the material is mixed and blended into a homogeneous material.

3.3 Base Preparation (Cont'd)

.6 Complete base preparation prior to the import of Crushed Base Gravel in select locations identified on the Contract Drawings.

3.4 Regrading

.1 Regrade and move BST/granular material within the highway driving surface to achieve the design lines and grades as shown on the Contract Drawings.

.2 Should any excess BST/granular material result from the regrading process, grade the excess material onto the shoulder / embankment. Ensure positive drainage from the highway driving surface is maintained.

.3 The finished reclamation grading / elevations may be subject to verification by the Departmental Representative at regular intervals.

3.5 Compaction

.1 Shape and roll alternately to obtain smooth, even, and uniformly compacted subgrade surface.

.2 Compact the entire width of BST/granular material and all regrading within the limits of the Variable Depth Reclamation. Place lifts a maximum of 200 mm thick and complete necessary compaction. Complete proof rolling to confirm compaction before placement of additional material through regrading.

.3 Compact to a density not less than 98% of the Standard Proctor maximum dry density in accordance with ASTM D698. Material shall be unfrozen and free from snow and ice during testing.

.4 Shape and roll alternately to obtain smooth, even and uniformly compacted structure.

.5 Apply water as necessary during compacting to obtain specified density. If Base, Subbase or levelling course aggregate is excessively moist, take remedial action as directed by the Departmental Representative.

.6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

3.5 Compaction (Cont'd)

.7 Correct surface irregularities by loosening and adding or removing material until the surface within the specified tolerance.

.8 Test compaction of each lift and the final Variable Depth Reclamation surface using proof rolling. Proof rolling shall require one complete coverage of the entire embankment area for each lift by the tires of a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. Proof rolling details shall be included in the Contractor's Quality Management Plan, as described in Section 01 45 00 – Quality Control.

.9 When testing the compaction of the BST/granular material using proof rolling, the material shall be considered compacted when upon completing a pass over the BST/granular material, the BST/granular material exhibits no observed deflections or rutting.

.10 Apply water as necessary or dry material as necessary during the compaction process to obtain specified compaction.

3.6 Surface Tolerances

.1 Reshape compacted surface to be within plus or minus 20 mm of the design lines and grades as indicated on Contract Drawings and to the grades and cuts/fills shown on the Contract Drawings but not uniformly high or low.

.2 Correct surface irregularities by moving existing materials through the grading process until the surface in within the specified tolerance.

3.7 Protection and Clean-up

.1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied.

.2 Following placement of Hot Mix Asphalt Concrete Pavement but prior to Gravel Shouldering, regrade material which has spilled onto embankment shoulder from Variable Depth Reclamation process. Ensure embankment shoulder has consistent and smooth grades to the satisfaction of the Departmental Representative.

3.7 Protection and Clean-up (Cont'd)

.3 Regrade and clean ditches to the satisfaction of the Departmental Representative should any material have been transported into the ditches from the Variable Depth Reclamation process.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Definitions.

.3 Submittals.

.4 Quality Management.

.5 Measurement and Payment.

.6 Asphalt Cement.

.7 Anti-stripping Agent.

.8 Anti-stripping Agent Dosage Rate.

.9 Delivery of Asphalt Cement.

.10 Storage.

.11 Execution.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.
.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

.2 American Association of State Highway and Transportation Officials (AASHTO), latest edition.
.1 AASHTO M 320, Standard Specification for Performance-Graded Asphalt Binder.

.3 British Columbia Ministry of Transportation and Infrastructure.
.1 Recognized Product List (latest version available at time of tender closing).

.4 Alberta Transportation.
.1 Alberta Transportation Approved Products List.

1.3 Definitions

.1 Supply: Supply will include ordering, purchase, scheduling, delivering, supplying storage facilities, handling, storing, heating, sampling, testing, and other related work.

1.4 Submittals

.1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering Asphalt Cement and Anti-stripping agent, submit manufacturer's instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing materials meet the requirements of this contract specification.

.3 For each load of Asphalt Cement delivered for the project, provide to the Departmental Representative within 24 hours of delivery, the bill of lading prepared by the Asphalt Cement manufacturer indicating:

.1 Delivery date/time/location.
.2 Type of Asphalt Cement and Anti-stripping agent product.
.3 Batch number.
.4 Mass.
.5 Relative density at 15 °C.
.6 PG specification information.
.7 Temperature of product at delivery point.
.8 Percentage by weight of Asphalt Cement of the Anti- stripping agent added to the Asphalt Cement at the Asphalt Cement manufacturing facility prior to delivery to the project site.

.4 For each load of Asphalt Cement delivered for the project, prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Cement material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

1.5 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Control.

1.5 Quality Management (Cont'd)

.2 Provide access throughout the work as requested by the Departmental Representative to sample asphalt cement to be incorporated into work.

1.6 Measurement and Payment

.1 Payment for the supply and incorporation of Asphalt Cement into the Hot Mix Asphalt Concrete Pavement shall not be made and shall be considered incidental to Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

PART 2 – PRODUCTS

2.1 Asphalt Cement

.1 Asphalt Cement, Performance Grade (PG) 52-34 to meet the requirements of AASHTO M320.

.2 Asphalt Cement shall be supplied by one of the "Accepted Producers" from one of the accepted "Terminal Supplier from Accepted Producers" as indicated in the Asphalt Cement section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List.

2.2 Anti-Stripping Agent

.1 The Contractor shall select, supply, and have incorporated into the Asphalt Cement at the Asphalt Cement manufacturing facility prior to delivery of the Asphalt Cement to the project site, an antistrip additive from the "Liquid Anti-Strip Additives – Reviewed Products" list of the Alberta Transportation Approved Products List. The anti- strip additive shall be from the "Group A" product list. Anti- strip additives from the "Group B" list will not be accepted. The dosage rate shall be in accordance with Item 3.1 – Anti- stripping Dosage Rate of this specification.

PART 3 – EXECUTION

3.1 Anti-stripping Agent Dosage Rate

.1 The Anti-stripping Agent dosage rate shall be a minimum of 0.3% by weight of Asphalt Cement or greater as necessary to achieve the minimum tensile strength ratio (TSR) of 80 in the Asphalt Concrete Mix (see Item 2.4 – Asphalt Concrete Mix and Job Mix Formula of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement). The use of a dosage rate of > 0.5% by weight of Asphalt Cement to achieve the minimum TSR of 80 shall be pre-approved by the Departmental Representative.

3.2 Delivery of Asphalt Cement

.1 The Contractor shall ensure the supplier delivers asphalt in good condition, uniform in product, and at correct temperature to the specified delivery point.

.2 Record of delivery must be kept, and every bill of lading must show:

.1 Delivery date/time/location.
.2 Type of Asphalt Cement and Anti-stripping agent product.
.3 Batch number.
.4 Mass.
.5 Relative density at 15 °C.
.6 PG specification information.
.7 Temperature of product at delivery point.
.8 Percentage by weight of Asphalt Cement of the Anti- stripping agent added to the Asphalt Cement at the Asphalt Cement manufacturing facility prior to delivery to the project site.

3.3 Storage

.1 The Contractor is responsible for properly storing and heating the Asphalt Cement until use.

3.4 Execution

.1 As required in the production of Hot Mix Asphalt Concrete Pavement as specified in Section 32 12 16.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Definitions.

.3 Submittals.

.4 Measurement and Payment.

.5 Materials.

.6 Equipment.

.7 Application.

1.2 References

.1 American Society for Testing and Materials (ASTM).
.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoTI).
.1 Recognized Product List (latest version available at time of tender closing).

1.3 Definitions

.1 Asphalt Tack Coat: an application of liquid asphalt to promote bonding between two separate lifts of Hot Mix Asphalt Concrete Pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering materials, submit manufacturer's instructions, printed product literature, and datasheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing Asphalt Tack Coat materials meet the requirements of this contract specification.

1.4 Submittals (Cont'd)

.3 For each load of Asphalt Tack Coat delivered for the project, provide to the Departmental Representative within 24 hours of delivery, the bill of lading prepared by the Asphalt Tack Coat manufacturer indicating:
.1 Delivery date/time/location.
.2 Type of Asphalt Tack Coat product.
.3 Material production location.

.4 Prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Tack Coat material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.5 Provide access as requested by the Departmental Representative to sample Asphalt Tack Coat material throughout the work.

.6 For each application, submit a written summary report to Departmental Representative within 24 hours of application and include information as follows:
.1 Total area covered (station start and end, width, and lane).
.2 Quantity of Asphalt Tack Coat used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

1.5 Measurement and Payment

.1 Payment for Asphalt Tack Coat will be made on the basisof the Price per Unit Bid for Supply and Install Asphalt Tack Coat in the Tender Form. The Price per Unit Bid shall include all costs included with the supply, transport, storage, heating, handling,and placement of the Asphalt Tack Coat, and all other items necessary for successful completion of work.

.2 Measurement for Payment for completion of Supply and Install Asphalt Tack Coat will be made on the area of material surveyed in square metres, incorporated in the works and accepted by the Departmental Representative. Any Asphalt Tack Coat used to correct defective Hot Mix Asphalt Concrete Pavement shall not be measured for payment (see Section 32 12 16 – Hot Mix Asphalt Concrete Pavement).

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt Tack Coat shall be one of the "Accepted Products" from one of the accepted "Producers" as indicated in the Primers section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List. Note: The product SS–1 will not be accepted as an Asphalt Tack Coat product.

.2 Water shall be clean, potable, and free of foreign matter.

PART 3 – EXECUTION

3.1 Equipment

.1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for the duration of Work.

.2 Pressure distributor:
.1 Designed, equipped, maintained, and operated so that asphalt material can be.
.1 Maintained at even temperature.
.2 Applied uniformly on variable widths of surface up to 6 meters.
.3 Applied at readily determined and controlled rates from 0.2 L/m2 and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m2.
.4 Distribute in uniform spray without atomization at the temperature required.
.5 Apply tack coat to the contact edge (longitudinal joint) of any adjacent asphalt at the same rate as other surfaces.

.3 Equipped with meter, registering travel in meters per minute, visibly located to enable the truck driver to maintain constant speed required for application at a specified rate.

.4 Equipped with the pump having flow meter graduated in units of 2 L or less per minute passing through nozzles and readily visible to the operator. Pump power unit to be independent of the truck power unit.

3.1 Equipment (Cont'd)

.5 Equipped with an easily read, accurate and sensitive device that registers the temperature of the liquid in the reservoir.
.1 Measure temperature to the closest whole number.

.6 Equipped with an accurate volume measuring device or calibrated tank.

.7 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

.8 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 meters and capable of being raised or lowered.

.9 Cleaned if previously used with incompatible asphalt material.

3.2 Application

.1 Apply Asphalt Tack between lifts of Hot Mix Asphalt Concrete Pavement. Apply Asphalt Tack Coat only when preceding surface is clean, dry, and unfrozen.

.2 If desired by the Contractor, dilute asphalt emulsion with water at 1:1 ratio for application if recommended by the Asphalt Tack Coat supplier and preapproved by the Departmental Representative. Mix thoroughly by pumping or other method approved by Departmental Representative.

.3 Apply Asphalt Tack Coat evenly to Hot Mix Asphalt Concrete Pavement surface at a rate between 0.2 L/m2 and 0.4 L/m2 unless recommended otherwise by the product manufacturer and preapproved by the Department Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of Asphalt Tack Coat material.

.5 The contact edge (longitudinal joint) of any mat placed by the Contractor shall be coated with Asphalt Tack Coat before placing the adjacent mat. The contact edge of the longitudinal joint shall be coated with the same Tack Coat product, at the same rate, using the same equipment (spray truck) as is being applied to the full width of Hot Mix Asphalt Concrete Pavement mat.

3.2 Application (Cont'd)

.6 Apply Asphalt Tack Coat only when the air temperature is greater than 10°C and when rain is not forecast within 2 hours of application.

.7 Apply Asphalt Tack Coat only to surfaces that are expected to be overlaid on the same day.

.8 Evenly distribute localized excessive deposits of Asphalt Tack Coat by brooming as directed by Departmental Representative.

.9 Where traffic is to be maintained, apply no more than one-half of the width of the surface in one application.

.10 Keep traffic off tacked areas until Asphalt Tack Coat has set.

.11 Re-apply Asphalt Tack Coat to contaminated or disturbed areas.

.12 Allow sufficient time for Asphalt Tack Coat to set before placing Hot Mix Asphalt Concrete Pavement as directed by Departmental Representative and in accordance with the supplier recommendations.

.13 Inspect Asphalt Tack Coat application to ensure uniformity.

.1 Re-apply Asphalt Tack Coat to areas of insufficient or non-uniform coverage.

.2 Ensure Asphalt Tack Coat applied using handheld devices is consistent in appearance with adjacent areas of machine-applied material.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Definitions.

.3 Submittals.

.4 Measurement and Payment.

.5 Materials.

.6 Equipment.

.7 Application.

1.2 References

.1 American Society for Testing and Materials (ASTM).
.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoTI).
.1 Recognized Product List (latest version available at time of tender closing).

1.3 Definitions

.1 Asphalt Prime Coat: an application of liquid asphalt to promote bonding between the finished 100mm or 200mm Depth Reclamation /Crushed Base Course or Granular Subbase course surface, as appropriate, and the bottom lift of Hot Mix Asphalt Concrete Pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering materials, submit manufacturer's instructions, printed product literature, and datasheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing Asphalt Prime Coat materials meet the requirements of this contract specification.

1.4 Submittals (Cont'd)

.3 For each load of Asphalt Prime Coat delivered for the project, provide to the Departmental Representative within 24 hours of delivery, the bill of lading prepared by the Asphalt Prime Coat manufacturer indicating:
.1 Delivery date/time/location.
.2 Type of Asphalt Tack Coat product.
.3 Material production location.

.4 Prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Prime Coat material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.5 Provide access as requested by the Departmental Representative to sample Asphalt Prime Coat material throughout the work.

.6 For each application, submit a written summary report to Departmental Representative within 24 hours of application and include information as follows:
.1 Total area covered (station start and end, width, and lane).
.2 Quantity of Asphalt Prime Coat used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

1.5 Measurement and Payment

.1 Payment for Asphalt Prime will be made on the basis of the Price per Unit Bid for Supply and Install Asphalt Prime Coat in the Tender Form. The Price per Unit Bid shall include all costs included with the supply, transport, storage, heating, handling, and placement of the Asphalt Prime, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Supply and Install Asphalt Prime Coat will be made on the area of material surveyed in square metres, incorporated in the works, and accepted by the Departmental Representative.

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt Prime Coat shall be one of the "Accepted Products" from one of the accepted "Producers" as indicated in the Primers section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List.

.2 Water shall be clean, potable, and free of foreign matter.

.3 Sand blotter shall be sand or fine aggregate.

PART 3 – EXECUTION

3.1 Equipment

.1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for the duration of Work.

.2 Pressure distributor:

.1 Designed, equipped, maintained, and operated so that asphalt material can be.

.1 Maintained at even temperature.

.2 Applied uniformly on variable widths of surface up to 5 meters.

.3 Applied at readily determined and controlled rates from 0.2 L/m2 and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m2.

.4 Distribute in uniform spray without atomization at the temperature required.

.3 Equipped with meter, registering travel in meters per minute, visibly located to enable the truck driver to maintain constant speed required for application at a specified rate.

.4 Equipped with the pump having flow meter graduated in units of 2 L or less per minute passing through nozzles and readily visible to the operator. Pump power unit to be independent of the truck power unit.

.5 Equipped with an easily read, accurate and sensitive device that registers the temperature of the liquid in the reservoir.

3.1 Equipment (Cont'd)

.5 (Cont'd)
.1 Measure temperature to the closest whole number.

.6 Equipped with an accurate volume measuring device or calibrated tank.

.7 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

.8 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 meters and capable of being raised or lowered.

.9 Cleaned if previously used with incompatible asphalt material.

3.2 Application

.1 Proceed with the placement of Asphalt Prime Coat only after the 100mm or 200mm Depth Reclamation / Crushed Base Course or Granular Subbase course, as appropriate, is complete and accepted by the Departmental Representative and the surface proposed for Asphalt Prime Coat is clean, dry, and unfrozen.

.2 Dilute asphalt emulsion with water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by Departmental Representative.

.3 Apply Asphalt Prime Coat evenly to prepared surface at a rate between 1.0 L/m2 and 1.5 L/m2 unless recommended by the product manufacturer and preapproved by the Departmental Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with a thin, uniform coat of Asphalt Prime Coat material.

.5 Apply Asphalt Prime Coat only when the air temperature is greater than 10°C and when rain is not forecast within 2 hours of application.

.6 Apply Asphalt Prime Coat only to surfaces that are expected to be overlaid on the same day.

.7 Evenly distribute localized excessive deposits of Asphalt Prime Coat by brooming as directed by Departmental Representative.

3.2 Application (Cont'd)

.8 Where traffic is to be maintained, apply no more than one-half of the width of the surface in one application.

.9 Prevent overlap at the junction of applications.

.10 Apply Asphalt Prime Coat to areas receiving Hot Mix Asphalt Concrete Pavement (except Access Road Letdowns). Do not apply Asphalt Prime Coat to surfaces that will be visible when paving is complete.

.11 Keep traffic off the primed areas until Asphalt Prime has set.

.12 Re-apply Asphalt Prime Coat to contaminated or disturbed areas.

.13 Allow sufficient time for Asphalt Prime Coat to set before placing asphalt pavement.

.14 Inspect Asphalt Prime Coat application to ensure uniformity.

.1 Re-apply Asphalt Prime Coat to areas of insufficient or non-uniform coverage.

.2 Ensure Asphalt Prime Coat applied using handheld devices is consistent in appearance with adjacent areas of machine-applied material.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Definitions.

.2 References.

.3 Submittals.

.4 Quality Management.

.5 Measurement and Payment.

.6 Aggregate.

.7 Asphalt Cement.

.8 Anti-Stripping Agent.

.9 Asphalt Concrete Mix and Job Mix Formula.

.10 Plant and Mixing Requirements.

.11 Equipment.

.12 Preparation.

.13 Transportation & Delivery of Mixtures.

.14 Placing.

.15 Compaction.

.16 Temporary Line Markings.

.17 General.

.18 Pavement Density.

.19 Asphalt.

.20 Aggregate Gradation.

.21 Air Voids.

.22 Material Application Rate.

.23 Surface Segregation.

1.1 Section Includes (Cont'd)

.24 Smoothness.

.25 Workmanship Defects.

.26 Appeal Testing.

.27 Hot Mix Asphalt Concrete Pavement Corrective Measures.

1.2 Definitions

.1 Additives: solid or liquid materials used to enhance the properties of the liquid Asphalt Cement or Asphalt Concrete Mix.

.2 Aggregate: the crushed or screened gravel.

.3 Asphalt Cement: performance grade asphalt used in Hot Mix Asphalt Concrete Pavement.

.4 Asphalt Concrete Mix: high quality, carefully controlled, hot plant mix of Asphalt Cement and dense-graded high-quality crushed aggregate.

.5 Hot Mix Asphalt Concrete Pavement: paver-laid Asphalt Concrete Mix compacted to uniform density.

.6 Asphalt Content: the quantity of Asphalt Cement in the Asphalt Concrete Mix expressed as a percentage by weight of the total dry aggregate in the mix determined by the oven test procedures.
.1 Design Asphalt Content: the asphalt content upon which the Job Mix Formula is initially established.
.2 Approved Asphalt Content: Design Asphalt Content or subsequent adjustments to it, incorporated in a Job Mix Formula or revised Job Mix Formula as approved by Departmental Representative.
.3 Actual Asphalt Content: amount of asphalt binder in the mix as determined by testing done under Departmental Representative's Quality Assurance program. Testing includes an amount to correct for asphalt binder lost due to absorption by the aggregate or aggregate loss.

.7 Asphalt Mix Aggregate: the processed crushed aggregate prior to the addition of the Asphalt Cement.

1.2 Definitions (Cont'd)

.8 Asphalt Mix Design: the Asphalt Concrete Mix design that is developed by the Contractor through the initial trials and testing to determine and optimize the Job Mix Formula for the end product of Asphalt Concrete Mix.

.9 Driving Lane: A driving lane shall mean a single lane in any area of the pavement other than a shoulder or a barrier flare.

.10 End Product Specification (EPS): A specification whereby the Contractor is responsible for the workmanship and Quality Control of the construction processes, and whereby the Departmental Representative reviews the workmanship and may perform the specified Quality Assurance sampling and testing of the end product for the purpose of determining acceptance / rejection and payment.

.11 Job Mix Formula: the Job Mix Formula establishes aggregate proportioning, gradation and Asphalt Cement content to be used for the production of Asphalt Concrete Mix and requires approval of a Departmental Representative on basis of the Asphalt Mix Design.

.12 Levelling Course: Hot Mix Asphalt Concrete Pavement used to improve cross fall, level and strengthen existing pavements.

.13 Lift: a layer of Hot Mix Asphalt Concrete Pavement laid in a single application then compacted.
.1 Top Lift: the uppermost lift, forming the final running surface.
.2 Lower Lift: Any lift below Top Lift.
.3 Bottom Lift: The lowest Lift (excluding Levelling Course).

.14 Lot:
.1 A Lot is a portion of work being considered for acceptance and for determination of payment.
.2 For the application of the Contract requirements for Density, Asphalt Content, Aggregate Gradation, Air Voids, and Material Application Rate, a Lot is defined as:
.1 One day's scheduled production of at least 7 hours of plant production where no changes have occurred to criteria such as, but not limited to.
.1 Accepted Job Mix Formula.
.2 Specified lift (top lift, bottom lift, lower lift) being placed.

1.2 Definitions (Cont'd)

.14 (Cont'd)

.2 (Cont'd)

.2 A change in any of the above criteria may require a new Lot designation, subject to the Departmental Representative's decision.

.3 One day's production of fewer than 7 hours will be added to the next Lot, provided there are no changes in the Job Mix Formula or the specified lift being placed.

.4 A Lot shall be no more than two days total production even if the above criteria have not changed or been met.

.3 For application of the Contract requirements for Segregation and Smoothness, a Lot is defined as.

.1 One (1) kilometer length of top lift pavement for each driving lane.

.15 Quality Assurance: Departmental Representative's sampling and testing of the end product for the purpose of determining Payment Adjustments and compliance with rejection limit properties (acceptance/rejection). See Section 01 45 00 – Quality Management for further details.

.16 Quality Control: sum of all Contractor's activities to ensure a product meets Contract specification requirements which may include material handling and construction procedures, calibration and maintenance of equipment, production process control and any sampling, testing and inspection that is done for these purposes. The Contractor is entirely responsible for Quality Control. See Section 01 45 00 – Quality Management for further details.

.17 Reject Mix: Asphalt Concrete Mix that is deemed unacceptable for use in the project.

.18 Sample Mean: arithmetic mean of a set of test results constituting the sample.

.19 Smoothness: is a measure of the longitudinal profile of the pavement surface. The unit for measurement is the International Roughness Index (IRI).

.20 Sub-Lots: A portion of a Lot being considered for acceptance and for the determination of payment adjustments as follows:

1.2 Definitions (Cont'd)

.20 (Cont'd)

.1 For Density, Asphalt Content, Air Voids, and Aggregate Gradation, each Lot shall generally be divided into three equal Sub-Lots, defined by lineal metres of production. At the Departmental Representative's discretion, the number of Sub-Lots may be changed to suit the quantity of Hot Mix Asphalt Concrete Pavement production for a particular Lot. Representative

.2 For Smoothness, each Lot shall be divided into 100 metre Sub-Lots.

.21 Surplus Aggregate: aggregate surplus to the works, in split or un-split stockpiles which singly or combined will meet the desired Aggregate Gradation for Asphalt Concrete Mix.

.22 Stratified Random Sample: a set of test measurements taken from a number of separate (stratified) areas or Sub-Lots within a Lot in an unbiased way.

.23 Voids in Mineral Aggregate (VMA): the space available to accommodate the effective volume of Asphalt Cement (not absorbed in the aggregate) and volume of air voids necessary in the Asphalt Concrete Mix.

1.3 References

.1 Alberta Transportation.

.1 Paving Guidelines and Segregation Rating Manual (2002).

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoTI).

.1 Recognized Product List (latest version available at time of tender closing).

.2 Manual for Work on Roadways – 2015 Office Edition (Interim).

.3 2020 Standard Specifications for Highway Construction.

.3 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.2 ASTM C117, Test Method for Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.

1.3 References (Cont'd)

.3 (Cont'd)

.4 ASTM C142, Test Method for Clay Lumps and Friable Particles in Aggregates.

.5 ASTM C566, Test Method for Total Evaporable Moisture Content of Aggregate by Drying.

.6 ASTM D5, Standard Test Method for Penetration of Bituminous Materials.

.7 ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

.8 ASTM D 2171, Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer.

.9 ASTM D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.10 ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.11 ASTM D3203 – Standard Test Method for Percent Air Voids in Compacted Asphalt Mixtures.

.12 ASTM D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.13 ASTM D5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

.14 ASTM D6307, Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method.

.15 ASTM D6926, Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.

.16 ASTM D6928, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.17 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.4 Asphalt Institute (AI).

.1 Asphalt Institute MS-2 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.5 American Association of State Highway and Transportation Officials (AASHTO), latest edition.

.1 AASHTO T 304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate.

1.4 Submittals

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

1.4 Submittals (Cont'd)

.2 Submit Job Mix Formula (Asphalt Mix Design) to Departmental Representative as a single PDF document (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Asphalt mix design shall be prepared after a minimum of 50% of the asphalt mix aggregate (all material types: rock, manufactured fines, natural sand, blend sand, etc.) expected for the season of paving is manufactured and stockpiled and shall achieve the requirements of 2.4 – Asphalt Concrete Mix and Job Mix Formula of this specification. The Asphalt Mix Design must be reviewed and accepted by the Departmental Representative prior to commencement of pavement construction. The Departmental Representative will review the plan (first submission and if required all subsequent re-submissions) within 7 days of submission. Upon review of the plan the Departmental Representative will do one of the following:

.1 Accept the Asphalt Mix Design.

.2 Accept portions of the Asphalt Mix Design and provide comments outlining required changes, additional information, or completion of a new mix design. Following completion of required changes, additional information, or completion of a new mix design by the Contractor, the Contractor shall re-submit the complete Asphalt Mix Design for review.

.3 Reject the Asphalt Mix Design and provide comments outlining required changes or additional information needed before the Asphalt Mix Design will be reviewed in detail. Following completion of the required changes or additional information required by the Contractor, the Contractor shall re-submit the complete Asphalt Mix Design for review.

.3 Prior to Year 2 paving, the Contractor shall prepare and submit for review by the Departmental Representative a new Job Mix Formula (Asphalt Mix Design) after a minimum of 50% of the asphalt mix aggregate (all material types: rock, manufactured fines, natural sand, blend sand, etc.) has been manufactured for the upcoming year of paving. The Asphalt Mix Design shall be submitted in accordance with Item 1.4.2 of this specification.

1.4 Submittals (Cont'd)

.4 Prior to ordering additives (if necessary), submit manufacturer's instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing materials meet the requirements of this contract specification.

.5 Prior to use and following delivery to site, submit one – 1 Liter samples of any additives (as applicable) in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.6 Provide access as requested by the Departmental Representative to sample additives (as applicable) throughout the work.

.7 For each shift with the placement of Hot Mix Asphalt Concrete Pavement, submit a written summary report to Departmental Representative within 24 hours of application and include information as follows.

.1 Location (station start and end) lane, and lift paved. Notes pertaining to the paving of any appurtenances (letdowns, intersections, tapers, etc.)

.2 Asphalt Concrete Mix tonnage quantity summary and printed copies of the weigh scale tickets for each load of asphalt mix received at the placement operation. Weigh scale tickets shall include:

.1 Truck number.

.2 Weigh ticket number and net weight of load.

.3 Date, time, and location by station of delivery.

.3 Asphalt Cement and any other additives summary tonnage or volume quantity incorporated into the asphalt mix.

.4 Material application rate dimensions and calculations shall be provided for each Lot and each 10 truckloads of Hot Mix Asphalt Concrete Pavement placed during the applicable shift.

.8 Prior to the commencement of use, provide weigh Scale and if being used Plant Silo documentation, including:

.1 Location and type of scale.

.2 Calibration Test results.

1.4 Submittals (Cont'd)

.9 Coring: The contractor shall be responsible for providing all core samples for Quality Assurance and Payment Adjustments purposes. Unless instructed otherwise, the randomly selected locations for cores shall be determined by the Contractor's Quality Control as described in the Quality Management Plan. If requested, the Departmental Representative has the right to randomly select an alternative location. The alternative core locations supplied by the Departmental Representative have precedent and cores from these locations will be subject to tests for determining Quality Assurance Payment Adjustment purposes. The Contractor shall provide 100 mm diameter cores for these purposes. If requested, the Contractor shall prepare the cores prior to the submission by removing all material not representative of the Hot Mix Asphalt Pavement Lift to be tested. The Contractor shall deliver these cores and provide the locations of the coring to the Departmental Representative, within 24 hours of being provided the locations for the coring, to a designated location as directed by the Departmental Representative.

.10 The Contractor shall fill all core holes before the roadway is re-opened to traffic. Core holes shall be filled by the following method:

.1 Empty the hole of water and loose material.

.2 Remove any excess moisture by wiping the inside with a dry towel.

.3 Apply Tack Coat to the inside surfaces. Apply emulsified asphalt to the outside perimeter.

.4 Place Hot Mix Asphalt Concrete Pavement in loosely, so that the compacted Lifts do not exceed 75 mm.

.5 With a minimum of 20 blows per Lift, compact the loose material using a minimum 2 kg sledge hammer and tamper.

.6 For additional Lifts, repeat Steps 1 to 5.

.7 The final Lift shall be a minimum thickness of 25 mm, and finished to a level higher but not exceeding 6 mm, than the elevation of the surrounding pavement.

.11 The Contractor may use an alternative method if acceptable to the Departmental Representative.

.12 All costs associated with obtaining the cores, including the filling and compaction of the core holes are considered incidental to the Contract and are the responsibility of the Contractor.

1.4 Submittals (Cont'd)

.13 Loose samples: The Contractor shall allow for the collection of two (2) loose samples per Sub-Lot by the Departmental Representative from the paver screed or behind the paver screed at random locations. The loose samples shall be collected for Quality Assurance (Payment Adjustments purposes) and as appeal samples should they be needed.

.14 If requested by the Departmental Representative, the Contractor shall collect the two (2) loose samples per Sub- Lot from the paver screed or behind the paver screed at random locations. The random locations shall be chosen per the procedure outlined in the Quality Management Plan or as directed by the Departmental Representative. Loose samples will be used by the Departmental Representative for Quality Assurance (Payment Adjustment purposes) and appeal samples should they be needed.

.15 Upon submission and acceptance of the Asphalt Mix Design by the Departmental Representative, the Contractor shall prepare and submit to the Departmental Representative blank aggregate samples for correlation of the Contractor's, Departmental Representative's, and appeal laboratory ignition ovens. The Blanks shall be prepared in accordance with BC MoTI 2020 Standard Specifications for Highway Construction, Section 502, Appendix 3 – Blank Aggregate Sample Preparation. The Departmental Representative will randomly select which of the individual blanks will be used by each party. Within 3 working days and prior to any mix production, the Contractor and the Departmental Representative shall prepare and test Asphalt Concrete Mix samples in accordance with Section 502, Appendix 4 – Ignition Oven Correlation Procedure of the BC MoTI 2020 Standard Specifications for Highway Construction.

1.5 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Control.

.2 Provide access throughout the work as requested by the Departmental Representative to sample Asphalt Cement to be incorporated into work.

.3 Quality Control Testing Frequency: Minimum test frequency requirements as described in Table 01 45 00 – 01.

1.5 Quality Management (Cont'd)

.4 Quality Control of aggregate production is the responsibility of the Contractor. Tests performed by Departmental Representative will be Quality Assurance tests and will not be considered as Quality Control tests. The Contractor shall not produce paving aggregate until the Contractor has received written notification that their Quality Management Plan is acceptable and has in-place testing facilities for aggregate production that are in accordance with their Quality Management Plan.

.5 Provide and maintain equipment and qualified personnel to perform all field testing necessary to determine the characteristics of the materials produced and incorporated into work.

.6 Use professional engineering services and a qualified test laboratory licensed to practice in British Columbia to assess and where necessary, modify aggregate materials being produced to ensure their end-use meets all specification requirements.

.7 Departmental Representative reserves the right to test and monitor the quality of material being produced by the Contractor at any time and as often as necessary. Departmental Representative is under no obligation to provide Contractor with test results and this testing shall not in any way relieve Contractor of responsibility of producing aggregates that meet specifications in all respects.

1.6 Measurement and Payment

.1 Payment for Hot Mix Asphalt Concrete Pavement will be made on the basis of the Price per Unit Bids for Hot Mix Asphalt Concrete Pavement in the Tender Form. The Price per Unit Bids shall include all costs for the supply, manufacture, loading, transport, and mixing of Asphalt Cement and asphalt mix aggregate, the supply, manufacture, loading, transport, placement, and compaction of asphalt concrete mix, temporary line markings, quality control, preparation of mix design, and all other items necessary for successful completion of the works. The price per unit shall further include the supply, certification, the operation of a scale to weigh all asphalt concrete mix prior to delivery to the site and the purchase, scheduling, delivery, storage, handling, and incorporation of the anti-stripping agents into the asphalt concrete mix as required.

1.6 Measurement and Payment (Cont'd)

.2 The Hot Mix Asphalt Concrete Pavement will be subject to Payment Adjustments as detailed in Part 4 – Payment Adjustments and Rejection Limits. The bonus / penalty amounts as determined by the Payment Adjustments will be weight penalty) via change order at the conclusion of Year 1 and Year 2 Hot Mix Asphalt Concrete Pavement placement and the completion of all applicable measurements and calculations.

.3 The Hot Mix Asphalt Concrete Pavement will be subject to Payment Adjustments as detailed in Part 4 – Payment Adjustments and Rejection Limits. The bonus / penalty amounts as determined by the Payment Adjustments will be paid or charged back to the Contractor (in the case of a penalty) via change order following Substantial Performance of the project.

.4 Acceptance of any Lot or Sub-Lot of Hot Mix Asphalt Concrete Pavement for payment will occur if the Lot or Sub- Lot complies with the requirements of the The Contractor shall be responsible for all costs associated with corrective measures undertaken to achieve contract requirements.

.1 The test results for End Product Specification (EPS) acceptance parameters are such that the Lot or Sub- Lot meets the requirements for acceptance at an adjusted rate.

.2 The Lot or Sub-Lot is approved in respect of all other requirements.

.3 The Contractor has not notified the Departmental Representative in writing that it shall exercise its option to either repair or remove and replace the work, at its own cost, with work meeting the requirements for acceptance at full or increased payment.

1.6 Measurement and Payment (Cont'd)

.5 Measurement for Payment for completion of Hot Mix Asphalt Concrete Pavement will be made by the mass of material measured in tonnes incorporated into the work, scaled, and accepted by the Departmental Representative. Provide a copy of each weight scale ticket to the Departmental Representative upon delivery of the Hot Mix Asphalt Concrete Pavement to the site or within 24 hrs of placement as directed / approved by the Departmental Representative. The measurement for payment of Hot Mix Asphalt Concrete Pavement will include Hot Mix Asphalt incorporated in the Access Road Letdowns. At the Departmental Representatives complete discretion, Hot Mix Asphalt Concrete Pavement which is not scaled, does not have a weigh scale ticket, or weigh scale tickets are not provided to the Departmental Representative within 24 hours of placement shall not be measured for payment.

.6 Unless accepted otherwise by the Departmental Representative, only acceptable Hot Mix Asphalt Concrete Pavement will be included in the payment quantity. Any material failing to achieve the rejection limits (see Part 4 – Payment Adjustments and Rejection Limits) shall not be measured or included for payment, see Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures of this specification for further details.

.7 In the Departmental Representative's sole discretion and without setting precedence, where any work is rejected but the Departmental Representative determines that it may be left in place, the Departmental Representative may authorize partial payment to the Contractor as full compensation for any residual value the work may have. Notwithstanding the foregoing, PSPC is under no obligation to make any payment for such work.

PART 2 – PRODUCTS

2.1 Aggregate

.1 The Contractor shall provide their own source(s) of aggregate materials for Hot Mix Asphalt Concrete Pavement. Asphalt Mix Aggregate materials shall be in accordance with Section 31 05 16 – Aggregates General and the requirements of this specification section.

2.1 Aggregate (Cont'd)

.2 Aggregate shall be composed of sound, hard and durable particles of sand, gravel, and rock-free from injurious quantities of elongated, soft, or flaky particles, shale, loam, and organic or other deleterious materials.

.3 Aggregate shall fully comply with specifications and the Contractor shall recognize and satisfy himself as to the type and amount of work (including washing or other means as necessary) that may be needed to produce the material in accordance with the requirements of these specifications.

.4 Contractor shall split aggregates into coarse and fine fractions prior to crushing coarse fractions. Crushed coarse and fine fractions shall be stockpiled separately with no intermixing of materials.

.5 Aggregate shall meet the following requirements:

.1 Coarse Aggregate.

.1 Shall be all mineral filler retained on sieve designated in test procedures for each individual test.

.2 Shall consist of crushed stone, crushed gravel, or a combination thereof, or materials naturally occurring in a fractured condition, or materials naturally occurring of highly angular nature or rough texture.

.3 Shall be free from a coating of clay, silt, or other deleterious material, and shall meet requirements in Table 32 12 16 – 01. The tests referenced in Table 32 12 16 – 01 shall be completed to the minimum frequencies and schedule (when applicable) listed in Table 01 45 00 – 01 (Section 01 45 00 – Quality Control).

2.1 Aggregate (Cont'd) .5 (Cont'd)

Table 32 12 16 – 01: Requirements for Coarse Aggregates

Test Reference #	Procedures	Requirement
ASTM C127	Maximum Water Absorption: % by mass	2
ASTM C142	Maximum % by mass of clay balls & friable particles	1.0
ASTM D5821	2 Fractured Faces: Minimum % by Mass retained on the 4.75mm sieve	90
ASTM D5821	1 Fractured Face: Minimum % by Mass retained on the 4.75mm sieve	98
ASTM D6928	Maximum Micro-Deval abrasion loss factor, %	18
ASTM D4791	Flat and Elongated Particles, Max.% by weight	5

.2 Fine Aggregate.

.1 Shall be all mineral filler retained on sieve designated in test procedures for each individual test.

.2 Shall be clean, tough, durable, moderately sharp, and free from coatings of clay, silt, or other deleterious maierial, and shall contain no clay balls or other aggregations of fine material.

.3 Shall have a sand equivalent of not less than 40 when tested in accordance with ASTM D2419.

.4 Shall have a minimum value of 45 when tested according to the AASHTO Test T 304, Method "A" – Uncompacted Void Content of Fine Aggregate when determining Fine Aggregate Angularity.

.5 Fine aggregate shall have a minimum 60% manufactured fines (passing the 4.75 mm sieve).

.3 Mineral Filler and Mineral Dust:

.1 Mineral filler shall consist of all matter passing the 0.600 mm sieve and mineral dust shall consist of all matter passing the 0.075 mm sieve.

.2 Mineral filler and mineral dust to be free from organic matter.

.3 Mineral filler shall be non-plastic when tested with ASTM D4318.

2.1 Aggregate (Cont'd)

.5 (Cont'd)

.3 (Cont'd)

.6 Coarse aggregate, fine aggregate, mineral filler, and mineral dust when required shall be combined to produce the gradation of Hot Mix Asphalt Concrete Pavement shown in Table 32 12 16 – 02.

Table 32 12 16 – 02: Asphalt Mix Aggregate Gradation Limits

Sieve Size (mm)	Percent Passing by Mass
	Fine Mix (12.5mm)
37.5	–
25.0	–
19.0	–
16.0	–
12.5	100
9.50	90 – 100
4.75	55 – 80
2.36	32 – 64
1.18	24 – 51
0.600	17 – 40
0.300	13 – 29
0.150	8 – 18
0.075	4 – 10

.7 If blend sand is required, it shall be screened to pass the 4.75 mm sieve. There shall be a minimum of 1,000 tonnes of blend sand in stockpile at all times, unless less than 1,000 tonnes are required to complete the work.

2.2 Asphalt Cement

.1 Purchase, supply, deliver, store, and handle Asphalt Cement to plant site until use in accordance with Section 32 12 10 – Asphalt Cement.

.2 Any change in Asphalt Cement type or grade must be preapproved by the Departmental Representative.

2.3 Anti-Stripping Agent

.1 An anti-stripping agent shall be used by the Contractor in accordance with specification Section 32 12 10 – Asphalt Cement. The supply to the project site of an Anti-stripping Agent separate from the Asphalt Cement will not be accepted.

2.4 Asphalt Concrete Mix and Job Mix Formula

.1 Preparation and submittal of the Asphalt Mix Design for acceptance by the Departmental Representative is the responsibility of the Contractor. All costs incurred in Asphalt Mix Design formulation are the responsibility of the Contractor. The Asphalt Mix Design shall be submitted in accordance with Item 1.4.2 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

.2 The Contractor shall utilize a qualified registered member of the Association of Professional Engineers and Geoscientists of British Columbia or a qualified, registered member of the Applied Science Technologists and Technicians of British Columbia who shall sign off the asphalt mix design. The Contractor shall also utilize a CCIL certified testing laboratory meeting the requirements of Section 01 45 00 – Quality Control and acceptable to the Departmental Representative, to assess the aggregate material proposed for use and to carry out the asphalt mix design(s).

.3 Aggregate proportioning and Asphalt Content for the approved Asphalt Mix design will form the Job Mix Formula for the production of Asphalt Concrete Mix. Asphalt Mix Design, Job Mix Formulas, and field adjustments made in accordance with these specifications must all be based on the Asphalt Mix meeting the requirements of Item 2.4.4 – Asphalt Concrete Mix and Job Mix Formula of this specification and Table 32 12 16 – 02.

.4 Requirements for Asphalt Mix Design:

.1 Asphalt Mix design shall be performed using the asphalt cement grade specified in Section 32 12 10 – Asphalt Cement, which is from the same refinery contracted to supply the asphalt cement for the duration of the project. Any subsequent changes in the asphalt cement supplied by the Contractor will require a new Asphalt Mix Design unless accepted otherwise by the Departmental Representative

.2 Asphalt Mix Design shall follow Marshall Method of Mix Design as outlined in the latest edition of the Asphalt Institute Manual Series No. 2 (MS-2). The Asphalt Mix Design, at the Design Asphalt Content shall meet requirements in Table 32 12 16 – 03.

2.4 Asphalt Concrete Mix and Job Mix Formula (Cont'd)

.4 (Cont'd)

Table 32 12 16 – 03: Marshall Design and Production Criteria

Property of Laboratory Compacted Paving Mixture	Requirement
Number of blows each face of test specimens	75
Minimum % Voids in mineral aggregate for maximum particle size (VMA)	15.0
Voids Fill with Asphalt (VFA)	65%
Percentage of Air Voids in laboratory compacted mixture	3.5% +/- 0.1%
Minimum Marshall Load, N @ 60 degrees C	90,000
Flow Index, units of 0.25 mm	8 to 14
Asphalt Film Thickness	Min 8.0 microns
Minimum Tensile Strength Ratio (TSR) - AASHTO T283	85

.3 The Asphalt Concrete Mix shall at all times use an anti-stripping agent and have a tensile strength ratio (TSR) of 85 or greater. The Contractor shall be responsible to arrange for the incorporation of an anti-stripping agent into the Asphalt Cement at a sufficient dosage rate to achieve this minimum TSR ratio (see specification Section 32 12 10 – Asphalt Cement for further details).

.4 The Asphalt Mix Design submission shall include the following information:

.1 Gradation of each aggregate to be used in the mixture.

.2 Percentage by mass of each aggregate to be used in the mixture.

.3 Asphalt Mix Design gradation of combined aggregate.

.4 Aggregate characteristics including sand equivalent, percentage of fractured faces, and bulk specific gravity.

.5 All Marshall mix design characteristics, including graphs used in arriving at final mix design, bulk specific gravity of combined aggregates, and asphalt absorption of combined aggregates.

.6 Recommended Design Asphalt Content expressed as a percentage of dry weight of aggregate.

.7 Theoretical maximum specific gravity of asphalt mix design at design asphalt content and at asphalt contents considered above and below design asphalt content.

2.4 Asphalt Concrete Mix and Job Mix Formula (Cont'd)

.4 (Cont'd)

.4 (Cont'd)

.8 Identification of each asphalt supplier by name, location and type and grade of asphalt to be supplied.

.9 For each asphalt sample supplied, include the asphalt specific gravity and recommended mixing and compaction temperature for the preparation of design specimens.

.10 Void tables to include air voids, VMA and voids filled with asphalt for various asphalt content (0.1% increments) and bulk densities (increment of 5 kg/m3).

.5 Verification of Asphalt Mix Design.

.1 Verification of the Asphalt Mix Design will be carried out by the Contractor during the course of production of the first 1,000 tonnes of mix using the Asphalt Mix Design.

.2 During the first 1,000 tonnes of plant production, the Contractor may make any adjustments it chooses to the Asphalt Mix Design, testing the mix, and refining the Asphalt Mix Design to a state that fully complies with Table 32 12 16 – 02, Item 2.4.6 – Asphalt Concrete Mix and Job Mix Formula of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, and these Contract Specifications.

.3 All mix of the Asphalt Mix Design laid must be tracked by the Contractor, and reported to the Departmental Representative, as to lay-down location and the Asphalt Mix Design values in effect at the time that mix was produced, to ensure appropriate values are used in comparing design to sampled properties.

.4 After production of the first 1,000 tonnes, the Contractor shall declare their Job Mix Formula (JMF) to the Departmental Representative in writing, and provide volumetric properties/test data on the final mix produced. Any future adjustments to the JMF shall comply with all requirements of Item 2.4.6 – Asphalt Concrete Mix and Job Mix Formula of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement. Should the contractor fail to declare their JMF to the Departmental Representative after the first 1000 tonnes, the submitted / accepted Asphalt Mix Design shall be considered the current JMF.

2.4 Asphalt Concrete Mix and Job Mix Formula (Cont'd)

.4 (Cont'd)

.5 (Cont'd)

.5 Where the JMF varies from the Asphalt Mix Design by a cumulative amount greater than any tolerance specified in Item 2.4.6.1 – Asphalt Concrete Mix and Job Mix Formula of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, the Contractor shall do a single point confirmatory Asphalt Mix Design and report the results to the Departmental Representative.

.6 A Field Adjustment of Job Mix Formula may be undertaken by the Contractor to improve the quality of the Hot Mix Asphalt Concrete Pavement and bring or keep the properties of the Hot Mix Asphalt Concrete Pavement in conformance with the requirements for Asphalt Concrete Mix and Job Mix Formula (Item 2.4.1 – 2.4.4 –Asphalt Concrete Mix and Job Mix Formula of this specification section) and Table 32 12 16 – 02. A Field Adjustment of the Job Mix Formula shall further comply with the following:

.1 A field adjustment to the Job Mix Formula is defined as a change in the asphalt cement content of the mix, aggregate gradation and/or proportioning of various aggregate sizes, within the specified limits without review and acceptance of a new Asphalt Mix Design. The maximum field adjustment from the job mix formula shall be:

Job Mix Formula Property	Maximum Culmulative Field Adjustment
Percent Passing by Sieve Size:	
37.5 mm, 25.0 mm, 19.0 mm, and 16.0 mm	+/– 2.0%
12.5 mm and 9.5 mm	+/– 2.0%
4.75 mm and 2.36 mm	+/– 1.5%
1.18 mm and 0.600 mm	+/– 1.5%
0.300 mm and 0.150 mm	+/– 1.5%
0.075 mm	+/– 0.5%
Asphalt Cement Content	+/– 3.0%

.2 The proposed field adjustment shall be submitted in writing per Section 01 33 00 – Submittal Procedure together with all supporting verification data and documentation to the Departmental Representative for review. The Departmental Representative will review the field adjustment and notify the Contractor whether or not it is acceptable.

2.4 Asphalt Concrete Mix and Job Mix Formula (Cont'd)

.4 (Cont'd)

.6 (Cont'd)

.3 After the Job Mix Formula has been established in accordance with Item 2.4.6 – Asphalt Concrete Mix and Job Mix Formula of this Specification, no field adjustment to the Job Mix Formula will be permitted without prior written approval of the Departmental Representative. The Contractor shall be limited to two field adjustments of the Job Mix Formula from the originally derived Asphalt Mix Design.

PART 3 – EXECUTION

3.1 Plant and Mixing Requirements

.1 Mixing plants shall be operated in accordance with the manufacturer's recommendations and shall be calibrated prior to commencing production of the specified Asphalt Concrete Mix.

.2 Storage facilities for Asphalt Cement shall be capable of heating material under effective and positive control and shall contain a provision for measuring and sampling. Each tank shall contain only one asphalt cement material.

.3 Contractor shall supply the equipment necessary to add additives (if necessary).

.4 Asphalt Concrete Mix Production.

.1 Aggregate and Asphalt Cement shall be combined to produce a uniform mixture of specified gradation at an Asphalt Content in accordance with the approved Job Mix Formula and in which all particles of aggregate are uniformly coated.

3.1 Plant and Mixing Requirements (Cont'd)

.4 (Cont'd)

.2 The temperature of the asphalt mix measured at the plant discharge chute shall be maintained at plus or minus 15°C of the Design Mixing Temperature designated in the accepted Mix Design, with adjustments within that range made at the Contractor's discretion. Where the Contractor plans to adjust the actual mix temperature to 10°C or more above the Design Mixing Temperature, the Contractor shall notify the Departmental Representative prior to making the adjustment. To optimize mix properties during inclement weather or to address other specific circumstances, the Departmental Representative may agree, in advance, to a higher mixing temperature. Mix produced at a temperature above the upper tolerance limit may be deemed Reject Mix by the Departmental Representative.

.3 Plant emissions shall not exceed the limits set by the British Columbia Ministry of the Environment. .

.4 Asphalt plant must be equipped with pollution control devices in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate the emission of dust and smoke pollutants into the atmosphere. The use of secondary dust collection systems which require discharge of dust polluted water into natural drainage system will not be allowed. Regardless of requirements stated above, asphalt plant operations must comply with all environmental pollution control regulations applicable to the work area.

.5 A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion.

.6 Contractor shall dispose of rejected Asphalt Concrete Mix in a manner acceptable to Departmental Representative.

3.2 Equipment

.1 Rollers shall be reversible and self-propelled with compaction capability to match plant production rates.

.2 Pavers shall be self-propelled and operated with automatic electronic screed controls to maintain required levels, crossfalls, and joint matching.

.3 Pavers shall have a paver hopper insert with a minimum capacity of 12 tonnes installed in the hopper of conventional paving equipment when a Materials Transfer Vehicle (MTV) is used.

3.2 Equipment (Cont'd)

.4 Pavers shall utilize a "sloper" along the outside edge of the Hot Mix Asphalt Concrete Pavement. The sloper shall create a 2H:1V slope on the asphalt lifts and in the locations indicated on the Contract drawings.

.5 MTV shall be equipped as follows.

.1 To have a truck unloading system which receives the Asphalt Concrete Mix from the hauling equipment and independently delivers mixture from the hauling equipment to the paving equipment.

.2 Has remixing capability by either a storage bin in the MTV with a minimum capacity of 12 tonnes of Asphalt Concrete Mix and a remixing system in the bottom of MTV storage bin, or a dual pugmill system located in the paver hopper insert with two full length transversely mounted paddle mixers to continuously blend the Asphalt Concrete Mix as it discharges to a conveyor system.

.3 Provide the paver with a homogeneous, non-segregated mixture of uniform temperature with no more than 11°C difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of 0.3 m to 0.9 m from the screed while the paver is operating.

.6 If the MTV malfunctions during spreading operations, discontinue placement of Hot Mix Asphalt Concrete after there is sufficient material placed to maintain traffic in a safe manner. Placement of Hot Mix Asphalt Concrete in a lift not exceeding 50 mm may continue until any additional Hot Mix Asphalt Concrete in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV in operational.

.7 Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 8 km/h without any acceleration or deceleration while crossing a bridge.

3.3 Preparation

.1 Failed areas in existing surfaces shall be repaired as directed by Departmental Representative. Areas requiring repair will be identified by the Contractor's Quality Control in consultation with the Departmental Representative.

3.3 Preparation (Cont'd)

.2 Before Hot Mix Asphalt Concrete Pavement is placed, winter sand, organics, gravels, dirt, and other objectionable material shall be removed from the surface to be paved, by sweeper, grader, excavation, or other methods.

.3 Existing fillets and ramps at approaches to railway crossings and bridge structures, or adjacent to paved surfaces or other structures, shall be removed to depths shown on plans or in a manner acceptable to Departmental Representative. Removed material shall be disposed of and exposed surfaces shall be prepared in a manner acceptable to Departmental Representative.

.4 Where new surfacing materials are placed against an existing pavement structure, the joint shall be of a vertical butt type, well-bonded (tack coat required), sealed and finished to provide a continuous, smooth profile across the joint. To accomplish this, the existing pavement shall be milled per the requirements of Section 32 01 16.13 – Reshaping Asphalt Pavement per the requirements of the details on the Contract Drawings. All asphalt millings shall be hauled and placed to assist with letdown grading at access road / letdown locations within the limits of the work per the direction of the Departmental Representative. In the longitudinal section, the minimum slope of the milled area shall be 200:1. In plan, Contractor shall cut the joint in any of the following ways:
.1 Joint shall be cut at 30° – 45° to centreline of roadway across the full width of the mat; or
.2 Joint shall be cut at 30° – 45° to roadway centreline across travel lanes and contiguously at 90° to roadway centreline elsewhere: or
.3 Joint shall be composed of segments parallel to and at 90° to roadway centreline. Each mat shall contain a segment, 1.5 to 2 meters long, parallel to centreline of roadway and located on centreline of the travel lane. All other segments shall be contiguous and at 90° to roadway centreline. When the existing pavement has been removed in advance of the paving of the joint area, Contractor shall construct a smooth taper at joint area to a slope of at least 50:1. Tapers may be placed on tar paper and shall be removed when paving is resumed. Traverse joints shall be straight and have a vertical face.

3.3 Preparation (Cont'd)

.4 (Cont'd)

.4 Contact edges of existing asphalt mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall be coated with Asphalt Tack Coat in accordance with Section 32 12 13.16 before placing Hot Mix Asphalt Concrete Pavement.

.5 Place Asphalt Prime Coat on the finished 100mm or 200mm Depth Reclamation / Crushed Base Course or Granular Subbase Course surface, as appropriate in accordance with Section 32 12 13.23 – Asphalt Prime Coat (no prime required on Access Road Letdowns). When two or more lifts of Hot Mix Asphalt Concrete Pavement are required (including levelling course lifts) or when placing Hot Mix Asphalt Concrete Pavement on BST, apply Asphalt Tack Coat between each lift in accordance with Section 32 12 13.16 – Asphalt Tack Coat. If two or more levelling course lifts are being placed during the same shift with less than 6 hours between the placement of lifts, the Contractor may request to the Departmental Representative that the Tack Coat between the lifts of Levelling Course be omitted.

.6 Asphalt Prime Coat and Asphalt Tack Coat shall be allowed to cure prior to placing subsequent lift of Hot Mix Asphalt Concrete Pavement.

3.4 Transportation & Delivery of Mixtures

.1 Trucks used for transportation of the Asphalt Concrete Mix shall be compatible with the size and capacity of the spreading equipment.

.2 Load limit restrictions will be in accordance with British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size.

.3 Truck boxes shall be clean, free from accumulations of asphalt mix and foreign material.

.4 Excess truck box lubricants such as light oil, detergent or lime solutions shall not be allowed to contaminate the mix, and shall be disposed of in an environmentally acceptable manner.

3.4 Transportation & Delivery of Mixtures (Cont'd)

.5 During transport, Asphalt Concrete Mix shall be completely covered to protect it from precipitation and excessive heat loss by securely fastened waterproofed tarpaulins, unless otherwise approved by Departmental Representative.

.6 No loads shall be sent out so late in the day as to prevent completion of spreading and rolling of Hot Mix Asphalt Concrete Pavement during daylight.

3.5 Placing

.1 Unless pre-approved by the Departmental Representative, Hot Mix Asphalt Concrete Pavement shall not be placed when the air temperature is below 4°C, or when the weather is rainy. Should the Contractor wish to place Hot Mix Asphalt Concrete Pavement when temperatures are below 4°C, the Contractor shall submit a request for variance to the Departmental Representative. At a minimum, the request for variance shall include the details of the additional measures which will be undertaken by the Contractor to achieve all project quality requirements at the lower air temperature. If received from the Contractor, the Departmental Representative will review the request for variance and will respond within 7 days either, accepting the request, rejecting the request, or requesting additional information. Regardless of the details provided or additional measures planned by the Contractor as outlined in the request for variance, the Departmental Representative is under no obligation to accept the request for variance from the Contractor. Should the request for variance be accepted by the Departmental Representative, the Contractor shall remain responsible for all aspects of the Hot Mix Asphalt Concrete Pavement quality and any increased costs associated with mixing and placement during colder temperatures.

.2 Hot Mix Asphalt Concrete Pavement shall be placed only on clean, dry, and unfrozen surfaces.

.3 Hot Mix Asphalt Concrete Pavement shall be placed in a MTV in advance of the paver.

3.5 Placing (Cont'd)

.4 Hot Mix Asphalt Concrete Pavement shall be placed to the widths, thicknesses, and locations shown on the Contract Drawings. The thickness of Top Lift and Bottom Lift shall be consistent across the full width of the driving land and shoulder. Unless otherwise shown on the Contract Drawings, Hot Mix Asphalt Concrete Pavement shall be placed in the following total thicknesses and lift thickness:

.1 Highway driving lanes and shoulder total compacted thicknesses and compacted lift thicknesses shall be 50 mm maximum for each Top, Lower or Bottom Lift, as applicable.

.2 Access Road Letdowns and Rest Stops lift total compacted thicknesses and compacted lift thicknesses shall follow that of the Highway driving lanes and shoulder:

.5 Upon completion of compaction the crossfall / superelevation of the lower lift, bottom lift, and top lift of Hot Mix Asphalt Concrete Pavement shall be +/- 0.3% of the Crossfalls shown on the Contract Drawings. Any locations 20 m or longer in which the crossfall or superelevation varies from the allowable tolerance shall be corrected through either removal and replacement or overlay (see Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures).

.6 If, during construction, it is found that the spreading and finishing equipment in operation leaves tracks or indented areas that are not satisfactorily corrected by the scheduled operations, or if it produces other permanent blemishes, the use of such equipment shall be discontinued and other satisfactory spreading and finishing equipment shall be provided by the Contractor.

.7 Longitudinal joints shall not be permitted in driving lane on the final lift of Hot Mix Asphalt Concrete Pavement.

.8 Longitudinal joints shall be offset a minimum of 150 mm from one lift to the next.

.9 Longitudinal and transverse joints shall be (except Access Road Letdowns) well bonded (tack coat required) and sealed, and finished to provide a continuous, smooth profile across the joints. Surplus material will be disposed of in a manner acceptable to the Departmental Representative. Broadcasting surplus material across the mat will not be permitted.

3.5 Placing (Cont'd)

.10 Finish the outside edge of the Hot Mix Asphalt Concrete Pavement shoulder using the paver "sloper". The sloper shall create a 2H:1V slope on the asphalt lifts and in the locations indicated on the Contract drawings.

.11 The contact edge of any mat placed by the Contractor (longitudinal joints) shall be coated with Asphalt Tack Coat before placing the adjacent mat (see Section 32 12 13.23-2 – Asphalt Tack Coat).

.12 When paving is discontinued in any lane, the mat shall be tapered to a slope a minimum of 25 horizontal to 1 vertical. The taper shall be placed on tar paper and the taper and tar paper shall be removed when paving is resumed. The transverse joint shall be straight and have a vertical face when the taper is removed.

.13 Transverse construction joints from one lift to the next shall be separated by at least 2 meters.

.14 Where the construction of a final lift of pavement next to a concrete curb section or curb and gutter section will be delayed, the Contractor shall construct a temporary asphalt concrete fillet next to the concrete section in accordance with the plans or as directed by the Departmental Representative. These fillets shall be removed when paving is resumed.

.15 Road intersections, entrances, and access road letdowns shall be paved in accordance with the plans or as directed by the Departmental Representative. Unless otherwise permitted by the Departmental Representative, the Hot Mix Asphalt Concrete Pavement shall be spread on intersections, entrances, and access road letdowns by means of a Paver.

.16 When two or more lifts of Hot Mix Asphalt Concrete Pavement are required, apply Asphalt Tack Coat between each lift in accordance with Section 32 12 13.16 – Asphalt Tack Coat.

.17 Asphalt Tack Coast shall be allowed to cure prior to placing.

3.6 Compaction

.1 All Hot Mix Asphalt Concrete Pavement shall be free from segregation, waves, hairline cracks, and other obvious defects after final rolling of mat.

3.6 Compaction (Cont'd)

.2 After final rolling is complete, Contractor shall ensure finished mat has cooled a minimum of 2 hours before opening to traffic.

.3 Lubricants such as light oil, fuel oil, detergent or lime solutions shall not be allowed on rollers. Hot Mix Asphalt Concrete Pavement will be rejected if Asphalt Concrete Mix is contaminated by any lubricants other than water.

.4 The contractor should take core samples to determine actual pavement density. At the start of paving, the Contractor should take a minimum of two pavement cores from each Sub-Lot. The Contractor may employ a nuclear densometer to ensure intermediate density control. Two nuclear densities may be determined for each Sub-Lot, based on accepted Asphalt Concrete Mix densities obtained from the most recent mix briquettes.

3.7 Temporary Line Markings

.1 The Contractor shall provide daily interim centreline painted traffic markings (spotting) on all newly constructed Hot Mix Asphalt Concrete Pavement to be exposed to traffic overnight.

.2 All temporary pavement marking shall be completed per the requirements of Section 4.4.2 of the British Columbia Ministry of Transportation Traffic Manual for Work on Roadways – 2015 Office Edition (Interim).

PART 4 – PAYMENT ADJUSTMENT AND REJECTION LIMITS

4.1 General

.1 The Hot Mix Asphalt Concrete Pavement will be subject to the Payment Adjustments and Rejection Limits as detailed in this section. PSPC's Quality Assurance testing results will be used to determine the Payment Adjustment amounts (bonus / penalty) and to determine if the minimum Rejection Limits are achieved (acceptance or rejection) of the Hot Mix Asphalt Concrete Pavement.

.2 Applicable measurements and calculations for Payment Adjustment amounts will be prepared and paid or charged back to the Contractor via Change Order following Substantial Performance of the project.

4.1 General (Cont'd)

.3 Hot Mix Asphalt Concrete Pavement which does not achieve minimum rejection limits will be subject to correction and or rejection without payment. The Departmental Representative may issue a non-compliance report for any Hot Mix Asphalt Concrete Pavement which does not achieve minimum rejection limits. The Contractor shall respond to the NCR as per the process outlined in Section 01 45 00 – Quality Management prior to undertaking any remedial action.

.4 Unit Price Adjustments and Rejection Limits will apply to the following end product properties of the Hot Mix Asphalt Concrete Pavement as detailed in Section 4.2 – 4.9 of this specification.

.1 Pavement Density:
- .1 Top lift, Lower Lift and Bottom Lift: Unit Price Adjustments and Rejection Limits.
- .2 Access Road Letdowns and Rest Stops: Rejection Limits only.

.2 Asphalt Content:
- .1 Top lift, Lower Lift and Bottom Lift: Unit Price Adjustments and Rejection Limits.
- .2 Access Road Letdowns and Rest Stops: Rejection Limits only.

.3 Aggregate Gradation:
- .1 Top lift, Lower Lift and Bottom Lift: Unit Price Adjustments and Rejection Limits. .
- .2 Access Road Letdowns and Rest Stops: Rejection Limits only.

.4 Air Voids:
- .1 Top lift, Lower Lift and Bottom Lift: Unit Price Adjustments and Rejection Limits.
- .2 Access Road Letdowns and Rest Stops: Rejection Limits only.

.5 Material Application Rate (Unit Price Adjustments and Rejection Limits, except Hot Mix Asphalt Concrete Pavement in Rest Stops (Km 282, and Km 319) where only Rejection Limits shall apply.
- .1 Top lift, Lower Lift and Bottom Lift: Unit Price Adjustments and Rejection Limits.
- .2 Access Road Letdowns and Rest Stops: Rejection Limits only.

.6 Surface Segregation:
- .1 All lifts: Rejection Limits only.

.7 Smoothness:

4.1 General (Cont'd)

.4 (Cont'd)

.7 (Cont'd)

.1 Top lift of highway driving lanes (smoothness at bridges applies to "End / Start Top Lift ACP Placement" location as shown on Contract Drawings (excludes asphalt concrete pavement placed on concrete approach slabs)): Unit Price Adjustments and Rejection Limits.

.2 Bottom Lift, Lower Lift, highway shoulder, Access Road Letdowns, and Rest Stops: Not Applicable.

.8 Workmanship Defects:

.1 All lifts (including asphalt concrete pavement placed at permanent tie-in locations with existing asphalt): Rejection Limits only.

.5 For the first 1,000 tonnes of Asphalt Concrete Mix produced under a contract the following provisions take precedence over all other payment adjustment provisions of Section 4.2– 4.9 of this specification, but do not take precedence over the rejection criteria.

.1 Unless requested otherwise by the Contractor in writing in advance of Asphalt Concrete Mix production, the first 1,000 tonnes of Asphalt Concrete Mix production and placement shall not be subject to the bonus/penalty payment adjustments for Asphalt Cement content, density, air voids, and gradation. Payment adjustments will apply to smoothness, segregation and material application rate if the Hot Mix Asphalt Concrete Pavement is applied in a Top Lift location.

.2 Contrary to any other provision of this specification for Hot Mix Asphalt Concrete Pavement, any Asphalt Concrete Mix produced during the initial 1,000 tonnes will only be considered acceptable if. –

.1 The Asphalt Mix Design has been reviewed and accepted by the Departmental Representative.

.2 Aggregate gradation per Item 2.1 – Aggregate of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement is within the gradation limits specified in Table 32 12 16 – 02, or in the banana formed by applying the Table 32 12 16 – 06.

.3 All other properties fall inside the allowable limits specified in this specification for the Hot Mix Asphalt Concrete Pavement including the marshal design, Table 32 12 16 – 03.

4.1 General (Cont'd)

.5 (Cont'd)

.2 (Cont'd)

.4 Asphalt Cement content of the sample is within +/- 0.5% of the design value for top lift and is within +/- 0.55% of the design value for the bottom lift.

.3 All values are measured against the Asphalt Mix Design value at the time the sampled mix was produced.

.4 Any Asphalt Concrete Mix with any characteristic outside the limits listed above is Reject Mix. Additionally, rejection limits for smoothness, segregation, density, air voids, application rate, and workmanship defects shall apply in accordance with this specification.

4.2 Pavement Density

.1 Payment Adjustments: Payment Adjustments for pavement density will be made on the average Marshall Percent Density for each Lot as follows.

.1 Marshall Percent Density = In-place Density (core sample) x 100 Marshall Briquette Density

.2 In-Place Density: The average in-place density will be determined from core samples of the completed Lift of pavement. One random core sample from each Sub-Lot will be tested and the test results for the Sub-Lots will be averaged to determine the in- place density for the Lot.

.3 Marshall Briquette Density: The density will be determined by forming three (3) briquettes from the sample selected for Quality Assurance testing for each Sub-Lot. The test results from each Sub-Lot will be averaged to obtain a Marshall Briquette Density for the Lot. Note: the samples shall be allowed to cool and then reheated to form briquettes.

.4 Should the initial test results for Marshall Percent Density in any Sub-Lot be lower than 97.0%, one additional core shall be taken within the Sub-Lot and tested, and the results shall be averaged with the initial result to determine the Marshall Percent Density for the Sub-Lot.

.5 Payment adjustment for pavement density will be the amount shown in Table 32 12 16 – 04 for the Sample Mean of the test results for that Lot.

4.2 Pavement Density (Cont'd)

Table 32 12 16 – 04: Payment Adjustment for Density – Marshall

Marshall % Density Lot Average)	Payment Adjustment for Design Lift Thickness ($ per tonne)– All Lifts
>= 98.0	+$1.50
>= 97.5 to < 98.0	+$1.00
>= 97.0 to < 97.5	+$0.50
>= 96.5 to < 97.0	–$1.00
>= 96.0 to < 96.5	–$2.00
>= 95.5 to < 96.0	–$4.00
>= 95.0 to < 95.5	–$8.00
< 95.0	Reject

.2 Rejection Limits: If any Sub-Lot has a Marshall Percent Density below 95.0%, the Sub-Lot will be rejected (regardless of the values of other acceptance parameters) and subject to the Contractor's opportunity to correct the density via corrective measures, will be rejected and not paid for. The Contractor shall correct the density by either overlay or remove and replace the previously placed area of reject Hot Mix Asphalt Concrete Pavement (see Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures of this specification).

.3 Payment Adjustments for Pavement Density Rejected Work Made Acceptable: Payment Adjustments for pavement density rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable. Where replacement or Asphalt Concrete Overlay material does not cover the entire Lot, prior tests of other Sub-Lots will be averaged with new tests on the corrective work.

.4 Pavement Density Testing: Pavement density testing will be completed in accordance with.
.1 ASTM D6926 – Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.
.2 ASTM D2726 – Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

4.3 Asphalt

.1 Payment Adjustments: Payment Adjustments for Asphalt Content will be made on the average Asphalt Content for each Lot obtained from all of the Sub-Lots samples as follows.

.1 Determination of Asphalt Content will be made from random loose Quality Assurance samples obtained from each Sub-Lot (generally 3 per Lot) and tested in accordance with ASTM test procedures.

.2 Asphalt Content of Hot Mix Asphalt Concrete Pavement will be determined using average of results obtained from all Sub-Lot samples. The Actual Asphalt Content of Lot will be compared to Job Mix Formula Asphalt Content and the deviation will be used for Payment Adjustment purposes.

.3 Payment Adjustments for Asphalt Content will be the amount shown in Table 32 12 16 – 05.

Table 32 12 16 – 05: Payment Adjustment for Asphalt Content

Deviation from Actual Asphalt Content from Approved Asphalt Content % of Dry Aggregate,Lot Average)	Payment Adjustment for Asphalt Content ($ per tonne)	
Percent Greater than Specified in JMF	Top Lift	Lower Lift & Bottom Lift
>= -0.05 to =< 0.35	$0.00	$0.00
> 0.35 to =< 0.40	-$2.00	-$2.00
> 0.40 to =< 0.45	-$3.50	-$3.50
> 0.45 to =< 0.50	-$5.00	-$5.00
> 0.50 to =< 0.55	Reject	-$6.50
> 0.55	Reject	Reject
Percent Less than Specified in JMF	Top Lift	Lower Lift & Bottom Lift
>= -0.05 to =< 0.20	$0.00	$0.00
> 0.20 to =< 0.30	-$1.00	-$1.00
> 0.30 to =< 0.35	-$3.00	-$3.00
> 0.35 to =< 0.40	-$5.00	-$5.00
> 0.40 to =< 0.45	-$7.00	-$7.00
> 0.45 to =< 0.50	-$8.00	-$8.00
> 0.50 to =< 0.55	Reject	-$9.00
> 0.55	Reject	Reject

4.3 Asphalt (Cont'd)

.2 Rejection Limits: Rejection limits for Asphalt Content are the limiting values of the sample mean as shown in Table 32 12 16 – 05, beyond which the Lot is rejected and not paid for. If the Asphalt Content of a Lot is outside acceptance limits, the Lot is rejected automatically regardless of values of other acceptance parameters. For top lift deviation of more than 0.50%, the Contractor shall either overlay or remove and replace the Lot (see 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures). For bottom lift and lower lift deviations of more than 0.55%, the Departmental Representative will determine whether removal and replacement is necessary. For material that is allowed to stay in place, a deduction at 50% of the unit price bid per tonne of Hot Mix Asphalt Concrete Pavement material will be implemented.

.3 Payment Adjustments for Asphalt Content Rejected Work Made Acceptable: Payment Adjustments for Asphalt Content rejected work made acceptable will be based on testing of the replacement or overlay material where applicable. Where replacement or overlay material does not cover the entire Lot or Sub-Lot, prior tests of the uncovered area or remaining area will be averaged with new tests on the corrective work.

.4 Asphalt Content Testing: Asphalt Content testing wil be completed in accordance with.

.1 ASTM D6307 – Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method. Note: the ignition oven calibration factor will be applied to Asphalt Content measured by the ignition oven, and the corrected Asphalt Content used to determine acceptability of the mix and any payment adjustments.

4.4 Aggregate Gradation

.1 Payment Adjustments: Payment Adjustments for Aggregate Gradation will be made on the Lot mean percent passing for each sieve shown in Table 32 12 16 – 06 obtained from the Sub-Lot samples as follows.

.1 Determination of Lot mean percent passing for each sieve will be made from random loose Quality Assurance samples obtained from all Sub-Lots (generally 3 per Lot) and tested in accordance with ASTM test procedures.

.2 The actual values of the mean percent passing for each sieve of a Lot will be compared to Job Mix Formula Aggregate Gradation and the deviation will be used for Payment Adjustment purposes.

4.4 Aggregate Gradation (Cont'd)

.1 (Cont'd)

.3 Payment Adjustments for Aggregate Gradation will be the amount shown in Table 32 12 16 – 06.

.2 Rejection limits: Where one or more values of the sample mean for the specified sieves falls outside the Limits for Aggregate Gradation (Divergence from Job Mix Formula Grading Curve) specified in Table 32 12 16 – 06, or the requirements for fracture as specified in Table 32 12 16 – 01 is not achieved, the Lot is rejected and not paid for regardless of the values of other acceptance parameters. For top lifts the Contractor shall either overlay or remove and replace the Lot (see 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures). For bottom lifts the lift shall remain in place, however no payment will be made for this lot.

.3 Payment Adjustments for Aggregate Gradation Rejected Work Made Acceptable: Payment Adjustments for aggregate gradation rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable.

.4 Payment Adjustments for Gradation Rejected Work Made Acceptable: Rejection limits for aggregate gradation rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable.

.5 Aggregate Gradation Testing: Aggregate Gradation testing will be completed in accordance with.

.1 ASTM C117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

4.4 Aggregate Gradation (Cont'd)

.5 (Cont'd)

Table 32 12 16 – 06: Payment Adjustments for Aggregate Gradation (Divergence from Job Mix Formula Grading Curve), Percentage passing by mass ASTM C117 and C136

Sieve Size (mm)	Deviation from JMF (%)	Payment Adjustment for Aggregate Gradation ($ per tonne)
4.75	+/– 5.0	$0.00
	+/– 5.1	
	+/– 6.1	
	+/– 7.1	
	+/– 8.1	
	+/– > 9.0	Reject
0.6	+/– 3.0	$0.00
	+/– 3.1	
	+/– 4.1	
	+/– 5.1	
	+/– > 6.0	Reject
0.075	+/– 1.0	$0.00
	+/– 1.01 –1.25	–$1.00
	+/– 1.26	
	+/– > 1.5	Reject

4.5 Air Voids

.1 Payment Adjustments: Payment Adjustments for Air Voids will be made on the average Marshall specimen Air Void for each Lot obtained from all the Sub-Lots samples as followed.

.1 Determination of Lot mean Air Voids will be made from random loose Quality Assurance samples obtained from all Sub-Lots (generally 3 per Lot) and tested in accordance with ASTM test procedures.

.2 Air Voids of the Hot Mix Asphalt Concrete Pavement will be determined using averages of results obtained from all Sub-Lot samples. The actual Air Void value of the Lot will be compared to the Job Mix Formula Air Voids and the deviation will be used for Payment Adjustment purposes.

.3 Payment Adjustments for Air Voids will be the amount shown in Table 32 12 16 – 07.

4.5 Air Voids (Cont'd)

.2 Rejection limits: Rejection limits for Air Voids are the limiting values of the sampling mean as shown in Table 32 12 16 – 07, beyond which the Lot is rejected and not paid for. If the Air Voids of a Lot is outside acceptance limits, the Lot is rejected automatically regardless of values of other acceptance parameters. For top lift deviation of more than 1.50%, the Contractor shall either overlay or remove and replace the Lot (see 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures). For lower lift deviations of more than 1.50%, the Departmental Representative will determine whether removal and replacement is necessary. For material that is allowed to stay in place, a deduction at 50% of the unit price bid per tonne of Hot Mix Asphalt Concrete Pavement material will be implemented.

.3 Payment Adjustments for Air Void Rejected Work Made Acceptable: Rejection limits for air void rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable.

.4 Air Void Testing: Air Void testing will be completed in accordance with.

.1 ASTM D3203 – Standard Test Method for Percent Air Voids in Compacted Asphalt Mixtures.

.2 ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

.3 ASTM D2726 – Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Asphalt Mixtures.

Table 32 12 16 – 07: Payment Adjustments for Asphalt Air Void (Divergence from Job Mix Formula Air Voids) Percentage ASTM D3203

Deviation from JMF (%)	Payment Adjustment for Air Voids ($ per tonne)
+/– 0.5	$0.00
+/– 0.5	–$3.00
+/– > 1.00	Reject

4.6 Material Application Rate

.1 Payment Adjustments: Payment Adjustments for material application rate will be made on the actual material application rate, expressed as a percentage of the specified material application rate for each Lot as follows.

4.6 Material Application Rate (Cont'd)

.1 (Cont'd)

.1 Hot Mix Asphalt Concrete Pavement will be applied to roadway at rate specified on the drawings, contract specifications, or as directed in writing by Departmental Representative. Material application rates will be determined by tonnage delivered to paver as recorded by weigh tickets generated by automated scales, divided by the area covered by the Lot after allowances have been made for entrance letdowns and/or intersections and rest stops. Contractor will provide material application rate calculations to Departmental Representative at end of each shift.

.2 Payment Adjustments for material application rate will be the amount shown in Table 32 12 16 – 08, based on the actual material application rate, expressed as a percentage of the specified material application rate (excluding Hot Mix Asphalt Concrete Pavement placed at Km 282, and Km 319 Rest Stop areas).

Table 32 12 16 – 08: Payment Adjustments for Material Application Rates

Actual Application Rate Expressed as % of Specified Application Rate	Payment Adjustment of Material in the Lot ($ Per Tonne) Bottom Lift & Lower Lift	Top Lift
>= 110	–$7.00 for all material in the Lot up to 110% & no payment for product in excess of 110.0%	–$7.00 for all material in the Lot up to 106% & no paymentfor product in excess of 106.0%
>= 106.0 to < 110.0	–$5.00	–$7.00 for all material in the Lot up to 106% & no payment for product in excess of 106.0%
>= 105.0 to < 106.0	–$5.00	–$5.00
>= 104.0 to < 105.0	–$1.00	–$3.00
>= 96.0 to < 104.0	+$0.50	+$0.50
>= 94.0 to < 96.0	–$2.00	–$2.00
>= 92.0 to < 94.0	–$3.00	–$3.00
>= 90.0 to < 92.0	–$4.00	–$4.00
>= 85.0 to < 90.0	–$7.00	–$7.00
< 85.0	Reject	Reject

4.6 Material Application Rate (Cont'd)

.2 Rejection Limits: Where actual material application rate for the Lot is within the reject zone as shown in Table 32 12 16 – 08, the Lot is rejected with no payment made for the Lot. A Lot rejected for material application rate may be corrected by the Contractor per the options outlined in Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures, and/or rejected with no remedial work required at the discretion of Departmental Representative.

.3 Payment Adjustments for Material Application Rejected Work Made Acceptable: Payment Adjustments for material application rejected work made acceptable will be based on the material application rate of the final product (remedial mill and fill combined with any remaining Asphalt Concrete Mix) for the Lot.

4.7 Surface Segregation

.1 Payment Adjustments: Payment Adjustments for surface segregation will not be made.

.2 All top lift segregation (slight, moderate, and severe) shall be repaired such that the finished pavement surface is homogeneous, free from segregation and shall be uniform with respect to surface texture. A segregated area is defined as an area within the driving lanes of the pavement wherein the texture differs visually from the texture of the surrounding pavement.

.3 All bottom lift and lower lift with severe segregation shall be repaired such that the finished pavement surface has a finished surface texture of moderate or better segregation.

.4 Determination of Segregation.

.1 The Contractor and Departmental Representative shall establish through use of photographs as contained in the Alberta Transportation – Paving Guidelines and Segregation Rating Manual (2002), the visual appearance as provided in Table 32 12 16 – 09, and / or other mutually agreed tools, the definition of slight, moderate and severe segregation.

.2 At the request of the Departmental Representative, he Departmental Representative and Contractor shall evaluate first two Lots upon completion of the second Lot, after opening to traffic, to confirm "agreed to" guidelines.

4.7 Surface Segregation (Cont'd)

.4 (Cont'd)

.3 Contractor and Departmental Representative will observe finished pavement to evaluate the existence, severity and extent of segregation and other defect only when all paving is complete.

.4 Evaluation will be completed following substantial performance of the work prior to Completion.

.5 Repair of Surface Segregation.

.1 Segregation, including any areas outside the driving lanes assessed for Payment Adjustments, shall be repaired according to Table 32 12 16 – 09.

.2 All segregated patch repairs shall be completed to a rectangular shape.

.3 Repairs shall be to the neat lines and dimensions of the segregated areas using sand cement slurry or other product acceptable to the Departmental Representative. Acceptable sand cement slurry can be made as follows, with proportions varied as needed for workability.

.1 25 liters of ss-1 (or equivalent) emulsions.

.2 4 – 5 kg (2 shovels) of = 3 mm sand.

.3 2 – 3 kg (1 shovel) Type GU (general use) Portland Cement.

.4 Additional water, if needed for workability.

.5 Or other products preapproved by the Departmental Representative.

.4 After repairs, the Lot will be re-evaluated for acceptance.

.5 Continuous or semi-continuous longitudinal blemishes which have not been rated as segregated areas shall be repaired using a fog coat where directed by Departmental Representative.

.6 Repairs shall be carried out by the Contractor at his own expense.

.7 If an Asphalt Concrete Overlay is used as a corrective measure on a defective Lot, the Asphalt Concrete Overlay thickness will be subject to approval of Departmental Representative. Where an Asphalt Concrete Overlay is used as a corrective measure in any lane, adjacent lane(s) shall also be overlaid to same thickness and length, regardless of whether adjacent lanes were acceptable or not. The Asphalt Concrete Overlay will be subject to same specifications as original pavement. Minimum thickness of Asphalt Concrete Overlay shall be 40 mm.

4.7 Surface Segregation (Cont'd)

.5 (Cont'd)

.8 Whether the Asphalt Concrete Overlay is applied as a corrective measure or is placed over otherwise acceptable pavement in order to match an adjacent lane, acceptability and payment will be determined as follows.

.1 Acceptability, and eligibility for either positive or negative Payment Adjustment, will be determined entirely on the results of testing and observations conducted on the Asphalt Concrete Overlay, regardless of test results that have been obtained on the underlying, overlaid lift of pavement.

Table 32 12 16 – 09: Segregation – Remediation Methodology

Segregation Severity	Visual Appearance	Repair Procedures	Applicable to Asphalt Lifts
None	Uniform surface texture	N/A	N/A
Slight	Matrix of asphalt binder, coarse and fine aggregate exists, visually increased presence of stone sizes.	Sand, asphalt emulsion slurry	Top Lift Only
Moderate	Significantly more stone than surrounding pavement; matrix of asphalt binder & coated sand particles is reduced	Seal coat or sand asphalt emulsion slurry patch or neat hot mix patch or mill and fill patch	Top Lift Only
Severe	Appears as an area of very stony mix – stone against stone – little or no matrix	Remove and replace or overlay to limits define by Departmental Representative	Top lift, Bottom Lift, and Lower lift

4.8 Smoothness

.1 Payment Adjustments: Payment Adjustments for smoothness will be made by the International Roughness Index (IRI) in each driving lane for each Lot as follows.

4.8 Smoothness (Cont'd)

.1 (Cont'd)

.1 The smoothness testing will be undertaken by the Departmental Representative following substantial completion of the work. The Contractor shall provide a desired date for the smoothness testing a minimum of 2 weeks in advance of desired date. The Departmental Representative will endeavor to complete the smoothness testing on the desired date but cannot guarantee the smoothness testing will be completed on the Contractor's desired date. Once a date for smoothness testing has been determined by the Departmental Representative the Contractor will be provided with a minimum of 3 days' notice. The contractor shall be responsible for sweeping and any other preparation work required for smoothness testing.

.2 The finished pavement surface shall be tested using a Class 1 precision rolling profile measuring instrument, to determine the longitudinal profile and compute the International Roughness Index (IRI) in each driving lane. Profiles shall be measured and the IRI calculated in the traffic wheel-paths for each Sub-Lot.

.3 For any Sub-Lot between 50 m and 100 m in length, the IRI value shall be considered representative of a complete Sub-Lot. For any Sub-Lot less than 50 m in length, the IRI value will be combined with the proceeding Sub-Lot IRI value.

.4 The profile shall be measured over the entire length of the pavement exclusive of structures and shoulder areas. Acceleration, deceleration and turning lanes are considered part of the driving lanes and shall be tested in accordance with this provision. For the measuring process, the Contractor shall provide the Departmental Representative a chalk guide line in the traffic wheel paths immediately prior to measurement.

.5 Auxiliary Lanes: For smoothness testing, sections of the driving lanes that do not fall within the continuous through lanes, such as acceleration lanes, deceleration lanes and turning lanes, and lanes which are less than 1 km in length, shall be treated as follows.

.1 The ratio of the section length to the standard Lot length of 1 km shall be determined and the Payment Adjustment shall be prorated on this basis as in the following example: Length of segment, i.e. 565 m = 0.565 times the Standard Lot length of 1000 m.

4.8 Smoothness (Cont'd)

.1 (Cont'd)

.5 (Cont'd)

.2 Hence the applicable Payment Adjustment is 0.565 times the payment adjustment for a 1 km Lot as determined from Table 32 12 16 – 10.

.6 Payment Adjustments for smoothness shall apply to the top lift only and shall be the applicable amount shown in Table 32 12 16 – 10 and those described in 4.8.3 – Smoothness Deficiencies. Smoothness at bridges applies to "End / Start Top Lift ACP Placement" location as shown on Contract Drawings. Smoothness Payment adjustment for Hot Mix Asphalt Concrete Pavement placed at Km 282 Rest Stop, Km 319 Rest Stop, access road letdowns, and bridge concrete approach slabs shall not be made.

Table 32 12 16 – 10: Lot Assessment and Payment Adjustments for Smoothness. For the final surface course only, the following Payment Adjustments shall apply to each Lot.

Lot IRI (m/km)	Payment Adjustment
=< 0.80	+$2,000
> 0.80 to =< 0.90	+$1,000
> 0.90 to =< 1.00	+$500
> 1.00 to =< 1.10	+$200
> 1.10 to =< 1.20	$0
> 1.20 to =< 1.30	–$100
> 1.30 to =< 1.40	–$250
> 1.40 to =< 1.50	–$600
> 1.50 to =< 1.60	–$1,400
> 1.60 to =< 1.70	–$2,000
> 1.70 to =< 1.80	–$3,000
> 1.80	Reject

.2 Rejection limits: The reject limit for smoothness is the limiting value as shown in Table 32 12 16 – 10, beyond which corrective work is required. The IRI value, calculated for each Sub-Lot, will be used to determine if the Lot will be accepted, and if so whether it will be subject to any Payment Adjustment. The Lot IRI is the average IRI value calculated for the Sub-Lots within the Lot. A Lot is rejected for smoothness if any Sub-Lot is rejected. A Sub-Lot is rejected (subject to remedial work) if:

.1 It has an IRI within the reject zone shown in Table 32 12 16 – 10.

4.8 Smoothness (Cont'd)

.2 (Cont'd)

.2 There are obvious defects or it has unrepaired smoothness deficiencies which require remediation in accordance with 4.6 – Surface Segregation or 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures).

.3 Smoothness Deficiencies: Smoothness deficiencies (bumps and dips) less than 12 mm over 3 m will not have remedial work required. Individual deficiencies between 8 mm and 12 mm over 3 m will result in a -$200.00 Payment Adjustment for each occurrence. Deficiencies exceeding 12 mm over 3 m will require remedial work.

.4 Remedial Work: If the test results on a Sub-Lot(s) of pavement indicate a payment reduction or rejection because of smoothness, the Contractor may propose remedial work to improve the smoothness. Such proposals are subject to approval of the Departmental Representative and shall be in accordance with Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures of this contract specification, however, such approval does not imply the proposed remedy will be successful, and does not reduce the Contractor's responsibility for meeting the acceptance requirements. Grinding may be acceptable, but an Asphalt Concrete Overlay may be required to fully improve smoothness. Only one attempt may be made to improve smoothness, and this must be completed within ten (10) calendar days from the time the Contractor receives notification from the Departmental representative of the original smoothness test results for that Sub-Lot.

.5 No payment will be made for any material, equipment or labour used to improve, or attempt to improve, smoothness.

.6 Payment Adjustments for Smoothness Rejected Work Made Acceptable: Following any attempt to improve the smoothness of a Sub-Lot or Sub-Lots, the Departmental Representative will retest the Sub-Lot(s), and the new results will replace the previous data for the purposes of determining acceptance and payment.

4.9 Workmanship Defects

.1 Finished surface of any lift (including asphalt concrete pavement placed on concrete bridge approach slabs) shall have a uniform close texture and be free of visible signs of poor workmanship. Any obvious defects as determined by Departmental Representative such as, but not limited to the following, will be cause for automatic rejection of Hot Mix Asphalt Concrete Pavement regardless of the values of any other control characteristic.

.1 Individual bumps and dips that exceed 12 mm over 3 m.

.2 Areas of excess or insufficient asphalt.

.3 Improper matching of longitudinal and transverse joints.

.4 Roller marks.

.5 Tire marks.

.6 Structural defects including, but not limited to, cracking or tearing.

.7 Improperly repaired sampling locations.

.8 Improperly constructed patches.

.2 When Hot Mix Asphalt Concrete Pavement is rejected by reason of obvious defects, the minimum area of rejection will be the actual length of the defect for the full width of the driving lane in which the defect exists. If the defect occurs in the highway shoulder, access road letdown, or rest stop, the minimum area of rejection will be the actual length of the defect by the full width of the defect.

.3 Rejected work shall be promptly repaired, remedied, overlaid, or removed and replaced all in a manner acceptable to Departmental Representative and in accordance with Item 4.11 – Hot Mix Asphalt Concrete Pavement Corrective Measures of this contract specification. Contractor shall be responsible for all costs including materials.

.4 No payment will be made for work in any Lot which has been rejected, until defects have been remedied.

4.10 Appeal Testing

.1 Density, Asphalt Content, Gradation and Air Voids.

4.10 Appeal Testing (Cont'd)

.1 (Cont'd)

.1 Contractor may appeal results of acceptance testing for any rejected or penalized Lot only once. Appeals will only be considered if cause can be shown. Appeal shall be for all tests within the Lot, and there will be no appeal allowed for single tests within a Lot. Quality Control tests for density which are provided to Departmental Representative subsequent to Contractor's receipt of Quality Assurance test results for that Lot will not be considered when evaluating cause for an appeal.

.1 Any attempt to improve density on the appeal Lot after Departmental Representative has tested the Lot for acceptance shall void the appeal and original test results will apply.

.2 Following procedures will apply for an appeal:

.1 Contractor shall serve notice of appeal to Departmental Representative, in writing, within 48 hours of receipt of test results with exception of appeals for gradation and Asphalt Content where appeal period will be within 72 hours of receipt of test results.

.2 Departmental Representative will arrange and pay for an independent testing laboratory to perform appeal testing. Neither personnel employed or testing laboratory retained by Contractor for Quality Control testing nor personnel employed or testing laboratory retained for quality assurance testing for PSPC/Departmental Representative on project will be used for appeal testing.

.3 The appeal testing laboratory shall hold current certification from the Canadian Council of Independent Laboratories (CCIL) (http://www.ccil.com/) under both the Asphalt Laboratory and Aggregate Laboratory Certification Programs, and at least one technician in the asphalt laboratory shall hold current certification under the Asphalt Technician Certification Program.

.4 For Density appeals the Contractor will within 2 working days of filing the appeal and take 5 core samples from random locations selected by the Departmental Representative from a Sub-Lot and provide the core samples to the Departmental Representative. The Departmental Representative will provide the core samples and the companion loose Asphalt Concrete Mix samples from the appealed Sub-Lots to the independent appeal testing laboratory.

4.10 Appeal Testing (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.5 For Density, the appeal agency shall prepare new briquette densities from the previously taken companion samples. The appeal agency shall determine the BRD/MTD from the companion sample and the densities of the cores and report the results to the Departmental Representative and the Contractor. The original core test results will be discarded and a new sample mean will be calculated from the 5 random cores and shall be used for acceptance and Payment Adjustments for the Sub Lot. The new results will be binding on the Contractor and PSPC.

.6 For Asphalt Content, Air Voids, and Gradation, the original test results will be discarded. A new sample mean for three new test results will be determined using the appeal samples and will be used for acceptance and Payment Adjustments. New results will be binding on the Contractor and PSPC.

.2 Smoothness.

.1 The Contractor may appeal acceptance test results of smoothness of any rejected or penalized Lot once. The appeal shall be in writing and submitted within 72 hours of receipt of the test results.

.2 Any attempt to improve smoothness on the appealed Lot after the Departmental Representative has tested the Lot for acceptance shall void the appeal and the original test results will apply.

.3 The appeal testing will be performed by the Departmental Representative, and the Contractor will be given the opportunity to witness, the appeal testing and new results will be binding on the Contractor and PSPC.

.3 Surface Segregation, Material Application Rate, and Workmanship Defects.

.1 The Contractor's appeal of surface segregation ratings must be done in writing and submitted within 72 hours of receipt of Ratings.

.2 Appeal of surface segregation ratings will first be handled by a joint review with the Contractor within 14 calendar days of receipt of written notice of appeal.

.3 If consensus cannot be reached then PSPC and the Contractor will engage a mutually agreed upon third party to assess the area(s) in question. New values will be binding on the Contractor and PSPC.

4.10 Appeal Testing (Cont'd)

.4 Payment for Appeal Testing

.1 If the new results indicate a change in the Payment Adjustment in the Contractor's favour, then sampling and testing costs incurred during the appeal procedures for that Lot will be borne by PSPC.

.2 If the new results verify that any payment reductions or rejections remains valid for that Lot, then the costs of testing (plus 10% mark-up) incurred during the appeal procedure will be charged to the Contractor.

4.11 Hot Mix Asphalt Concrete Pavement Corrective Measures

.1 Hot Mix Asphalt Concrete Pavement corrective measures shall at Contractor's option be either an overlay with Hot Mix Asphalt Concrete Pavement or removal and replacement of the defective Hot Mix Asphalt Concrete Pavement as follows:

.1 If an overlay with Hot Mix Asphalt Concrete Pavement is used as a corrective measure on a defective Lot or Sub-Lot, the overlay thickness will be subject to approval of Departmental Representative. Where an overlay is used as a corrective measure the full lane width and shoulder width shall receive an overlay and adjacent lane(s) and shoulder area shall also be overlaid to same thickness and length, regardless of whether adjacent lanes were acceptable or not. The overlay will be subject to same specifications as original pavement, except minimum compacted thickness of overlay in all locations shall be 45 mm.

4.11 Hot Mix Asphalt Concrete Pavement Corrective Measures (Cont'd)

.1 (Cont'd)

.2 If removal and replacement is used as a corrective measure on a defective Lot or Sub-lot the area and thickness of removal shall be subject to pre-approval by the Departmental Representative. The removal of asphalt shall be completed by milling in accordance with Section 32 01 16.13 – reshaping Asphalt Pavement (Milling) unless the full thickness of all asphalt in the area of defective Lot or Sub-lot is removed. In the case of top lift, any removals within the driving lane will require the removal of the full driving lane width. The minimum compacted thickness of removal and replacement shall be the defective Lot or Sub-lot design lift thickness. Replacement of the Hot Mix Asphalt Concrete Pavement shall be completed in maximum compacted lift thicknesses of 100 mm. Asphalt Tack Coat and Asphalt Prime (if applicable) shall be applied before and between each lift in accordance with Section 32 12 13.16 – Asphalt Tack Coat and Section 32 12 13.23 – Asphalt Prime.

.3 If an overlay of Hot Mix Asphalt Concrete Pavement is placed over to match an will be underlying, overlaid lift of pavement.

.1 The payment quantity, for application of the Unit Prices for Hot Mix Asphalt Concrete Pavement, and the quantity, to which any Payment Adjustment is to be applied, will be derived from the tonnage of Hot Mix Asphalt Concrete Pavement in the underlying, overlaid lift.

.4 If removal and replacement is used as a corrective measure acceptability and payment will be determined as follows:

.1 Acceptability, and eligibility for either positive or negative Payment Adjustment, will be determined entirely on the results of testing and observations conducted on the replacement Hot Mix Asphalt Concrete Pavement.

.2 The payment quantity, for application of the Unit Prices for Hot Mix Asphalt Concrete Pavement, and the quantity, to which any Payment Adjustment is to be applied, will be derived from the original (or removed) tonnage of Hot Mix Asphalt Concrete Pavement.

.5 The Contractor shall be responsible for all costs associated with corrective measures undertaken to achieve contract requirements.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Measurement and Payment.

.2 Equipment.

.3 Installation.

1.2 Measurement and Payment

.1 Payment for Rumble Strips will be made on the basis of the Price per Unit Bid for Rumble Strips in the Tender Form. The Price per Unit Bid shall include all costs included with the equipment, labour, materials, and installation of the Rumble Strips, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Rumble Strips will be made on the length of Rumble Strips measured in kilometers, measured parallel to the direction of the highway centerline, and accepted by the Departmental Representative. The shoulder Rumble Strips on each shoulder of the highway shall be measured separately then added together to get the total quantity. Gaps in the Rumble Strips (i.e. intersections) shall be included in the total quantity unless the gap exceeds 200 m.

PART 2 – PRODUCTS

2.1 Products

.1 Not used.

PART 3 – EXECUTION

3.1 Equipment

.1 The milling machine shall be equipped to meet or exceed the following requirements:
.1 The cutting head shall be capable of producing grooves meeting the requirements as shown on the Contract Drawings.

3.1 Equipment (Cont'd)

.1 (Cont'd)

.2 The machine shall either be equipped with an integral sweeping device mounted directly behind the cutter or, a separate sweeping operation shall be conducted as construction of the Rumble Strips progresses within the signed construction zone.

3.2 Installation

.1 Install patterned Rumble Strips in the locations and layout as shown on the Contract Drawing.

.2 Shoulder Rumble Strips shall not extend across intersections, tapers or accesses as indicated on the Contract Drawings or as directed in the field by the Departmental Representative.

.3 After milling the grooves, the Contractor shall pickup and dispose of all detritus created from the milling operation.

.4 Patterns of milled Rumble Strips constructed outside the tolerances as shown on the plans or exhibiting obvious defects will be rejected, and the Contractor shall be responsible for repairing the unacceptable work.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Measurement and Payment.

.2 Water.

.3 Dust Control Using Water.

1.2 Measurement and Payment

.1 Measurement for Payment for the completion of Roadway Dust Control shall not be made and shall be considered incidental to the work.

PART 2 – PRODUCTS

2.1 Water

.1 If necessary, apply for necessary environmental permits for the extraction of water from local sources.

PART 3 – EXECUTION

3.1 Dust Control Using Water

.1 Complete Roadway Dust Control using water over the full width of all utilized driving lanes whenever:
.1 Dust from travelling vehicles impairs driver's vision such that objects further than 150 m are obscured by dust.
.2 As deemed necessary by the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Submittals.

.2 References.

.3 Measurement and Payment.

.4 Paint.

.5 Traffic Management.

.6 Equipment.

.7 Application.

1.2 Submittals

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

.2 Unless advised otherwise in advance of the work by the Departmental Representative, prior to ordering materials, submit manufactures instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing paint materials meet the requirements of contract specification Section 32 17 23 – Pavement Markings.

.3 Provide access as requested by the Departmental Representative to sample paint line products throughout the work.

.4 For each application / line type, submit written summary report to Departmental Representative within 24 hours of application and include information as follows.
.1 Total line painted (station start and end and line lane location).
.2 Quantity of paint and glass beads used and mean application rate. Carry out measurements in presence of Departmental Representative upon request.

1.3 References

.1 British Columbia Ministry of Transportation and Highways.

1.3 References (Cont'd)

.1 (Cont'd)
.1 Traffic Management Manual for Work on Roadways – 2020 Office Edition.

1.4 Measurement and Payment

.1 Payment for line painting will be made on the basis of the Price per Unit Bid for Solid and Dashed Yellow Line Pavement Markings and Solid Single White Line Pavement Markings in the Tender Form. The Price per Unit Bid shall include all costs included with the layout (by survey), supply and installation of the line painting, traffic control and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Pavement Markings will be made on the length of line painting surveyed in kilometers (measured per line km), measured parallel to the direction of the centerline of the proposed highway, and accepted by the Departmental Representative. Double lines (or simultaneous and broken lines) shall be counted as one single line for quantity calculation. Gaps between broken lines and gaps for intersections will be considered as a line with the gap distance counted in the line quantity.

PART 2 – PRODUCTS

2.1 Paint

.1 Paint:
.1 To CGSB 1 206 M89, alkyd traffic paint.
.2 Color: to CGSB 1-GP-12C, yellow 505 – 308 and 1-GP-12C, white 513 – 301.

.2 Thinner:
.1 To CGSB 1-GP-5M.

.3 Glass Beads:
.1 Overlay Type: to CGSB 1-GP-74M.

PART 3 – EXECUTION

3.1 Traffic Management

.1 Traffic management for the completion of line painting shall be in accordance with the Contractor's accepted Traffic Management Plan (see Section 01 35 00 – Traffic Control) and the following as minimum requirements:

.1 Equipment and signage including but not limited to painting truck, escort vehicle as required by Section 14.7 – Conventional Long-Line Centerline and White Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition.

3.2 Equipment

.1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in a single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shutoff.

.2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

.3 Eradicator to remove incorrectly placed lines or lines placed with an incorrect paint /glass bead application rate. Should the use of an eradicator be necessary, all costs shall be incidental to the work and no separate payment will be made.

3.3 Application

.1 Paint Pavement Markings as per the details, dimension, and locations shown on Contract Drawings. The Contractor shall be responsible for all pre-marking using survey (see Section 01 11 55 – General Instructions, Item 1.19 – Survey) to properly apply Pavement Markings within the tolerances.

.2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/hr and no rain is forecast within the next 4 hours.

3.3 Application (Cont'd)

.3 Contractor is to ensure that pavement surface is free from surface water, frost, ice, dust, oil, grease and other foreign materials as required before painting.

.4 Ensure traffic control per Section 01 35 00 – Traffic Management is in place for the duration of the paint application and drying process.

.5 Apply traffic paint evenly at a wet film thickness of 400 micrometers, or 45 litre/km of solid 110 mm line.

.6 Do not thin paint.

.7 Paint lines to be of uniform colour and density with sharp edges.

.8 Apply glass beads at rate of 700 g/litre of painted area immediately after application of paint.

.9 Thoroughly clean distributor tank before refilling with paint or different colour.

.10 Tolerances:
.1 Paint markings to be within +/- 12 mm of design lines indicated on Contract Drawings.
.2 Paint thickness shall be within +/- 10% of specified thickness or volume.
.3 Application of glass beads to be within 25 grams/litre of paint.

.11 Remove lines placed outside of tolerance or lines placed with application rate outside tolerance.

.12 Protect pavement marking until dry.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 References.

.2 Product Data.

.3 Scheduling.

.4 Product Handling and Storage.

.5 Measurement and Payment.

.6 Materials.

.7 Equipment.

.8 Application.

.9 Workmanship.

.10 Protection of Surfaces.

.11 Preparation of Slurry.

.12 Slurry Application.

.13 Warranty and Maintenance.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition:
.1 ASTM D5338, Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures.
.2 ASTM D6525, Standard Test Method for Measuring Nominal Thickness of Rolled Erosion Control Products.
.3 ASTM D6566, Standard Test Method for Measuring Mass Per Unit Area of Turf Reinforcement Mats.
.4 ASTM D6567, Standard Test Method for Measuring the Light Penetration of a Rolled Erosion Control Product (RECP).
.5 ASTM D7322, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.

1.2 References (Cont'd)

.1 (Cont'd)

.6 ASTM D7367, Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.

.2 Environmental Protection Agency (EPA), latest edition:

.1 EPA 2021.0, Methods for Measuring Acute Toxicity to Freshwater and Marine Organisms, Daphnia puplex and Daphnia magna acute.

1.3 Product Data

.1 Provide product data, prior to seeding for:

.1 Seed:

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net mass or volume in each container.

.2 Biotic Soil Media.

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.3 Hydraulic Erosion Control Product (HECP).

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.4 Fertilizer

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.2 Guarantees.

.3 Chemical Analysis.

.2 Unless advised otherwise in advance of the work by the Departmental Representative, submit in writing to the Departmental Representative 14 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.

1.4 Scheduling

.1 Schedule Hydraulic Seeding as directed by the Departmental Representative to coincide with the completion of surface on which the Hydraulic Seeding shall be applied.

1.5 Product Handling and Storage

.1 Deliver and store seed in original containers individually labeled in accordance with "Seeds Regulations" and indicating name of supplier.

.2 Deliver and store seed and fertilizer out of adverse weather.

.3 Protect all product as required during transportation and storage.

.4 Remove from project area, product that has become wet or otherwise damaged during transportation or storage, or does not meet requirements specified.

1.6 Measurement and Payment

.1 Payment for the completion of Hydraulic Seeding – Supply and Application will be made on the basis of the Price per Unit Bid for Hydraulic Seeding – Supply and Application in the Tender Form. The Price per Unit Bid shall include all costs for supply, placement, and maintenance of the Hydraulic Seeding in all areas of topsoil, cut slopes, excavation, and other disturbed areas as detailed in these specifications or as directed by the Departmental Representative. The Price per Unit Bid shall further include all costs associated up to one (1) mobilization to complete Hydraulic Seeding – Supply and Application during the spring or summer season, at the direction of the Departmental Representative.

.2 Measurement for Payment for completion of Hydraulic Seeding – Supply and Application will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative.

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 Mixture: "Certified", Canada No. 1 seed for common cultivars in accordance with Government of Canada Seeds Act and Regulations and shall conform to the following seed mixes for the applicable project locations:

Table 32 92 19.16 –01: Grass Seed Mix

% By Weight	Species
30%	Creeping Red Fescue
20%	Slender Wheatgrass
10%	Alsike Clover
10%	Timothy
10%	Canada Bluegrass
15%	Smooth Brome Grass
5%	Sheep Fescue

.2 Fall rye.

.2 Biotic Soil Media shall be a Wood Fibre Based Product certified for use in Canada containing the following ingredients:

.1 Renewable Thermally Refined Bark and Wood Fibers

.2 Biochar

.3 Cross-Linked Polysaccharide Biopolymers

.4 Soil Building Components Containing Seaweed Extract, Humic Acid, and Endomycrrhizae.

.3 Hydraulic Erosion Control Product (HECP) shall be a Wood Fibre Product certified for use in Canada with the following properties as detailed in Table 32 92 19.16 – 02:

2.1 Materials (Cont'd) .3 (Cont'd)

Table 32 92 19.16 – 02: HECP

Physical Properties (1)	Test Method	Test Value
Thickness	ASTM D6525 (2)	>= 4 mm
Ground Cover	ASTM D6567 (2)	>= 98%
Mass/Unit Area	ASTM D6566 (2)	>= 390 g/m2
Water Holding Capacity	ASTM D7367	>= 1,400%
Cover Factor (3)	Large Scale (5)	<= 0.05
Percent Effectiveness (4)	Large Scale (5)	>= 95%
Cure Time	Observed	4
Vegetation Establishment	ASTM D7322 (2)	>= 600%
Functional Longevity	ASTM D5338	<= 12 Months

Environmental Properties (1)	Test Method	Test Value
Ecotoxicity	EPA 2021.0	48-hr LC50> 100%
Biodegradability	ASTM D5338	Yes

Product Composition	Typical Value
Thermally Processed (7) (within a pressurized vessel) Virgin Wood Fiber	77%
Wetting Agents – including high-viscosity, colloidal polysaccharides, crossed-linked biopolymers and water absorbents (>10% of total formulation)	18%
Crimped, Biodegradable Interlocking Fibers	2.5%
Micro-Pore Granules	2.5%

.1 Table Notes:

.1 When uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions.

.2 ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products.

.3 Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.

.4 % Effectiveness = One minus Cover Factor multiplied by 100%.

.5 Large scale testing conducted at Utah Water Research Laboratory and Texas Transportation Institute. For specific testing information please contact a Profile technical service representative at 800-508-8681.

2.1 Materials (Cont'd)

.3 (Cont'd)

.1 (Cont'd)

.6 Functional Longevity is the estimated time period, based upon ASTM D5338 testing and field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors.

.7 Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined®/Processed and to achieve phytosanitization.

.4 Water: free of impurities that would inhibit germination and growth.

.5 Fertilizer:

.1 To Canada Fertilizers Act and Regulations.

.2 Complete synthetic, ratio: 18:18:18.

2.2 Equipment

.1 Capable of mixing and evenly distributing seed, fertilizer, Biotic Soil Media, and HECP mixtures for efficient treatment of areas to be seeded.

.2 Agitation system:

.1 To be built in.

.2 To have sufficient capacity to agitate, suspend and homogeneously mix slurry of materials in amounts specified using slurry recirculation or mechanical agitation method.

.3 To be capable of operating during seeding and charging of the tank.

.3 Slurry tank to have working capacity of at least 4,500 litres with pump capable of maintaining continuous, nonfluctuating stream of slurry. Distribution lines to be equipped with appropriate nozzles and of sufficient diameter to prevent blockage. Tank volume to be certified by certifying authority and identified by authorities with the Volume Certification Plate.

.4 Capable of seeding by 50 m hand operated hose or tower with appropriate nozzles.

PART 3 – EXECUTION

3.1 Application

.1 Apply Hydraulic Seeding as per the direction provided by the Departmental Representative during spring or summer season to avoid winter weather conditions. Assume one (1) mobilization will be required to complete Hydraulic Seeding (Optional Work).

3.2 Workmanship

.1 Apply Hydraulic Seeding in all areas of topsoil, cut / fill slopes, disturbed areas, or other areas as detailed in these specifications or as directed by the Departmental Representative.

.2 Do not spray onto structures, signs, guardrails, plant material, and other surfaces than intended.

.3 Clean-up immediately any material sprayed where not intended, to satisfaction of Departmental Representative.

.4 Do not perform work under adverse field conditions such as wind speeds that will carry product beyond area designed for hydraulic seeding or not uniformly applied, frozen ground or ground covered with snow, ice or standing water, or other adverse conditions unless otherwise pre-approved by the Departmental Representative.

.5 Protect seeded areas from trespass until plants are established.

3.3 Protection of Surfaces

.1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.

.2 Obtain Departmental Representative's review of grade, finished surface, and topsoil depth before starting to seed.

3.4 Preparation of Slurry

.1 Measure quantities of materials by weight or weight-calibrated volume measurement. Supply equipment required for this work.

3.4 Preparation of Slurry (Cont'd)

.2 Calculate amount of material to be used and area to be covered for each tank load utilizing size of slurry tank and carrying capacities of water.

.3 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize Biotic Soil Media and HECP and charge slowly into seeder. Use optimum carrying capacity of water relative to Biotic Soil Media, and HECP as follows:
.1 Biotic Soil Media: 55kg/1000 L.
.2 HECP: 43kg/1000 L.

.4 Mix thoroughly to complete the slurry once all other material is in the seeder.

3.5 Slurry Application

.1 Hydraulic seeding equipment:
.1 Slurry tank.
.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.
.3 Capable of seeding by 50 m hand operated hoses or tower with appropriate nozzles.

.2 The hydraulic seeding slurry mixture shall be applied in (2) two separate applications. The second application shall be applied within 24 hours of the first application. The slurry mixture per hectare of each application shall be as follows:
.1 Application 1 (Biotic Soil Media and Seed):
.1 Biotic Soil Media: 3500 kg
.2 Fall rye: 110 kg.
.3 Fertilizer: 360 kg.
.2 Application 2 (HECP):
.1 HECP: 3900 kg.
.2 Grass Seed Mixture: 125 kg.

.3 Thoroughly mix and uniformly apply slurry, at optimum angle of application for adherence to surfaces and germination of seed over area to be seeded.
.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 previous applications to form uniform surfaces.

.5 Re-apply where application is not uniform.

3.5 Slurry Application (Cont'd)

.6 Immediately remove slurry from items and areas not designated to be sprayed.

.7 Protect seeded areas from trespass and damage.

.8 Remove protection devices.

3.6 Warranty and Maintenance

.1 The Contractor shall warranty the Hydraulic Seeding free of defects in accordance with General Conditions (GC3.13), for one full growing season or 12 months from the date of Substantial Performance whichever is greater.

.2 It is the responsibility of the Contractor to complete maintenance as the Contractor deems necessary on the Hydraulic Seeding such that a 90% survival rate is achieved at the end of the warranty period.

.3 If at the end or prior to the end of the warranty period a 90% survival rate is not achieved the Contractor shall at his own expense replace Hydraulic Seeding not surviving or in poor condition except when the loss or damage can be proven to be due to abnormal weather, or any causes beyond the control of the Contractor.

.4 An end-of-warranty inspection will be conducted by the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 General

.2 References.

.3 Submittals.

.4 Environmental.

.5 Delivery, Storage, and Handling.

.6 Measurement and Payment.

.7 Steel Pipe Culverts.

.8 Welding Materials.

.9 Crushed Base Gravel.

.10 Natural Substrate.

.11 Riprap.

.12 Nonwoven Geotextile.

.13 Equipment.

.14 Installation.

.15 Existing Steel Pipe Extension.

.16 Placement of Nonwoven Geotextile.

.17 Placement of Riprap.

.18 Clean-up.

1.2 General

.1 Complete Steel Pipe Culvert installation work in the dry. Provide temporary drainage, pumping, hoses, temporary coir logs, fish stop nets and check dams as shown on the Environmental Staging Drawings and the Contractor's accepted EPP.

1.3 References

.1 Canadian Standards Association (CSA International), latest edition:
.1 CSA W59, Welded Steel Construction (metal arc welding).
.2 CSA W48, Filler metals and allied materials for metal arc welding.

.2 American Society for Testing and Materials (ASTM), latest edition:
.1 ASTM A252, Standard Specification for Welded and Seamless Steel Pipe Products.

.3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3).

.4 Canadian Welding Bureau Group (CWB):
.1 CWB Form 160 Welding Procedure Data Sheet.

1.4 Submittals

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

.2 The following submittals are required prior to undertaking the work:
.1 Submit to the Departmental Representative for review and acceptable the steel producer's certificates for the steel pipe culverts in accordance with ASTM A252.
.2 Submit to the Departmental Representative the following welding submittals:
.1 A completed Canadian Welding Bureau Group (CWB) Form 160 Welding Procedure Data Sheet. The submitted CWB Form 160 shall be signed / sealed by a person accredited with the CWB.
.2 Documentation confirming the welders performing the work are certified with CWB.

1.5 Environmental

.1 Complete culvert installation and related works in conformance with the requirements of Section 01 35 43 – Environmental Procedures, the Contractor's accepted Environmental Protection Plan (EPP).

1.5 Environmental (Cont'd)

.2 The Contractor shall account for the possibility of not being able to complete work due to high flows or adverse weather conditions in the construction schedule and in the unit prices. No payment for temporary work stoppages due to high flows or adverse weather conditions will be made.

1.6 Delivery, Storage, and Handling

.1 Handle and store the Steel Pipe Culverts products in a manner to avoid damage, alteration, deterioration and spoiling.

.2 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection by the Departmental Representative. Culvert material designated by the Departmental Representative as unacceptable, due to damage or failure to meet specified requirements, shall be immediately repaired or replaced by the Contractor to the acceptance of the Departmental Representative.

1.7 Measurement and Payment

.1 Payment for extending existing Steel Pipe Culverts will be made on the basis of the Price per Unit Bid for 900mm diameter Steel Pipe Culvert Extension in the Tender Form. The Price per Unit Bid shall include all costs included with the work including:

.1 Confirmation of the existing pipe diameter and modification to existing culvert ends (as required) to ensure sound connection of culvert extension.

.2 Excavation and dewatering (as required) to facilitate culvert extension.

.3 Supply, transport, and installation of the specified diameter Steel Pipe Culvert welding.

.4 Supply, placement and compaction of Crushed Base Gravel and Embankment and all other items necessary for the successful completion of the work.

.5 Proving Culvert Ditching and End Protection with Riprap for 900mm diameter Culvert at Km 511.04- The price shall include all costs for dewatering (as required), excavating, loading, hauling and disposal of the excavated materials in preparation for the Riprap, supply and placement of bentonite, supply and installation of the Nonwoven Geotextile, construction of ditch block (if needed), supply, loading, transport and installation of 50kg Riprap and all other items necessary for the successful completion of the work.

1.7 Measurement and Payment (Cont'd)

.2 Measurement for Payment for 900mm diameter Steel Pipe Culvert Extension and End Protection will be made per unit item and the number of Culvert Extensions constructed.

PART 2 – PRODUCTS

2.1 Steel Pipe Culverts

.1 Supply Steel Pipe Culvert Extensions of required diameter and length as shown on the Contract Drawings and the following wall thicknesses including:
.1 Steel pipe diameter less than or equal to 900 mm: 12.5 mm (0.5").

.2 The substitution of pipe with smaller diameter or thinner wall thickness will not be permitted.

.3 Steel pipe culverts shall be seamless or welded pipe (spiral or seam) conforming with the requirements of ASTM A252 with a minimum yield strength of 310 MPa.

.4 Steel pipe culverts shall be delivered to the site in uniform lengths.

2.2 Welding Materials

.1 Welding materials to CSA W59.

.2 Welding electrodes to CSA W48 Series.

2.3 Crushed Base Gravel

.1 Crushed Base Gravel shall be in accordance with Section 31 05 16 – Aggregates General and Section 32 11 24 – Crushed Base, Granular Subbase Course & Base Levelling.

2.4 Natural Substrate

.1 Natural Substrate shall be in accordance with Section 31 05 16 – Aggregates General.

2.5 Riprap

.1 The Contactor shall source the Riprap for the project from the following options:

2.5 Riprap (Cont'd)

.1 (Cont'd)

.1 Existing rock material within the limits of construction that achieves the requirements for Riprap may be set aside by the Contractor for re-use as Riprap.

.2 Alternative source outside the Alaska Highway Right-of-Way.

.2 Regardless of the Riprap source, the Riprap shall conform with the following requirements:

.1 Crushed/blasted angular stone consisting of hard durable particles free from clay lumps, frozen material and other deleterious materials, and free from splits, seams or defects likely to impair its soundness during handling or under the action of water.

.2 Is a graded material conforming with the following gradation limits:

Table 31 37 00 – 01: 50 Kg Class Riprap

Mass (kg)*	Nominal Diameter @ 2650 kg/m3 (mm)	Percent Larger Than
300	600	0
150	510	15
50	350	50
5	160	85
1	95	100

Table Note: *Mass governs the gradation of Riprap. Nominal diameter is provided for information purpose only. Nominal size is defined according to the following expression: Nominal Size (mm) = 1150 times the cube root of the mass (kg) divided by the density of the rock (kg/m3).

.3 Neither the breath or the thickness of any individual piece of Riprap material is to be less than one third of its length. A maximum of 2.0 percent by weight of such pieces will be permitted.

.4 Have a relative density not less than 2.65 in accordance with ASTM C127.

.3 The Riprap shall be stockpiled at the project site for inspection by the Departmental Representative prior to placement.

2.6 Nonwoven Geotextile

.1 Nonwoven Geotextile specifications shall be as per the Nonwoven Geotextile specified under the Section 31 24 14 Excavation, Embankment and Compaction.

PART 3 – EXECUTION

3.1 Equipment

.1 The Contractor shall be solely responsible for selection of equipment capable of handling the excavation of trench size, ground conditions and existing soils.

3.2 Installation

.1 Complete all work in accordance with the Environmental Requirements as outlined in Section 01 35 43 – Environmental Procedures and the Contractor's accepted EPP. Setup berms and/or pumps as required to ensure flows are contained within the existing culvert and the new steel pipe culvert installation is completed in the dry.

3.3 Existing Steel Pipe Extension

.1 Install steel pipe culvert extension to the length, alignment, vertical gradient and elevations shown on the Contract Drawings. Extend steel pipe culvert to +/– 0.1 m horizontal and +/– 0.05 m vertical of the alignment shown on the Contract Drawings. Adjustments to the line and level should be gradual to ensure that the Steel Pipe Culvert extension or joints are not damaged. Monitor line and level of the culvert with appropriate instruments. Steel pipe culvert installation outside of these tolerances may be considered defective work by the Departmental Representative and subject to the conditions of GC3.11.3.

.2 Fuse Steel Pipe Culvert sections to the existing culvert using Complete Penetration Groove welds. Complete all welds, including overhead welds, in accordance with CSA W59 and CSA W48, and provide weld certification in accordance with Item 1.4.3 of this specification section. The Departmental Representative will conduct random visual inspections and/or non-destructive testing of completed welds during trenchless culvert installation. Should any cracks in the welds develop either immediately following the welding or upon further installation, the weld will be considered rejected and require replacement.

3.3 Existing Steel Pipe Extension (Cont'd)

.3 Trim / modify existing culvert end to provide suitable section surface to connect extension to. Prior to welding steel pipe culvert section and install, rotate the steel pipe culvert section to find the best match / alignment between adjacent culvert sections. Install "Alignment Dogs" on the Steel Pipe Culvert to align adjacent sections of the steel pipe culverts as necessary.

.4 Install Crushed Base Gravel (see Section 32 11 24 – Crushed Base, Granular Subbase & Base Levelling Course) around any length of pipe installed using Trenchless Method that upon installation is not completely encircled with native, undisturbed embankment material (e.g. end of Steel Pipe Culvert at jacking pit or Steel Pipe Culvert which has been exposed to remove obstruction).

.5 If required, trim ends of extended steel pipe culvert to the lines shown on the Contract Drawings.

3.4 Placement of Nonwoven Geotextile

.1 Install temporary drainage and pumping and construct berms as outlined in the Contract Drawings and accepted EPP to keep excavations and the work area free from water to the maximum extent possible.

.2 Complete excavation to the lines and grades shown on the Contract Drawings in accordance with Section 31 24 14 – Excavation, Embankment and Compaction. Where required, place and compact Crushed Base Gravel to the lines and grades shown on the Contract Drawings and in accordance with Section 31 24 14 – Excavation, Embankment and Compaction and Section 32 11 24 – Crushed Base, Granular Subbase & Base Levelling.

.3 Place Nonwoven Geotextile on a clean surface, properly shaped to the lines and grades shown on the Contract Drawings and free from debris, snow and ice, or other deleterious material.

.4 Place Nonwoven Geotextile material by unrolling onto excavated /graded surface in orientation, manner and locations indicated on Contract Drawings and retain in position with pins. All Nonwoven Geotextile placed on a slope shall at a minimum be secured with pins a minimum 300 mm long every 2 m2 of Nonwoven Geotextile.

3.4 Placement of Nonwoven Geotextile (Cont'd)

.5 Place Nonwoven Geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.6 Place Nonwoven Geotextile on sloping surfaces in one continuous length from toe of slope to upper extent of Nonwoven Geotextile.

.7 Overlap each successive strip of Nonwoven Geotextile 1000 mm over previously laid strip. When Nonwoven Geotextile are placed on a slope, ensure overlap is as follows:
.1 Nonwoven Geotextile placed higher on slope is placed above Nonwoven Geotextile placed lower on slope.

.8 Pin successive strips of Nonwoven Geotextile with securing pins at 1000 mm interval at midpoint of lap.

.9 Protect installed Nonwoven Geotextile material from displacement, damage or deterioration before, during andafter placement of material layers.

.10 Replace damaged or deteriorated Nonwoven Geotextile to approval of the Departmental Representative.

.11 Construction equipment is not permitted on the Nonwoven Geotextile at any stage of construction.

.12 Upon acceptance by the Departmental Representative, place succeeding material as shown on the Contract Drawings.

3.5 Placement of Riprap

.1 Install temporary drainage and pumping and construct berms as outlined in the Contract Drawings and accepted EPP to keep excavations and the work area free from water to the maximum extent possible.

.2 The Riprap material shall be loaded, transported, and placed with care to ensure that material does not break or reduce in size smaller than the actual material size requirements when placed.

.3 Place Riprap materials on a clean surface, properly shaped per the lines and grades shown in the Contract Drawings and free from debris, snow and ice or other deleterious material.

3.5 Placement of Riprap (Cont'd)

.4 Riprap materials shall be placed to the lines and thickness shown on the Contract Drawings. The finished surface of the Riprap shall be within +200 mm / –100 mm of the finished design grades but not uniformly high or low.

.5 Place Riprap material using methods that do not lead to segregation or degradation of aggregate. Do not place by end dumping from haul units.

.6 Do not drop Riprap from a height greater than 0.5 m vertically from its final position.

.7 Place Riprap commencing at the toe of the slope and proceeding up the slope. Material shall be densely placed,and individual stones shall be worked with placement equipment to form a well-keyed surface. Ensure placement of the riprap materials allows for positive drainage.

.8 Riprap not conforming to the requirements of this Section shall be removed from the project site with the expense of the removal borne by the Contractor.

.9 The Contractor shall ensure that the construction methods adopted produces a finished surface that is comprised of the full spectrum of particle sizes continuously throughout its length and breadth.

.10 Dress all Riprap voids so that the final surface is well keyed, densely placed, and uniform. The Departmental Representative will require that all surface voids be filled intowhere a rock having a mass equal or greater than 25% of the maximum stone mass can be placed.

.1 Install Crushed Base Gravel after the Riprap has been placed to the full design thickness, is well keyed and densely placed in accordance with this Specification Section and to the satisfaction of the Departmental Representative.

.2 Spread the Crushed Base Gravel on top of the placed Riprap by raking or other means, ensuring theCrushed Base Gravel is worked into the voids between the Riprap.

.3 Install Crushed Base Gravel over the full width of the channel bottom, extending up the side of the channel a height of 0.5 m from the bottom of the channel.Crushed Base Gravel is not required on Riprap placed more than 0.5 m above the bottom of the channel.

3.5 Placement of Riprap (Cont'd)

.11 Construction equipment is not permitted on the Riprap at any stage of construction.

.12 Maintain finished material surfaces in a condition conforming to these specifications until acceptance by the Departmental Representative.

3.6 Clean-up

.1 Clean-up all disturbed areas to an equal or better condition to that prior to construction (refer to Section 01 74 00 – Cleaning for further details).

.2 Complete Hydraulic Seeding of all disturbed areas (refer to Section 32 92 19.16 – Hydraulic Seeding for further details).

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

.1 Related Requirements.

.2 Reference Standards.

.3 Action and Informational Submittals.

.4 Measurement and Payment.

.5 Materials.

.6 Preparation.

.7 Instalalation.

.8 Cleaning.

1.2 Related Requirements

.1 Section 32 12 16 Hot Mix Asphalt Concrete Pavement

.2 Section 32 11 24 Crushed Base, Granular Subbase & Base Levelling Course

1.3 Reference Standards

.1 ASTM International
.1 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM D 1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
.3 ASTM C 618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.2-98, Boiled Linseed Oil.

1.4 Action and Informational Submittals

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

1.5 Measurement and Payment

.1 Measurement for the removing and re-instating of precast concrete barriers as indicated on the drawings. Concrete barrier to be measured in metres along its centreline; include transition sections at terminals of installation. No separate payment is made for transition sections and is included in the concrete barrier unit rate. Payment to include removing, loading, hauling, temporary storage and re-instating the barrier as indicated on the drawings and completing all the concrete barrier related re-installation work.

PART 2 – PRODUCTS

2.1 Materials

.1 Existing bridge concrete barriers.

PART 3 – EXECUTION

3.1 Preparation

.1 Temporary Erosion and Sedimentation Control:
.1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 Installation

.1 Hauling from the temporary storage area and re-installed the existing concrete barriers permanently on asphalt concrete pavement in accordance with Drawings and Specifications.

.2 Layout of barriers to be done by contractor.

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.

3.3 Cleaning (Cont'd)

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

.4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION