



Public Works and Government Services Canada

Requisition No. EZ899-162344

SPECIFICATIONS
For:

**Service Road Drainage and Paving, Pacific Agri-Food
Research Centre, Agassiz, British Columbia**

Project No.
R.078803.001

APPROVED BY:

 Jan 25, 2016
Program Manager, PWGSC Date

 2016.0127
Construction Safety Coordinator Date

TENDER:

 10/01/2016
Project Manager Date



PWGSC

Service Road Drainage and Paving
Pacific Agri-Food Research Centre, Agassiz, BC
Project No. R .078803.001

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END OF SECTION

PART 1 - GENERAL

- 1.1 Precedence .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Specifications document.
- 1.2 Definitions .1 “Department” shall mean Public Works and Government Services Canada and is abbreviated as “PWGSC”.
- .2 “Departmental Representative” shall mean a representative appointed by PWGSC for the purpose of execution of this Contract.
- .3 “Owner” shall mean Agriculture Canada.
- 1.3 Hierarchy of Documents .1 In the event of discrepancies, the hierarchy of documents shall be as follows, in descending order:
- .1 These Specifications
- .2 Master Municipal Contract Documents Platinum Edition (2009)
- .2 In the event of a difference between scaled dimensions on Plans and the figures written thereon, the figures shall govern. In the event that two or more plans show conflicting information, the information on the most recently dated plan shall govern.
- .3 Any technical and manufacturer’s standard, Government Act, Regulation or Code of Practice referred to in the Contract documents shall be the version current at the time the Contract is awarded.
- .4 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.
- 1.4 Codes, Bylaws, Standards .1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments.
- .2 Perform work in accordance with the Canadian Standards Association, the American Society for Testing of Materials, Master Municipal Construction Documents MMCD, Construction Standards and/or any other Code or Bylaw of local application.
- .3 Comply with applicable local bylaws, 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.
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- 1.5 Contract Documents .1 The Contract Documents, drawings and specifications, are intended to complement each other, and to provide for and include everything necessary for the completion of the Work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.
- .3 If anything is found by the Contractor to be missing from the Contract Documents immediately inform the Departmental Representative.
- 1.6 Other Contracts .1 Further Contracts may be awarded while this contract is in progress.
- .2 Cooperate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.
- .3 Coordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of this Work.
- 1.7 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.
- 1.8 Project Location .1 The project is located at the Pacific Agri-Food Research Centre in Agassiz, British Columbia (#6947 Lougheed Highway.)
- 1.9 Time of Completion .1 Substantial completion of the work shall be done within 4 weeks after Contract Award. However, irrespective of the General Condition Clause of Substantial Performance, if paving goes beyond 4 weeks due to weather related delays, an appropriate time extension may be provided.
- 1.10 Contract Method .1 Construct Work under Lump Sum Price Contract.
- 1.11 Section Includes .1 In general, Work under this Contract covers the:
- .1 Excavation and shaping of drainage swales and re-seeding.
- .2 Installation of new culverts and trench drains of a size, type, length and grade as indicated on the Contract Drawings.
- .3 Full depth reclamation of existing mixture of gravels and asphalt to 250 mm depth.
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- .4 Reshaping and grading of the subgrade.
 - .5 Gravel base supply and installation.
 - .6 Asphalt paving.
 - .7 Gravel shoulders and feathering.
- 1.12 Work Included .1 Work includes, but is not limited to: (quantities are approximate)
- .1 Managing of construction to accommodate local traffic.
 - .2 Excavating and shaping swales and drainage channels and re-seeding (170 m of drainage ditch 30 to 80 cm deep and 100 m of shoulder swales 20 to 30 cm deep and seeding).
 - .3 Installation of culverts and trench drains (22.2 m of trench drain and 27 m of 300 mm diameter culvert).
 - .4 Removing, salvaging, and reinstallation two sets of stop signs and metal railings.
 - .5 Full depth reclamation of existing gravel, asphalt, and concrete roadway and compound areas (2,000 square metres.)
 - .6 Shaping, moving, and re-compacting of reclaimed material to produce uniform sub-grade (2,000 square metres.)
 - .7 Adjusting manhole frames and covers (5 by count.)
 - .8 Saw cutting asphalt at tie-ins (40 metres.)
 - .9 Supply, placing, shaping, and compacting of 19 mm crushed granular base (500 tonnes).
 - .10 Saw cutting and trimming existing asphalt to permit clean tie-ins.
 - .11 Supply and applying prime coat to the prepared road base (2,000 square metres.)
 - .12 Supply and placement of hot mix asphalt (420 tonnes.)
 - .13 Supply and placement of 19 mm gravel shoulder material and feathering material at tie-ins to gravel roads (150 tonnes.)
 - .14 Leveling, shaping, and seeding of disturbed areas and general site cleanup of construction debris.
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- .2 "Green" requirements:
 - .1 Use only environmentally responsible green materials/ products with no VOC emissions.
 - .2 Use materials/products containing highest percentage of recycled and recovered materials practicable - consistent with maintaining cost effective satisfactory levels of competition.
 - .3 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.
 - .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.
 - 1.13 Contractor's Responsibility
 - .1 Give all required Notices and comply with all local, provincial, and federal laws, bylaws, ordinances, rules, regulations, codes, and orders relating to the Work which are or become in force during the Performance of the Work.
 - .2 As Prime Contractor, coordinate all the Work and provide all labour, materials, equipment, and services necessary for delivery, storage, handling, protection, installation, removal, inspection, and replacement or maintenance as required to provide a complete Project.
 - 1.14 Work Schedule
 - .1 Carry on work as follows:
 - .1 Within 10 working days after Contract award, provide a "phasing bar chart" and a schedule showing anticipated progress stages and final completion of the Work within the time period required by the Contract documents. Indicate the following:
 - .1 Commencement and completion of Work of each section of the specifications or drawings as outlined.
 - .2 Final completion date within the time period required by the Contract documents.
 - .2 Do not change approved Schedule - without notifying Departmental Representative.
 - .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
 - 1.15 Cost Breakdown
 - .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail (as listed in clause 1.12 of this section) as directed by the Departmental Representative and aggregating Contract price.
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- 1.16 Documents Required .1 Maintain 1 copy each of the following at the job site:
- .1 Contract drawings.
 - .2 Contract specifications.
 - .3 Addenda to Contract documents.
 - .4 Copy of approved work schedule.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Manufacturers' installation and application instructions.
 - .9 One set of record drawings and specifications for "as-built" purposes.
 - .10 Project Safety Plan / Traffic Control Plan.
 - .11 Labour conditions and wage schedules.
- 1.17 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.
- .3 Furnish inspection certificates in evidence that the work conforms to the requirements of the authority having jurisdiction.
- 1.18 Contractor's Use of Site .1 Use of site:
- .1 Exclusive and complete for execution of Work.
 - .2 Assume responsibilities for assigned premises for performance of this Work.
 - .3 Be responsible for coordination of all Work activities on site, including the Work of other contractors engaged by the Departmental Representative.
- .2 Perform Work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .3 Do not unreasonably encumber site with material or equipment
- 1.19 Traffic Control .1 Do not close any lanes of road without consulting Departmental Representative. Contractor to provide vehicle access to all areas of the Research Centre with minimal use of detours. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in "Traffic Control Manual for Work on Roadways".
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- 1.20 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.
- 1.21 Existing Services .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.
- 1.22 Cutting and Patching .1 Cut existing surfaces only as required to accommodate new work and as directed by the Departmental Representative.
- .2 Remove items so shown or specified.
- .3 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final construction.
- .4 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.
- 1.23 Setting Out Work .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated. Road profile may be modified by the Contractor with Departmental Representative's approval to reduce removal of existing material from site.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.
- 1.24 Quality of Work .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods, and procedures to meet minimum standards set out in the applicable codes and standards.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.
- 1.25 Works Coordination .1 Coordinate work of subtrades:
- .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
- .1 Provide each subcontractor with complete plans and specifications for
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- Contract, to assist them in planning and carrying out their respective work.
- .2 Develop coordination drawings when required, illustrating potential interference between works of various trades and distribute to affected parties.
 - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .4 Submit copy of coordination drawings and meeting notes to Departmental Representative for information purposes.
 - .5 Coordinate and plan for all necessary road/lane 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 unnecessary 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.
- 1.26 Relics and Antiques .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area. .2
- 1.27 Project Meetings .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- 1.28 Testing and Inspections .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified in Section 014500 – Quality Control.
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- .2 The Contractor will appoint and pay for the services of testing agencies and/or testing laboratories to meet the requirements specified in the Contract documents 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 Contractor under the Departmental Representative's supervision.
 - .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.
 - .4 Contractor shall notify Departmental Representative in advance of planned testing.
 - .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
 - .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
 - .7 The Departmental Representative may require, and pay for, additional inspection and testing services not included here.
 - .8 Provide Departmental Representative with 2 copies of testing laboratory reports and mill tests and certificates of compliance as soon as they are available.
 - 1.29 As-Built Documents
 - .1 The Engineer in coordination with the Contractor will provide 2 sets of drawings, 2 sets of specifications, and 1 copy of the original AutoCAD files for "as-built" purposes.
 - .2 As work progresses, Contractor is to maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings, and shop drawings as changes occur. At the end of the work Contractor is to supply the Engineer the records of the changes in the drawings and specifications to prepare as-built drawings.
 - 1.30 Cleaning
 - .1 Conduct daily cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
 - .2 Ensure cleanup of the work areas each day after completion of work.
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- 1.31 Environmental Protection .1 Prevent extraneous materials from contaminating air, land, or water beyond construction area.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable regulations.
- 1.32 Archaeological /Heritage Areas .1 There do not seem to be any archaeological impacts if the project footprint does not increase. The Contractor shall avoid contact or damage to buildings on the work site.
- 1.33 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.
- 1.34 Additional Information .1 Following Geotechnical memo is included in the contract Document as Appendix A.
- Geotechnical Memorandum**
Reference No. VAN-00228940-A0 Pavement Upgrades – Pacific Agri- Food Research Centre, Agassiz, B.C.
- .2 The information contained in this report, by its nature, cannot reveal all conditions which exist or can occur at the site. This report is included for the Contractor's general information only, and no guarantee is given as to the completeness and accuracy of this information. Any actions or assumptions based on the information, recommendations or suggestions contained in this report are entirely the Contractor's responsibility.
- 1.35 System of Measurement .1 The metric system of measurement (SI) is used on this Contract.
- 1.36 Familiarization with Site .1 Before submitting tender, it is recommended to visit the site to become familiar with all conditions likely to affect the tender cost.
- 1.37 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 is fully conversant with all conditions therein.

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Scheduled preconstruction and progress meetings.
- 1.2 Description .1 Coordination of progress schedules, submittals, use of sites, temporary utilities, construction facilities, and construction Work, with progress of work by others under instructions of Departmental Representative.
- 1.3 Construction Project Meetings .1 The Departmental Representative will schedule and administer project meetings as deemed necessary throughout progress of the Work.
- .2 Agenda to include, but not limited to, the following:
- .1 Review and approval of minutes of previous meeting.
 - .2 Review of site safety and security issues.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems that impede construction schedule.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .11 Maintenance of quality standards.
 - .12 Review proposed changes for affect on construction schedule and on completion date.
 - .13 Other business
 - .14 Schedule next meeting
- .3 The Owner shall provide physical space and arrange for meetings.
- .4 The Departmental Representative will record minutes, including significant proceedings and decisions, identify action by parties, and set time and date for next progress meeting.
- .5 The Departmental Representative will reproduce and distribute minutes within 3 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 5 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 3 days before meeting.
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- .4 Agenda to include, but not limited to, the following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 013217 - Construction Progress and Reporting.
 - .3 Schedule of submissions in accordance with Section 013300 - Submittal Procedures.
 - .4 Requirements for temporary facilities, storage sheds, utilities, etc. in accordance with Section 015100 - Temporary Utilities.
 - .5 Site security in accordance with Section 015200 - Construction Facilities.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .7 Take-over procedures, acceptance, and warranties in accordance with Section 017700 - Closeout Procedures.
 - .8 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .9 Appointment of inspection and testing agencies or firms in accordance with Section 014500 - Quality Control.
 - .10 Insurances and transcript of policies.
 - .11 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 013217 - 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 revise and resubmit as directed by Departmental Representative.
 - 1.6 Submittals
 - .1 Submit preliminary shop drawings and product data and samples in accordance with Section 013300, submittal procedures, for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Departmental Representative.
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- .2 Submit requests for payment for review, and for transmittal to Departmental Representative.
 - .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
 - .4 Process substitutions through Departmental Representative.
 - .5 Process change orders through Departmental Representative.
 - .6 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 017700 – Closeout Procedures.
 - .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
 - .3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
 - .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Schedule submittals required.
- .2 Progress Photographs.
- 1.2 Submittals .1 At preconstruction meeting submit a detailed schedule bar chart listing work items and days to complete each item. Clearly show sequence and interdependence of construction activities.
- .2 Submit letter ensuring that schedule has been prepared in coordination with major Subcontractors and suppliers, if applicable.
- .3 Update schedule at the end of each week and submit to the Departmental Representative.
- 1.3 Progress Photographs .1 Provide digital photographs with dates and descriptions on CD disk with progress reports. Relate dates and descriptions to photo file names in a separate text file on disk.
- .2 Number of photographs: minimum of 100 photos to cover all aspects of the work.
- .3 Viewpoints: determined by Contractor to provide history of work.
- .4 Frequency: with progress statement, at completion of each construction stage, and as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 This section includes but is not limited to the following:
- .1 Health and Safety Plan.
 - .2 Certificates and Transcripts.
 - .3 Survey and Quality Testing Reports.
 - .4 Warranties
- 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 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.
- .4 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .5 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .7 Keep one reviewed copy of each submission on site.
- 1.3 Progress Photographs .1 Submit progress photographs in accordance with Section 013217 - Construction Progress and Reporting.
- 1.4 Survey and Quality Testing Reports .1 Submit certified survey and quality testing reports with progress reports.

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Informational and Warning Devices.
.2 Protection and Control of Public Traffic.
.3 Operational Requirements.
- 1.2 Measurement for Payment .1 No separate payment will be made for any special procedure for traffic control and accommodation. Payments for dust control to be included in the Lump Sum prices in this Contract.
.2 Provide continuous traffic flow to the employee parking lot and barns during construction provide appropriate guide traffic signs.
- 1.3 References .1 "Traffic Control Manual for Work on Roadways" (distributed by Province of B.C., Ministry of Transportation and Highways).
- 1.4 Protection of Public Traffic .1 Comply with current requirements of Acts, Regulations, and By-Laws for traffic regulation or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
.2 Do not leave equipment on traveled roadways overnight.
.3 Do not close driving areas without consulting Departmental Representative. Before re-routing traffic erect signs and devices.
.4 Keep traveled way graded, free of pot-holes and provide and maintain reasonable access to buildings in vicinity of Work.
- 1.5 Informational and Warning Devices .1 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 "Traffic Control Manual for Work on Roadways".
.2 Meet with Departmental Representative prior to commencement of Work to determine signs and other devices required for project.
- 1.6 Operational Requirements .1 Maintain existing conditions for traffic throughout period of Contract except when required for construction under Contract and when measures have been taken as specified herein and reviewed by Departmental Representative to protect and control public traffic.
.2 Remove signs and barriers upon completion of the project.

END OF SECTION

PART 1 - GENERAL

- 1.1 References .1 Government of Canada:
- .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 Province of British Columbia:
- .1 Workers Compensation Act, Part 3, Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.
- 1.2 Related Sections .1 Refer to the following current Specification sections as required:
- .1 Project Management: Section 013119
 - .2 Construction Progress and Reporting: Section 013217
 - .3 Submittal Procedures: Section 013300
 - .4 Special Procedures for Traffic Control: Section 013500
 - .5 Temporary Utilities: Section 015100
 - .6 Construction Facilities: Section 015200
 - .7 Temporary Barriers and Enclosures: Section 015600
- 1.3 Workers Compensation Board Coverage .1 Comply fully with the Workers' Compensation Act, regulations, and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.
- 1.4 Compliance with Regulations .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- 1.5 Submittals .1 Submit to Departmental Representative for review all submittals listed.
- .2 Work affected by submittals shall not proceed until review(s) by Departmental representative is/are complete.
- .3 Submit the following:
- .1 Health and Safety Plan within 5 days after date of Notice to Proceed
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- and prior to commencement of Work.
- .2 Copies of reports or directions issued by federal and provincial Health and Safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS) and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review upon request.
- .5 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
- .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate, and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of Health and Safety on the project.
- 1.6 Responsibility
- .1 Assume responsibility as the Prime Contractor for Work under this Contract.
 - .2 Be responsible for Health and Safety of persons on site, safety of property on site, and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
 - .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable federal, provincial, territorial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.7 Health and Safety Coordinator
- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. The Health and Safety Coordinator must:
 - .1 Have site-related working experience.
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- .2 Have working knowledge of occupational Health and Safety regulations.
 - .3 Be responsible for completing all Health and Safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform Work.
 - .4 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - 1.8 General Conditions
 - .1 Provide safety barricades and lights around Work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
 - .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the Work site.
 - 1.9 Project/Site Conditions
 - .1 Potential work hazards onsite include: overhead and buried electrical utilities, buried water mains, and local traffic.
 - 1.10 Regulatory Requirements
 - .1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.
 - .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.
 - 1.11 Work Permits
 - .1 Obtain permit(s) related to project before start of work.
 - 1.12 Filing of Notice
 - .1 The Contractor is to file Notice of Project with Provincial authorities prior to beginning of Work.
 - .2 Provide copies of all notices to the Department Representative.
 - 1.13 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 a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
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- .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.
-
- .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment 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.
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- .3 Develop the plan in collaboration with all Subcontractors. Ensure that work/activities of Subcontractors are included in the hazard assessment and are reflected in the plan.
 - .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
 - .5 Departmental Representative's review: the review of Health and Safety Plan by PWGSC shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.
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- 1.14 Emergency Procedures
- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
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- .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 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.
 - 1.15 Hazardous Products .1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and provision of MSDSs acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
 - .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 013300 – Submittal Procedures.
 - 1.23 Fire Safety and Hot Work .1 Obtain Departmental Representative's authorization before any welding, cutting, straightening, or any other hot work operations can be carried out onsite.
 - 1.24 Fire Safety Requirements .1 Store oily/paint-soaked rags, waste products, empty containers, and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .2 Handle, store, use, and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
 - 1.25 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.
 - 1.26 Posted Documents .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station,
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- evacuation route and marshalling station, and the emergency transportation provisions.
- .5 Notice of Project.
- .6 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
- .7 WHMIS documents.
- .8 MSDSs.
- .9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative.
- .2 Post all MSDSs onsite, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.
- 1.27 Meetings
- .1 Schedule and administer a Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Attend the Health and Safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.
- .3 Contractor to hold regular Health and Safety meetings onsite as required by applicable legislation.
- .4 All Health and Safety documentation / meeting minutes completed by the Contractor are to be forwarded to the Departmental Representative.
- 1.28 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 issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance with Health and Safety regulations is not corrected immediately or within posted time. The General Contractor/Subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

PART 1 - GENERAL

1.1 Definitions

- .1 **Environmental Pollution and Damage:** presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.
- .2 **Environmental Protection:** prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- .3 **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
- .4 **Noxious weeds:** are invasive plants that have been designated under the *BC Weed Control Act*. This legislation imposes a duty on all land occupiers to control a set list of identified invasive plants.
www.agf.gov.bc.ca/cropprot/noxious.htm

1.2 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.

1.3 Site Access and Parking

- .1 The Contractor shall park employee vehicles and equipment in an area designated by the Departmental Representative.

1.4 Erosion control

- .1 Erosion control measures that prevent sediment from entering any waterway, in the vicinity of the construction site.
- .2 Erosion control measures must be in compliance with both Federal and Provincial legislation where required. Contractors should be referencing the provincial MOE Standards and Best Practices for Instream Works (2004) for best management practices in sediment and erosion control during construction activities.

1.5 Pollution Control

- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres to any surface
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- water.
- .2 The Contractor shall prevent blowing dust and debris by providing dust control for on-site work by methods that are approved by the Departmental Representative.
 - .3 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.
 - .4 Timely and effective actions shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative shall be notified immediately of any spill as well as the provincial authorities.
 - .5 In the event of a major spill, the Contractor shall prioritize the clean up and all other work shall be stopped, where appropriate, and personnel devoted to spill containment and clean up.
 - .6 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative.

1.6 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) outside before delivery to the work site.
- .2 Equipment fueling site will be identified by the Contractor to the satisfaction of the Departmental Representative. On site storage of fuel shall not be allowed.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times.
- .5 Equipment use on the project shall be fueled with E10, and low sulphur diesel fuels where available, and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of the vehicles is avoided.
- .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations satisfactory to the Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in 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.
- .8 Fuel containers and lubricant products shall be stored only in secure locations to the satisfaction of the Departmental Representative. Fuel tanks or other potential deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight. Alternatively, the Contractor may hire a security person employed to prevent vandalism.

1.7 Operation of Equipment

- .1 Equipment movements shall be restricted to the "footprint" of the construction area.
 - .2 When, in the opinion of PWGSC, negligence on the part of the Contractor results in damage or
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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.

- .3 Restrict vehicle movements to the work limits.

1.8 Managing Invasive Plant Vegetation

- .1 Keep equipment clean and wash equipment prior to mobilization to site.
- .2 Whenever possible, re-seed with grass mixtures that are free of weeds, locally adapted, non-invasive, and quick to establish. Spread seed in the early spring or late fall to ensure successful establishment.

1.9 Fire Prevention and Control

- .1 A fire extinguisher shall be carried and available for use on each machine.
- .2 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
- .4 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The Departmental Representative shall be notified of any fire immediately as well as the applicable Provincial Authorities. Basic instruction and phone numbers will be provided on-site by the Contractor and will be discussed in the project start-up meeting.
- .5 Fires or burning of waste materials is not permitted.

1.10 Relics and Antiquities

- .1 Artifacts, relics, antiquities, and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and any objects found on the work site that may be considered artifacts shall be reported to the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.
- .2 All historical or archaeological objects found are protected under federal Acts and regulations. The Contractor and workers shall stop work and protect any articles found and request direction from the Departmental Representative.

1.11 Waste Materials Storage and Removal

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the applicable federal and provincial regulations.
 - .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 be contained and removed and disposed of at an appropriate off site waste landfill.
 - .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
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maintained in a clean condition.

1.12 Wastewater Discharge Criteria

- .1 Wash water, contaminated groundwater, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and will conform to the discharge requirements set out in the provincial Water Act Permit:
- .2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.

1.13 Drainage

- .1 Provide temporary drainage as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

1.14 Environment Protection Supplies

- .1 Comply with federal and provincial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.
- .2 Supply, transport, install and maintain erosion, sediment and drainage controls necessary to complete the Work in accordance with the requirements of Departmental Representative.
- .3 Provide inventory of environmental protection supplies prior to mobilization.

END OF SECTION

PART 1 - GENERAL

- 1.1 Quality Control Plan .1 Prepare and submit to Departmental Representative for review and approval a Quality Control Plan in accordance with Section 013300 – Submittal Procedures, prior to project startup.
- 1.2 Measurement for Payment .1 No separate payment will be made for quality assurance, surveying, and testing. These items shall be included in all work as part of total contract amount.
- 1.3 Inspection .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.
- 1.4 Independent Inspection Agencies .1 Appoint and pay for services of third-party Independent Quality Assurance testing laboratory and field staff including as follows:
- .1 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities.
- .2 Inspection and testing performed for Contractor's convenience.
- .3 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .4 Additional tests at the rates specified as follows:
1. Granular Base
- 1.1 Compaction: 1 test / 250 m²
- 1.2 Sieve: 1 test / material source / 1000 m³
2. Full Depth Reclamation
- 2.1 Compaction: 1 test / 250 m²
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| | 3. | Asphalt | |
| | 3.1 | Marshall test: | 1 test / 500 t of asphalt (min of 1 / day)
ASTM D1559, D3203, C117, C136 |
| | 3.2 | Cores: | 1 per 100 m of lane per lift |
| | .2 | Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work. | |
| | .3 | Provide equipment required for 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. | |
| | .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 (DR) it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, DR may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, with the amount determined by DR. | |
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- 1.8 Surveys
- .1 The Contractor shall be responsible for all layout and construction survey to complete the work.
 - .2 The Contractor shall submit a red line as-built drawing of the work to the Departmental Representative upon completion of the work. An electronic as-built survey will be acceptable in place of a red line drawing.
- 1.9 Reports
- .1 Submit 1 copy 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.

END OF SECTION

PART 1 - GENERAL

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| 1.1 Section Includes | .1 | Temporary utilities. |
| 1.2 Installation and Removal | .1 | Provide temporary utilities in order to execute Work expeditiously. |
| | .2 | Remove from site all such work after use. |
| 1.3 Water Supply | .1 | Provide continuous temporary supply of potable water for construction use, if applicable. |
| | .2 | Remove or decommission temporary water supply facilities upon completion of project. |
| 1.4 Sanitary Facilities | .1 | Provide sanitary facilities for construction use. |
| | .2 | Remove temporary sanitary facilities upon completion of project. |
| 1.5 Temporary Power and Light | .1 | Provide and pay for temporary power during construction for temporary lighting and operating of power tools and for construction use. |
| | .2 | Arrange for connection with appropriate utility company or Departmental Representative. Pay all costs for installation maintenance and removal. |
| 1.6 Temporary Communication Facilities | .1 | Provide and pay for temporary telephone necessary for own use. |
| 1.7 Fire Protection | .1 | Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations, and bylaws. |
| | .2 | Burning rubbish and construction waste materials is not permitted onsite. |

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Construction access and parking.
- 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 .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 disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .4 Existing roads will be used for access to the project site. Maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- 1.5 Sanitary Facilities .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.6 Construction Signage .1 Signs and notices for health, safety, traffic control, instruction, etc. shall be in both official languages. See Sections 013533, Health and Safety, and 013500, Special Procedures for Traffic Control, of these Specifications for more information.
- .2 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.

END OF SECTION

PART 1 - GENERAL

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| 1.1 Section Includes | .1 | Barriers. |
| | .2 | Traffic Controls. |
| 1.2 Installation and Removal | .1 | Provide temporary controls in order to execute Work expeditiously. |
| | .2 | Remove from all sites all such work after use. |
| 1.3 Protection for Trees | .1 | Protect 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 Access to Site | .1 | Maintain existing access roads required for access to Work. |
| 1.5 Public Traffic Flow | .1 | Provide and maintain competent signal flag operators, traffic signals, barricades and flashers as required to perform Work and protect the public. |
| 1.6 Fire Routes | .1 | Maintain access to property for use by emergency response vehicles. |
| 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 existing structures during performance of Work. |
| | .2 | Be responsible for damage incurred due to lack of or improper protection. |

END OF SECTION

PART 1 - GENERAL

- 1.1 Products and Materials
- .1 Use new products and materials unless otherwise specified.
 - .2 Use products of one manufacturer for material 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 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.
 - .5 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.
 - .6 Prevent damage, adulteration, and soiling of products during delivery, handling, and storage. Immediately remove rejected products from site.
 - .7 Store products in accordance with suppliers' instructions.
 - .8 Touch-up damaged finished surfaces to Departmental Representative's satisfaction.
 - .9 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- 1.2 Quality of Products
- .1 Products, materials, and articles (referred to as products throughout Specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source, and quality of Products provided.
 - .2 Defective products will be rejected regardless of previous inspections.
 - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.
 - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .3 Retain purchase orders, invoices, and other documents to prove that
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all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.

- .4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
 - .5 Unless otherwise indicated in the Specifications, maintain uniformity of manufacture for any particular or like item throughout the site.
- 1.3 Availability of Products
- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
 - .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
 - .3 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.
- 1.4 Manufacturer's Instructions
- .1 Unless otherwise indicated in Specifications, install or erect products in accordance with manufacturer's instructions.
 - .1 Do not rely on labels or enclosures provided with products.
 - .2 Obtain written instructions directly from manufacturers.
 - .2 Notify Departmental Representative in writing, of conflicts between Specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
 - .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
 - .4 Provide Manufacturer's instructions and specifications to
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- Departmental Representative (and Engineer) for review prior to any installations.
- 1.5 Contractor's Options for Selection of Products for Tendering .1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.
- .2 Products specified under "Acceptable Products": select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .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.
- 1.6 Substitution After Contract Award .1 No substitutions are permitted without prior written approval of the Departmental Representative.
- .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
- .1 products selected by tenderer from those specified are not available;
- .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
- .3 alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
- .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the Project. Pay for design or drawing changes
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- required as result of substitution.
- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.
- 1.7 Transportation .1 Pay costs of transportation of products required in performance of Work.
- 1.8 Quality of Work .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.
- 1.9 Coordination .1 Ensure cooperation of workers during Work. Maintain efficient and continuous supervision.
- 1.10 Remedial Work .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

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 013300, Submittal Procedures.
- .2 Use best quality products.

END OF SECTION

PART 1 - GENERAL

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| 1.1 Section Includes | .1 | Progressive cleaning. |
| | .2 | Final cleaning. |
| 1.2 Project Cleanliness | .1 | Maintain Work in tidy condition, free from accumulation of waste products and debris. |
| | .2 | Remove waste materials from sites at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials onsite. |
| | .3 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |
| 1.3 Final Cleaning | .1 | When Work is Substantially Performed, remove surplus products, tools, construction machinery, and equipment not required for performance of remaining Work. |
| | .2 | Remove all waste products and debris. |
| | .3 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |

END OF SECTION

PART 1 - GENERAL

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

.1 Waste Management Workplan. |
| 1.4 Use of Site and Facilities | .1 | Locate waste, refuse, recycling, etc. containers in locations to facilitate deposit of materials without hindering daily operations. |
| | .2 | Locate separated materials in areas which minimize material damage. |
| 1.5 Submittal | .1 | Submit requested submittals in accordance with Section 013300, Submittal Procedures. |
| | .2 | Prepare and submit the following submittals within 7 days of the Award of Contract:

.1 Submit 3 copies of completed Waste Management Workplan (WMW). |
| | .3 | Provide Departmental Representative with receipts indicating quantity of material delivered to landfill. |
| | .4 | Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling. |
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- quantity and type of materials sent for recycling.
- 1.6 Waste Management Workplan .1 Structure WMW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .2 Describe management of waste.
- .3 Identify opportunities for reduction, reuse, and/or recycling (3Rs) of materials.
- .4 Post workplan or summary where workers at site are able to review its content.
- 1.7 Waste Processing Sites .1 Provide waste processing sites as applicable within the Province of British Columbia to Departmental Representative within 14 days of the Award of Contract.
- 1.8 Disposal of Wastes .1 Burying of rubbish and waste materials is prohibited unless approved by Departmental Representative at off-site locations obtained by the Contractor.
- .2 Burning of rubbish and waste materials is prohibited unless permitted by British Columbia Ministry of Forests. Permit to be obtained by the Contractor.
- .3 Disposal of waste volatile materials, mineral spirits, oil, paint thinner, etc. into waterways or by dumping onsite is prohibited.
- 1.9 Storage and Handling .1 Store, materials to be reused, recycled, and salvaged in locations obtained by the Contractor and accepted by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- 1.10 Scheduling .1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

PART 2 – EXECUTION

- 2.1 Application .1 Do work in compliance with the WMW.
- .2 Implement MSSP for waste generated on Project in compliance with approved methods and as approved by Departmental Representative.
- .3 Materials must be immediately separated into required categories
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for reuse or recycling.

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

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes .1 Administrative procedures preceding preliminary and final reviews of Work and Final 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 Engineer's Review: Engineer, Departmental Representative, and Contractor will perform review of Work to identify if Work has been completed according to the requirements of the Contract Documents. Contractor shall correct Work accordingly.
- 1.3 Construction Completion Certificate .1 Once the Contractor has completed all Work and correction of deficiencies, he shall submit written certification to the Departmental Representative that
- .1 Contract Documents have been reviewed.
- .2 Work has been completed and inspected for compliance with Contract Documents.
- .3 Defects have been corrected and deficiencies have been completed.
- .4 Work is complete and ready for Final Review.
- .1 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.
- .2 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been
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- substantially performed, make application for Certificate of Substantial Performance.
- 1.4 Close-Out Submittals
- .1 Project Record Documents as specified in Section 013300.
 - .2 As-Built Documents as specified in Section 01100.
 - .3 Guarantees and Warranties:
 - .1 In addition to guarantee requirements contained elsewhere in the Contract Documents to which all Work of this Contract is to be guaranteed for two (2) years after the date of issue of the Construction Completion Certificate by the Engineer.
 - .2 Upon completion of the Work, furnish to the PWGSC a guarantee in writing, stating that the Contractor will make good, at their expense, and to the satisfaction of the Departmental Representative, all defects that may develop in materials and equipment used on the Work for a minimum period of two (2) years from date of Construction Completion Certificate, upon PWGSC assuming custody, that are in the opinion of the Departmental Representative due to the use of improper workmanship and faulty materials and equipment.
 - .3 The Contractor is to, in the case of Work Performed by their Subcontractors and when guarantees are required, secure such guarantees from the Subcontractor and furnish them to PWGSC on or before the final completion of the Work.
 - .4 The guarantees are to provide that all Work furnished and installed by the guarantors are to remain in like new condition and working order for the period of two (2) years and that the guarantors will replace same with new and like materials at no expense to PWGSC unless it can be proven that the defects are caused by abuse and negligence on the part of PGWSC or its employees.
 - .5 It is to be understood that in effecting the replacement, the Contractor or Subcontractor responsible is to also bear all Costs involved in removing or replacing adjacent affected materials.
 - .6 One (1) month prior to expiry of guarantee period, the Departmental Representative will carry out a detailed inspection of the Project.
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PWGSC

Road, Culvert and Bridge Works
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**CLOSEOUT PROCEDURES
AND SUBMITTALS**

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- .7 Any defect apparent will be noted and will be forwarded to the Contractor in writing for correction under the terms of the Contract with no additional cost to PWGSC.
 - .4 Commencement of Guarantee and Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance shall be date of commencement for warranty periods.
- 1.5 Final Payment
 - .1 Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request final review.

END OF SECTION

PART 1 - GENERAL

- 1.1 Measurement for Payment .1 All materials, labour, equipment, and services necessary for any toxic waste removal of existing materials shall be paid as a Change Order to this Contract.
- 1.2 References .1 Canadian Environmental Protection Act, CEPA.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .1 Material Safety Data Sheets (MSDS)
- .3 National Fire Code of Canada latest edition.
- .4 Transportation of Dangerous Goods Act (TDG Act).
- .5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).
- 1.3 Definitions .1 Toxic: For the purposes of this specification, a substance is considered toxic if it is listed on the Toxic Substances List found in Schedule 1 of CEPA.
- .2 List of Toxic Substances: found in Schedule 1 of CEPA, lists all substances that have been assessed as toxic. The federal government can make regulations with respect to a substance specified on the List of Toxic Substances. Column II of this List identifies the type of regulation applicable to each substance.
- 1.4 Submittals .1 Product Data:
- .1 Submit photocopies of shipping documents and waste manifests to Departmental Representative when shipping toxic wastes off-site.
- .2 Maintain 1 copy of product data in a readily accessible file onsite.
- .2 Submission Requirements:
- .1 Submit product data to Departmental Representative in accordance with Section 013300, Submittal Procedures.
- .2 Express all weights and volumes in SI Metric units.
- .3 Accompany submissions with a transmittal letter
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containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of attached product data.
- .5 Other pertinent data.

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|-----------------------------------|---|
| 1.5 Storage and Handling | <ol style="list-style-type: none">.1 Store and handle toxic wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines..2 Store and handle flammable and combustible wastes in accordance with current National Fire Code of Canada requirements..3 Coordinate storage of toxic wastes with Departmental Representative and abide by internal requirements for labeling and storage of wastes..4 Observe smoking regulations at all times. Smoking is prohibited in any area where toxic wastes are stored, used, or handled..5 Report spills or accidents involving toxic wastes immediately to Departmental Representative and to appropriate regulatory authorities within 24 hours of incident. Take all reasonable measures to contain the release while ensuring health and safety is protected..6 Transport toxic wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations..7 Use only an authorized/licensed carrier to transport toxic waste..8 Coordinate transportation and disposal of toxic wastes with Departmental Representative. |
| 1.6 Waste Management and Disposal | <ol style="list-style-type: none">.1 Dispose of toxic wastes generated onsite in accordance with applicable federal and provincial acts, regulations, and guidelines..2 Ensure toxic waste is shipped to an authorized/licensed treatment or disposal facility and that all liability insurance requirements are met. |

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 Canadian Environmental Protection Act, CEPA.
 - .1 Export and Import of Hazardous Waste Regulations (EIHWR Regulations), SOR/2002-200.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS)
 - .3 National Fire Code of Canada.
 - .4 Transportation of Dangerous Goods Act (TDG Act) 1999, (c.34).
 - .5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).
- 1.2 Definitions
- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment, or disposal.
- 1.3 Submittals
- .1 Submit product data in accordance with Section 013300, Submittal Procedures.
 - .2 Submit to Departmental Representative current MSDSs for each hazardous material required prior to bringing it/them onsite.
 - .3 Submit a hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.
- 1.4 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.
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- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene, and naphtha for ready use. Store all flammable and combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .5 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
 - .6 Flammable liquids having a flash point below 38 degrees Celsius, such as naphtha or gasoline will not be used as solvents or cleaning agents.
 - .7 Store flammable and combustible waste liquids for disposal in approved containers located in a safe, ventilated area. Keep quantities to an absolute minimum.
 - .8 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
 - .9 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
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- .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.
 - .11 Ensure personnel have been trained in accordance with WHMIS requirements.
 - .12 Report spills or accidents involving toxic wastes immediately to Departmental Representative and to appropriate regulatory authorities within 24 hours of incident. Take all reasonable measures to contain the release while ensuring health and safety is protected.
- 1.5 Transportation
- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
 - .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
 - .3 If hazardous waste is generated onsite:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable federal, provincial, and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to
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Departmental Representative.

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

PART 2 - PRODUCTS

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

PART 3 – EXECUTION

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

END OF SECTION

PART 1 - GENERAL

- 1.1 Basis of Payment .1 No measurement will be made under this Section. Payments for aggregate to be included in lump sum prices for granular materials supplied in this Contract.
- 1.2 References .1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- 1.3 Samples .1 Submit samples in accordance with Section 013300 – Submittal Procedures.
- .2 Allow sampling by third-party tester during production.
- .3 Provide third-party tester with access to source and processed material for sampling if requested by Departmental Representative.
- .4 Install sampling facilities at discharge end of production conveyor, to allow third party tester to obtain representative samples of items being produced. Stop conveyor belt when directed by third-party tester to permit full cross section sampling.
- .5 Do not stockpile material.

PART 2 - PRODUCTS

- 2.1 Materials - General .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: to ASTM D4791.
- .1 Greater dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one or blend of following:
- .1 Natural or manufactured sand.
- .3 Screenings produced in crushing of quarried rock, boulders, or gravel.
- .4 Coarse aggregates satisfying requirements of applicable section to be one or blend of following:
- .1 Crushed rock.
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- .2 Gravel and crushed gravel composed of naturally formed particles of stone.
- .5 All crushed gravel when tested to ASTM C136 and ASTM C117 to conform to the following:
 - .2 Liquid limit: maximum 25.
 - .3 Plasticity index: maximum 6.
 - .4 Crushed particles: at least 20% of particles by mass retained on 4.75 mm sieve to have at least one freshly fractured face.
- 2.3 Source Quality Control
 - .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 2 weeks prior to commencing production.
 - .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
 - .3 Advise Departmental Representative 2 weeks in advance of proposed change of material source.
 - .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 – EXECUTION

- 3.1 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.
 - .3 Wash aggregates, if required to meet specifications.
- 3.2 Handling
 - .1 Avoid segregation, contamination, and degradation of aggregate during handling and transporting.

END OF SECTION

PART 1 - GENERAL

- 1.1 Measurement for Payment
- .1 Payment for excavation and backfilling required for culverts and trench drains is included in the relevant lump sum prices in this contract.
 - .2 Payment for excavation of the drainage ditches and swales shall be made at the lump sum price tendered in this contract.
 - .3 Contractor to repair portions of roadway damaged (intentionally or not) during construction to Departmental Representative's approval.
 - .4 No extra payment will be made for excavating unnecessarily beyond lines shown on the drawings.
- 1.2 References
- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM C 117, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 422, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) (600 kN-m/m).
 - .5 ASTM D 1557-02e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft) (2,700 kN-m/m).
 - .6 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
 - .3 Canadian Standards Association (CSA):
 - .1 CAN/CSA-A3000, Portland Cement.
 - .2 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- 1.3 Definitions
- .1 Common excavation: excavation of materials of whatever nature, that are not included under definitions of rock excavation.
 - .2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping, and seeding.
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- .5 Unsuitable materials:
- .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.2.
 - .2 Table:

<u>Sieve Designation</u>	<u>% Passing</u>
2.00 mm	100
0.10 mm	45 – 100
0.02 mm	10 – 80
0.005 mm	0 – 45
 - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- 1.4 Waste Management and Disposal .1 Dispose of waste materials in accordance with Section 017421 - Waste Management and Disposal and the Waste Management Work plan.
- .2 Place materials defined as hazardous or toxic in designated containers. Ensure containers are sealed and stored safely.
- 1.5 Protection of Existing Features .1 Protect existing features in accordance with Section 015600 - Temporary Barriers and Enclosures and applicable local regulations.
- .2 Existing surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing trees and other plants, buildings, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as approved by Departmental Representative.
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PART 2 PRODUCTS

2.1 Materials .1 Granular base as specified in Section 32 11 23.

PART 3 - EXECUTION

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

3.2 Stripping of Topsoil .1 Commence topsoil stripping of areas as indicated after area has been cleared of weeds and grasses.

.2 Strip topsoil to depths as directed by Departmental Representative. Do not mix topsoil with subsoil.

.3 Dispose of unused topsoil as directed by Departmental Representative.

3.3 Stockpiling .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.6 Excavation .1 Excavate to lines, grades, elevations and dimensions as indicated on the drawings or as required.

.2 Excavation work to be as minimal as possible.

.3 Do not disturb soil within branch spread of trees or shrubs. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.4 Dispose of surplus and unsuitable excavated material in approved location.

.5 Do not obstruct flow of surface drainage or natural watercourses.

.6 Obtain Departmental Representative approval of completed excavation.

.7 Correct unauthorized over-excavation as follows:

.1 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.

.13 Hand trim, make firm, and remove loose material and debris from excavations.

3.7 Backfilling .1 Do not proceed with backfilling operations until Departmental Representative has approved.

- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground. Do not use backfill material that is frozen or contains ice, snow or debris.
 - .4 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
 - .5 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
- 3.8 Restoration
- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 017421 - Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

- 1.1 Measurement for Payment .1 Payment for roadway excavation, embankment and compaction shall be made at the in lump sum price tendered for sub-grade preparation and grading in this Contract and include moving reclaimed material within the site to meet the design elevations, grading, shaping, and compaction. .
- 1.2 References .1 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) (600 kN-m/m).
- 1.3 Definitions .1 Common Excavation: excavation of materials that are not Rock Excavation or Stripping Excavation.
- .2 Stripping Excavation: excavation of organic material covering original ground.
- .3 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .4 Waste material: material other than Stripping, and unsuitable for embankment construction or material surplus to requirements.
- .5 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping, and seeding.
- .6 Road Reclamation: Full depth road reclamation to a maximum depth 250 mm from existing ground.
- 1.4 Requirements of Regulatory Agencies .1 Adhere to Provincial and Federal Environmental requirements if potentially toxic materials are involved.
- 1.5 Waste Management and Disposal .1 Separate and recycle waste materials in accordance with Section 017421 – Waste Management and Disposal.

PART 2 – PRODUCTS

- 2.1 Materials .1 Embankment materials require approval by Departmental Representative.
- .2 Embankment material will come from the existing reclaimed road bed if approved by Departmental Representative.
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PART 3 - EXECUTION

- 3.1 Compaction Equipment .1 Compaction equipment must be capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.
- .2 Operate compaction equipment continuously in each embankment when placing material.
- .3 Care must be taken next to existing structures and next to new structures when performing compaction operations.
- 3.2 Water Distributors .1 Apply water with equipment capable of uniform distribution.
- 3.3 Stripping .1 Commence topsoil stripping of areas as indicated after weeds and grasses have been removed from these areas.
- .2 Strip to depths as indicated or as necessary to remove all organic material. Do not mix topsoil with subsoil.
- .3 Stockpile in locations in accordance with Contract Documents or as directed by Departmental Representative.
- .4 Dispose of unused stripped topsoil in accordance with Contract Documents or as directed by Departmental Representative.
- 3.4 Excavating .1 General:
- .1 Notify Departmental Representative if waste materials are encountered. Remove to depth and extent directed.
- .2 Compact each layer to minimum 95% standard dry density, and compact top 150mm below sub-excavate to min. 100% max. dry density, to ASTM D698 and ASTM D4718.
- .2 Drainage:
- .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
- .2 Provide ditches as work progresses to provide drainage.
- .3 Construct ditches as shown on plans or as directed.
- 3.5 Embankments .1 Full depth reclaim existing road surface prior to moving embankment material.
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- .2 Move excess material from high points in roadway profile to low points and to provide cross fall. With Departmental Representatives approval elevations shall be adjusted to eliminate excess material.
 - .3 Do not place frozen material nor place material on frozen surfaces.
 - .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
 - .5 Drain low areas before placing materials.
 - .6 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
 - .7 Embankments to be sloped to Departmental Representative's requirements. Intent is that slopes be 2% away from buildings or, where there is no building, to provide a 2% crown.
- 3.6 Subgrade Compaction
- .1 Break material down using full depth reclamation to sizes that enable required compaction and mix for uniform moisture to full depth of layer.
 - .2 Compact each layer to minimum 95% maximum dry density, to ASTM D698 and ASTM D4718 except top 150mm of subgrade. Compact top 150 mm to 100% maximum dry density.
 - .3 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.
- 3.7 Finishing
- .1 Shape entire roadbed to provide smooth, uniform surface and to Departmental Representative's satisfaction.
 - .2 Finish slopes and ditch bottoms to neat condition, true to lines, grades and drawings where applicable.
 - .3 Remove rocks over 150mm in any dimension from slopes and ditch bottoms.
 - .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- 3.8 Protection
- .1 Maintain finished surfaces in condition conforming to this Section until placement of subsequent materials.

END OF SECTION

1.0 GENERAL

- .1 This section refers to those portions of the work that are unique to full depth reclamation of existing road structure. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
 - .2 Full depth reclamation is an in-place reclamation procedure in which the full flexible pavement section and a predetermined portion of the granular materials are uniformly pulverized, blended, and incorporated into a base or subbase course.
- 1.1 Measurement and Payment .1 Payment for full depth reclamation includes cost of mobilization, demobilization, demonstration milling test section, test pits to confirm the suitability of the material to be milled, and spreading and compaction of milled materials. Payment shall be made at the lump sum price tendered for this item in this contract.
- 1.2 Demonstration and Test Pits .1 Prior to start of work, demonstrate effectiveness of proposed reclamation operation by reclaiming test section of minimum 15m long.
- .2 Prior to start of work, excavate shallow (300 mm deep) test pits to identify any areas of the proposed milling area that are unsuitable for reclamation due to cobbles, concrete or asphalt debris, or other items harmful to the equipment. Reduce depth of milling in such areas to avoid damage to equipment.
- 1.3 Inspection and Testing 1 Refer to Section 011100, General Instructions, Clause 1.28, Testing and Inspections.

2.0 PRODUCTS

- 2.1 Materials .1 Material produced from this procedure to be well graded, 75mm maximum size for use as granular sub-base.
- .2 Gradations may vary due to nature of in-situ materials.

3.0 EXECUTION

- 3.1 Equipment .1 Maintain equipment at all times in first class working condition. Use skilled and experienced operators.
- .2 To have the capability to effectively pulverize and blend existing pavement and underlying sub-base and/or base materials.
- .3 To have the capability to handle various types and thicknesses of pavement surface, from 25mm to 300mm of asphalt concrete, to a maximum depth including sub-base and/or base material of 400mm.
- 3.2 Preparation .1 Neatly cut existing asphaltic concrete pavement at limits of

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|-----------------------------|--|
| 3.2 Preparation | .1 Neatly cut existing asphaltic concrete pavement at limits of reclamation operation after reclamation and prior to paving. |
| | .2 Protect adjacent pavement, curb and gutter, appurtenances (manhole castings, valve covers) from damage. |
| 3.3 Construction Procedures | .1 Pulverize existing pavement and base and /or sub-base materials and blend so entire mass of material is uniformly graded. |
| | .2 Remove by hand all material with any dimension greater than 75mm for sub-base. |
| | .3 After material has been processed, shape, grade and compact to lines, grades and depth as shown on Contract Drawings. |
| | .4 Water may be applied to ensure optimum moisture content at time of blending and compaction. Uniformly compact restored cross section to density not less than 95% Modified Proctor density. |
| | .5 Complete reclamation procedures in continuous segments. Complete each segment and compact by end of each day and open to traffic unless specified in Contract Documents. |

END OF SECTION

PART 1 - GENERAL

- 1.1 Measurement for Payment .1 Payment for Granular Base, Gravel Shoulders, and Gravel Feathering work shall be made at the lump sum price tendered for 19 mm Granular Base in this Contract.
- 1.2 References .1 ASTM C117, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .5 ASTM D4718, Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles.
- .6 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³(2,700 kN-m/m³)).
- .7 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .8 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .9 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
- .10 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

PART 2 - PRODUCTS

- 2.1 Materials .1 Granular base: material to Section 310516 - Aggregates and following requirements:
- .1 Crushed stone or gravel.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
-

.1 Gradation to:

Sieve Designation	% Passing
19 mm	100
12.5 mm	75 - 100
9.5 mm	60 - 90
4.75 mm	40 - 70
2.36 mm	27 - 55
1.18mm	16 - 42
0.300 mm	8 - 30
0.075 mm	2 - 8

- .2 Liquid limit: ASTM D4318, max. 25.
.3 Plasticity index: ASTM D4318, max. 6.
.4 Crushed Particles: 60% of the material passing each sieve must have one or more fractured faces.

PART 3 - EXECUTION

- .1 Stockpile Granular Base as specified under Section 310516 – Aggregates.
- .2 Place Granular Base after underlying surface is to within tolerances.
- .3 Placing:
- .1 Construct Granular Base to depth and grade in areas indicated.
- .2 Ensure no frozen material is placed. Place on clean unfrozen surface, properly shaped and compacted, free from snow and ice.
- .3 Begin spreading base material on crown line or on high side of one-way slope.
- .4 Place material using methods which do not lead to segregation or degradation of aggregate.
- .5 Place material to full width in uniform layers not exceeding 100 mm compacted thickness.
- .6 Shape layer to smooth contour and compact to specified density before proceeding to paving.
- .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .8 Place granular shoulder material upon completion of paving to the dimensions shown on the contract drawings. Compact material as
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described in 3.1.5 of this specification. Sweep asphalt surface upon completion of placing shoulder gravel.

- .9 Place granular tapers at tie ins to gravel roads upon completion of paving to the dimensions shown on the contract drawings. Compact material as described in 3.1.5 of this specification. Sweep asphalt surface upon completion of placing taper gravel.

.4 Compaction Equipment:

- .1 Compaction equipment to be capable of obtaining required material densities.

.5 Compacting:

- .1 Compact to density not less than 100% maximum dry density in accordance with ASTM D698 and D4718.
- .2 Shape and roll alternately to obtain smooth, even, and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 Dry gravel if Granular Base is excessively moist.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.1 Sequence of Operation

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section or as directed by Departmental Representative.

3.2 Site Tolerances

- .1 Maintain finished Granular Base in condition conforming to this section until acceptance by Departmental Representative and until succeeding material is applied.
- .2 Apply dust control measures as required.
- .3 Ensure that Granular Base surface is in properly compacted state prior to application of succeeding material.

END OF SECTION

Part 1 **GENERAL****1.1** **MEASUREMENT PROCEDURES**

- .1 Payment for Asphalt Prime Coat work shall be made at the lump sum price tendered in in this Contract.

1.2 **REFERENCES**

- .1 ASTM International
 - .1 ASTM D140/D140M-09, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
 - .2 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.3 **QUALITY ASSURANCE**

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

Part 2 **PRODUCTS****2.1** **MATERIAL**

- .1 Asphalt material: to CAN/CGSB-16.1 grade RM-20, MC-70 or CAN/CGSB-16.2 grade SS-1h, as specified in Supplementary Specifications.
- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter.

2.2 **EQUIPMENT**

- .1 Pressure distributor:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rate of 2.0 L/m² with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distribute in uniform spray without atomization at temperature required.
- .2 Equipped with meter, registering travel in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.

- .2 Equipped with meter, registering travel in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
- .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
- .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .1 Measure temperature to closest whole number.
- .5 Equipped with accurate volume measuring device or calibrated tank.
- .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
- .8 Cleaned if previously used with incompatible asphalt material.

Part 3**EXECUTION****3.1****EXAMINATION**

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

3.2**APPLICATION**

- .1 Proceed with application of prime coat only after receipt of approval of granular base surface from Departmental Representative.
- .2 Cutback asphalt:
 - .1 Heat MC70 asphalt prime to between 60 and 70 degrees C for pumping and spraying in accordance with manufacturer's instructions.
 - .2 Apply asphalt prime to granular base at rate of 2 L/m².
 - .3 Apply on damp surface unless otherwise directed by Departmental Representative.
- .3 Emulsified asphalt:
 - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
 - .2 Mix thoroughly by pumping or other method approved by Departmental Representative.

- .3 Apply diluted asphalt emulsion at rate of 4.0 L/m² emulsified asphalt.
- .4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Departmental Representative.
- .4 Apply asphalt prime only on unfrozen surface.
- .5 Apply asphalt prime coat only when air temperature is greater than 5 degrees C and when rain is not forecast within 2 hours minimum of application.
- .6 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .7 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .8 Prevent overlap at junction of applications.
- .9 Do not prime surfaces that will be visible when paving is complete.
- .10 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .11 Keep traffic off primed areas until asphalt prime has cured.
 - .1 Control traffic in accordance with Section 01 35 00.06 - Special Procedures for Traffic Control.
- .12 Permit prime to cure before placing asphalt paving.

3.3 USE OF SAND BLOTTER

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.
- .3 Apply second application of sand blotter as required.
- .4 Do not roll blotter sand.
- .5 Sweep and remove excess blotter material.

3.4 CLEANING

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

END OF SECTION

Part 1 **General****1.1** **MEASUREMENT AND PAYMENT**

- .1 Payment for Asphalt Paving work shall be made at the lump sum price tendered in this Contract. Weigh tickets shall be provided to the Departmental Representative if requested as the loads are delivered to confirm amounts delivered.
- .2 Payment for asphalt saw cutting shall be included in the lump sum price tendered for asphalt paving.
- .3 Payment for adjusting of manhole frames and covers and valve adjustments shall be included in the lump sum price for asphalt paving tendered in this Contract.

1.2 **REFERENCES**

- .1 Standard specifications for testing, materials, fabrication, and supply, referred to herein, are fully described in Section 01 42 00 of the Master Municipal Construction Documents Platinum Edition (2009.)

1.3 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Upon request, submit manufacturer's test data and certification that asphalt cement meets requirements of this section.

Part 2 **Products****2.1** **MATERIALS**

- .1 Hot mix asphalt supplied shall meet specifications for **MMCD upper course #1** asphalt as described in Section 32 12 16 of the Master Municipal Construction Documents Platinum Edition (2009.)
- .2 Upon request, submit supplier's test data and certification that hot mix asphalt meets requirements of this Section 32 12 16, Clause 2.0 of the Master Municipal Construction Documents Platinum Edition (2009.)

2.2 **EQUIPMENT**

- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated on Contract Drawings.
- .2 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers:
 - .1 Drum diameter: 1200 mm minimum.
 - .2 Amplitude of vibration (machine setting): 0.5 mm maximum for lifts less than 40 mm thick.

- .4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
 - .4 Use only trucks which can be weighed in single operation on scales supplied.
- .5 Hand tools:
 - .1 Lutes or rakes with covered teeth for spreading and finishing operations.
 - .2 Tamping irons having mass 12 kg minimum and bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Department Representative, may be used instead of tamping irons.
 - .3 Straight edges, 3.0 m in length, to test finished surface.

Part 3 Execution**3.1 EXAMINATION**

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

3.2 PLANT AND MIXING REQUIREMENTS

- .1 The asphalt plant supplying the hot mix asphalt shall meet specifications as described in Section 32 12 16, Clause 3.1 of the Master Municipal Construction Documents Platinum Edition (2009).

3.3 PREPARATION

- .1 Reshape granular roadbed.
- .2 When paving over existing asphalt surface, clean pavement surface.
 - .1 When levelling course is not required, patch and correct depressions and other irregularities to approval of Departmental Representative before beginning paving operations.
- .3 Apply prime coat in accordance with Section 32 12 13.23 - Asphalt Prime Coat and permit prime coat to set prior to paving.
- .4 Saw cut existing asphalt pavements at match lines and paint surfaces with asphalt tack.

- .5 Adjust man hole frames & covers, and valve boxes to final elevation prior to paving.
- .6 Prior to laying mix, clean surfaces of loose and foreign material.

3.4 TRANSPORTATION OF MIX

- .1 Transport mix to job site in vehicles cleaned of foreign material.
- .2 Paint or spray truck beds with limewater, soap or detergent solution, or non-petroleum based commercial product, at least daily or as required.
 - .1 Raise truck bed and thoroughly drain, and ensure no excess solution remains in truck bed.
- .3 Deposit mix from surge or storage silo to trucks in multiple drops to reduce segregation.
 - .1 Do not dribble mix into trucks.
- .4 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.
- .5 Deliver loads continuously in covered vehicles and immediately spread and compact.
 - .1 Deliver and place mixes at temperature within range as directed by Departmental Representative, but not less than 125 degrees C.

3.5 PLACING

- .1 Obtain Departmental Representative's approval of base, existing surface, tack coat or prime coat prior to placing asphalt.
- .2 Place asphalt concrete to thicknesses, grades and lines as shown on Contract Drawings.
- .3 Placing conditions:
 - .1 Place asphalt mixtures only when air temperature is 5 degrees C minimum.
 - .2 When temperature of surface on which material is to be placed falls below 10 degrees C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .4 Place asphalt concrete in compacted lifts of thickness as shown on Contract Drawings.
 - .1 Surface course in 1 layer of 65 mm.
- .5 Spread and strike off mixture with self propelled mechanical finisher.
 - .1 Construct longitudinal joints and edges true to line markings.
 - .1 Departmental Representative to approve lines for paver to follow parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
 - .2 Maintain constant head of mix in auger chamber of paver during placing.
 - .3 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.

- .4 Correct irregularities in alignment left by paver by trimming directly behind machine.
- .5 Correct irregularities in surface of pavement course directly behind paver.
 - .1 Remove excess material forming high spots using shovel or lute.
 - .1 Fill and smooth indented areas with hot mix.
 - .2 Do not broadcast material over such areas.
- .6 Do not throw surplus material on freshly screeded surfaces.
- .6 When hand spreading is used:
 - .1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section.
 - .1 Use measuring blocks and intermediate strips to aid in obtaining required cross-section.
 - .2 Distribute material uniformly without broadcast material.
 - .3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes.
 - .1 Reject material that has formed into lumps and does not break down readily.
 - .4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.
 - .5 Provide heating equipment to keep hand tools free from asphalt.
 - .1 Control temperature to avoid burning material.
 - .2 Do not use tools at higher temperature than temperature of mix being placed.

3.6 COMPACTING

- .1 Roll asphalt continuously to average density of not less than 97% of 75 blow Marshall density in accordance with ASTM D1559 with no individual test less than 95%.
- .2 Do not change rolling pattern unless mix changes or lift thickness changes.
 - .1 Change rolling pattern only as directed by Departmental Representative.
- .3 General:
 - .1 Provide at least 2 rollers and as many additional rollers as necessary to achieve specified pavement density. When more than 2 rollers are required, 1 roller must be pneumatic tired type.
 - .2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.
 - .3 Operate roller slowly initially to avoid displacement of material. Do not exceed 5 km/h for breakdown and intermediate rolling for static steel-wheeled and pneumatic tired rollers. Do not exceed 8 km/h for finish rolling.
 - .4 Use static compaction for levelling course less than 25 mm thick.

- .5 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing not to exceed compacted lift thickness.
- .6 Overlap successive passes of roller by at least one half width of roller and vary pass lengths.
- .7 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.
- .8 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.
- .9 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
- .10 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.
 - .1 Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.
- .11 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.
- .12 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.
- .4 Breakdown rolling:
 - .1 Begin breakdown rolling with vibratory roller immediately following rolling of transverse and longitudinal joint and edges.
 - .2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.
 - .3 Operate breakdown roller with drive roll or wheel nearest finishing machine. When working on steep slopes or super-elevated sections use operation approved by Departmental Representative.
 - .4 Use only experienced roller operators.
- .5 Intermediate rolling:
 - .1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.
 - .2 Rolling to be continuous after initial rolling until mix placed has been thoroughly compacted.
- .6 Finish rolling:
 - .1 Accomplish finish rolling with two-axle or three-axle tandem steel wheeled rollers while material is still warm enough for removal of roller marks.
 - .1 If necessary to obtain desired surface finish, use pneumatic-tired rollers as directed by Departmental Representative.
 - .2 Conduct rolling operations in close sequence.

3.7 JOINTS

- .1 General:
 - .1 Remove surplus material from surface of previously laid strip.
 - .1 Do not deposit on surface of freshly laid strip.
 - .2 Construct joints between asphalt concrete pavement and Portland cement concrete pavement as indicated.
 - .3 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .2 Transverse joints:
 - .1 Offset transverse joint in succeeding lifts by at least 600 mm.
 - .2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.
 - .3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.
- .3 Longitudinal joints:
 - .1 Offset longitudinal joints in succeeding lifts by at least 150 mm.
 - .2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100 degrees C prior to paving of adjacent lane.
 - .1 If cold joint can not be avoided, cut back by saw cutting previously laid lane, by at least 150 mm, to full depth vertical face, and tack face with thin coat of hot asphalt of adjacent lane.
 - .3 Overlap previously laid strip with spreader by 100 mm.
 - .4 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.
 - .5 Roll longitudinal joints directly behind paving operation.
 - .6 When rolling with static roller, shift roller over onto previously placed lane in order that 100 to 150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained
 - .7 When rolling with vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.
- .4 Construct feather joints so that thinner portion of joint contains fine graded material obtained by changed mix design or by raking out coarse aggregate in mix.
 - .1 Place and compact joint to ensure joint is smooth and without visible breaks in grade.
 - .2 Locate feather joints as indicated.
- .5 Construct butt joints as indicated.
- .6 Wherever practical, locate joints under future traffic markings (paint lines).

3.8 FINISH TOLERANCES

- .1 Finished asphalt surface to provide a smooth driving surface. Adjustments deviating from design elevations shall be approved by Department Representative in advance of paving.
- .2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with 3 m straight edge placed in any direction.
- .3 Water ponding not permitted.

3.9 DEFECTIVE WORK

- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required.
 - .1 If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.
- .2 Repair areas showing checking, rippling, or segregation.
- .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.10 CLEANING

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

OF SECTION

PART 1 - GENERAL

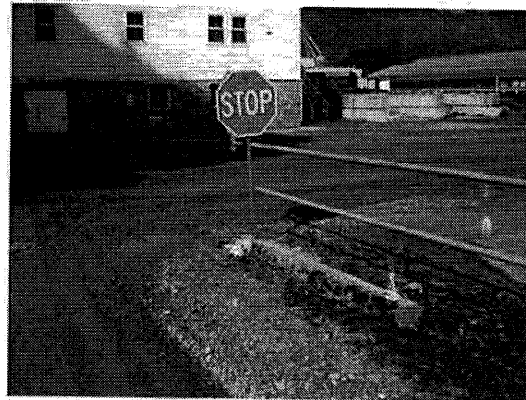
- 1.1 Measurement for Payment .1 Payments for modifications to existing traffic stop signs on steel rails shall be at the lump sum rate tendered in this Contract.
- 1.2 References .2 CSA International
 - .1 CSAW59 Welded steel construction.

PART 2 - PRODUCTS

- 2.1 Steel Pipe .1 48mm diameter X 3.55 wall thickness galvanized steel pipe.

PART 3 - EXECUTION

- 3.1 Examination .1 The Contractor shall review two existing metal rail and stop sign installations and make determination for temporary removal, storage, and reinstallation to original condition or replace with similar installation with new materials (reuse existing sign faces) if more cost effective.
- 3.2 Removal and Reinstallation .1 Remove existing sign and rails prior to paving and reinstall with salvaged or new materials after paving is completed to satisfaction of Departmental Representative.
 - .2 All welds shall have 2 coats galvacon or similar high zinc paint applied.
 - .3 If approved by Departmental Representative replacement using precast concrete no post barrier (460 mm high) and trapezoidal sign base (460 mm high).



End of Section

PART 1 - GENERAL

- 1.1 Measurement for Payment .1 Payments for pipe culverts shall be at the lump sum price tendered in this Contract for 300 mm diameter HDPE culverts.
- 1.2 References .1 ASTM International
- .1 ASTM D2412, pipe stiffness.
 - .2 ASTM F477, gaskets.
- .2 CSA International
- .1 CSA B182.8, HDPE pipe.
- 1.3 Delivery, Storage and Handling .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipe and pipe material from damage.
 - .3 Replace defective or damaged materials with new.

PART 2 – PRODUCTS

- 2.1 High Density Poly Ethylene .1 Exterior pipe corrugation to be embossed with stiffness ratings as required by CSA B182.8.
- .2 Pipe to have factory assembled spigot gaskets and integral bell joint features certified to CSA B182.8.
- .3 Pipe to have minimum stiffness of 320 kPa at 5% deflection, when tested in accordance with ASTM D241.
- .4 Gaskets to meet requirements of ASTM F477.
- 2.2 Granular Bedding and Backfill .1 Refer to Section 310516, 320116 and 321123 of specification.
-

PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 Trenching .1 Do trenching Work in accordance with Section 312333 - Excavating, Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.
- 3.3 Bedding .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place 75 mm minimum thickness of approved, compacted granular material on bottom of excavation.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.
- 3.4 Laying HDPE Pipe Culverts .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Lay pipe with outside bells facing upstream.
- .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.
- 3.8 Joints: HDPE Pipe Culverts .1 Install rubber gasket joints in accordance with manufacturer's written recommendations.
-

- .2 Ensure that spigot ends are fully entered into bell ends.
- 3.9 Backfilling
 - .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
 - .2 Place granular backfill material in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
 - .3 Compact each layer to 95% maximum density to ASTM D698 taking special care to obtain required density under haunches.
 - .4 Protect installed culvert with minimum 300 mm cover of compacted granular material before heavy equipment is permitted to cross.
 - .5 Place backfill in unfrozen condition.
- 3.10 Cleaning
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

- 1.1 Measurement for Payment .1 Payments for trench drains including metal grating shall be at the lump sum price tendered in this Contract.
- 1.2 References .1 ASTM International
- .1 ASTM C76M, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .2 ASTM C443M, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric)
- .2 CSA International
- .1 CSA A3000-[08], Cementitious Materials Compendium.
- 1.3 Delivery, Storage and Handling .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials in accordance with manufacturer's recommendations.
- .2 Store and protect trench drains and grate material from damage.
- .3 Replace defective or damaged materials with new.

PART 2 – PRODUCTS

- 2.1 Trench Drain .1 To ASTM C76M with 35 MPa concrete.
- .2 Designed to HS-20 live loading.
- 2.2 Trench Grating .1 To ASTM A48.
- .2 Designed to HS-20 live loading.
- 2.3 Granular Bedding and Backfill .1 Refer to Section 310516, 320116 and 321123 of specification.
-

PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for trench drain installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 Trenching .1 Do trenching Work in accordance with Section 312333 - Excavating, Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.
- 3.3 Bedding .1 Dewater excavation, as necessary, to allow placement of trench drain bedding in dry condition.
- .2 Place 75 mm minimum thickness of approved, compacted granular material on bottom of excavation.
- .3 Shape bedding to uniform flat surface such that entire length of trench drain is uniformly supported on bedding material. free of sags and high points.
- .4 Place bedding in unfrozen condition.
- 3.4 Laying Trench Drain .1 Begin drain placing at downstream end.
- .2 Ensure bottom of trench drain is in contact with bedding and compacted fill throughout its length.
- .3 Do not allow water to flow through trench drain during construction except as permitted by Departmental Representative.
- 3.5 Joints: Trench Drain .1 Align each trench drain section to a uniform alignment and grade. Install concrete collar around each joint. Collar to have minimum thickness of 75 mm under trench drain, 150 mm on each side and a total length of 600 mm.
- .2 Place minimum of 4 reinforcing bars (15 M, 500 mm long) equally spaced in each concrete collar.
-

-
- | | | |
|----------------------------|----|--|
| 3.6 Backfilling and Grates | .1 | Backfill unfrozen around trench drains as indicated or as directed by Departmental Representative. |
| | .2 | Place granular backfill in 150 mm layers to full width, alternately on each side of trench drain, to avoid lateral or vertical displacement. |
| | .3 | Compact each layer to 95% maximum density to ASTM D698. |
| | .4 | Place metal grates on trench upon completion of installation. |
| 3.7 Cleaning | .1 | Progress Cleaning: in accordance with Section 01 74 11 - Cleaning. |
| | .1 | Leave Work area clean at end of each day. |
| | .2 | Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning. |
| | .3 | Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal. |

END OF SECTION

PWGSC

Service Road Drainage and Paving
Pacific Agri-Food Research Centre, Agassiz, BC
Project No. R .078803.001

APPENDIX A

Appendix A

Geotechnical Memorandum

Reference No. VAN-00228940-A0 Pavement
Upgrades – Pacific Agri-Food Research Centre,
Agassiz, B.C.



275 – 3001 Wayburne Drive
Burnaby, BC V5G 4W3 Canada
T: 604.874.1245 • www.exp.com

Memorandum

Date: October 26, 2015
To: Tom Dunphy
Company: Public Works & Government Services Canada
Email: tom.dunphy@pwgsc-tpsgc.gc.ca
Reference No.: VAN-00228940-A0
Total No. of Pages: 6 + Attachments
Prepared By/Email: Don Sargent, P.Eng. don.sargent@exp.com
Project Name: Pavement Upgrades – Pacific Agri-Food Research Centre, Agassiz, BC
Subject: Geotechnical Assessment
Distribution/Email: Don Chalmers, P.Eng., Parsons don.chalmers@parsons.com

1.0 INTRODUCTION

As requested, the following presents the site reconnaissance and subsurface exploration findings, and provides discussion and recommendations for the proposed pavement upgrades at the above noted site.

The geotechnical services are provided by **exp** Services Inc. in accordance with the **exp** proposal dated September 18, 2015.

2.0 PROJECT DETAILS

The scope of work involves assessment of an existing gravel road which traverses the site in an a roughly east-west alignment. The project is for the upgrade paving of a 350m long existing two lane gravel road. It is understood that the gravel surfacing is holding up well under light traffic (mostly cars and small trucks). There may also be occasional loaded heavy trucks.

3.0 SITE DESCRIPTION / RECORD INFORMATION

The site is located at the Pacific Agri-Food Research center in Agassiz, BC.

The road improvement area is flat-lying with grade variations between about El. 17.5m to 17.9m. The current gravel surfaced roadway is bordered by gravel shoulders and occasional curb and gutters. An asphalt covered area is situated at the east end. Buried utilities are also located within the roadway areas. The roadway is surrounded by some buildings and open grassy boulevards.

4.0 SITE EXPLORATION AND RECONNAISSANCE

A geotechnical subsurface exploration was conducted on September 25, 2015, and consisted of:

- three test pits taken to between 0.9m to 1.4m depth by a rubber-tire mounted backhoe.
- six shallow trenches to between 0.1m to 0.3m depth by a rubber-tire mounted backhoe.

The locations of the test pits are shown on Location Plan, Figure 1 in Appendix B. The test pits were carried out on the edge of the existing gravel, allowing the existing pavement structure to be investigated. Soil descriptions at each location are included in the Summary Logs in Appendix C.

Each shallow trench was dug into the existing gravel surface roadway and it was extended to the edge of the gravel in order to identify the thickness of asphalt, where encountered in the trench. The shallow trench locations and a description of materials encountered are summarized as follows:



Memorandum (cont'd)

Re: Geotechnical Assessment – Pavement Upgrades,
 Pacific Agri-Food Research Centre, Agassiz, BC
 Reference No.: VAN-0028940-A0
 October 26, 2015

Location (1)	Depth To Asphalt	Materials
10	0.05m	Gravel over 100mm thick Asphalt
20	0.15m	Gravel over 100mm thick Asphalt
25	0.15m	Gravel over 100mm thick Asphalt
60	0.3m	Gravel over 100mm thick Asphalt
90	Greater than 0.3m	Gravel
130	Greater than 0.3m	Gravel

Note: (1) Approx. distance in meters west of TP 15-03 (at east end of site). The depth to asphalt was typically greater than 50mm, except for a length of about 10 to 20m at the far east end of the site.

The geotechnical exploration was supervised by an engineer from **exp**, who located the test holes, logged the subsurface conditions and gathered soil samples. Upon completion of the holes, they were backfilled with excavation spoils. The soil samples were returned to the **exp** laboratory for further visual classification, moisture content determination, and particle size analysis.

The test holes indicated subsurface conditions only at the locations of the holes. The precision of the subsurface conditions indicated depends on the methods used, frequency of sampling, and the uniformity of the subsurface conditions. The spacing of the test holes, frequency of sampling, and the method of exploration have been selected to meet the needs of the project within constraints of the budget and schedule for geotechnical exploration purposes.

Two (2) washed sieve analysis, per ASTM C 136 and C 117 were carried out; analysis reports are shown in Appendix D.

Subsurface Conditions

The test holes generally encountered the following soil types:

Unit F1	FILL	SAND AND GRAVEL, crushed
		<ul style="list-style-type: none"> - Grey, dense - trace silt - 0.05 to 0.3m thick - gravel overlying 100mm thick asphalt at far east end only - Sieve Test No. 2 (Appendix D)
Unit F2	FILL	SAND AND GRAVEL, asphalt bound
		<ul style="list-style-type: none"> - 100mm thick in TP15-01 only
Unit F3	FILL	SAND AND GRAVEL
		<ul style="list-style-type: none"> - Brown, trace silt, some cobbles - thin sand lens at TP15-01 - compact - 0.2 to 0.3m thick - Sieve Test No. 1 (Appendix D)



Memorandum (cont'd)

Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015

Unit A	SILT
	<ul style="list-style-type: none"> - Brown, stiff - moisture content: 19 to 47% - encountered at 0.3m to 0.5m depth in test pits
Unit B	SILT to Silty SAND
	<ul style="list-style-type: none"> - brown - trace sand & gravel - loose to compact

The Unit F1 (SAND AND GRAVEL), representing the existing gravel surfacing, was encountered generally. An asphalt layer or chip seal materials were encountered in some pits and trenches at varying depths in the order of 0.1m to 0.3m. The Unit F3 (SAND AND GRAVEL) at TP15-03 differed from that in the other pits in that cobbles and concrete/asphalt rubbles were encountered.

The sand and gravel fill was underlain by Unit A (SILT) representing natural soils.

No groundwater seepage was encountered at the time of the subsurface exploration.

5.0 PRELIMINARY EVALUATION AND ANALYSIS

5.1 General

It is anticipated that proposed pavement areas will generally be underlain by granular embankment and or silt subgrade soils.

5.2 Existing Pavement

The existing gravel surface was in fair to good condition. Some testholes encountered about 100 to 300mm of sand and gravel over a 100mm thick asphalt layer.

5.3 Pavement Design Criteria/Methodology

Pavement design evaluations were conducted in general accordance with the local practice. The local Ministry of Transportation & Infrastructure (Ministry) Pavement Structure Design Guidelines and some Municipalities guidelines were considered. Structural coefficients, drainage coefficients, and material properties for pavement construction materials have been considered. For design purposes, good drainage of the roadbed has been assumed.

For reference, the Ministry minimum pavement structure (T-01/15) for Type "C" Low Volume & Subdivision roads is as follows:

Type "C" Road (less than 100,000 ESAL's)

- 50 to 75mm of Asphalt Pavement
- 225mm of Well-Graded Base
- 300mm of Select Granular Sub-Base (over silt subgrades)



Memorandum (cont'd)

Re: *Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015*

A project-specific pavement design has been developed. Project specific aspects include frequent car use and an anticipated infrequent truck use but there is a potential for occasional heavier trucks. However, a number of other considerations affect pavement performance including:

- Slow moving, and parked trucks;
- Uncertain truck volumes and timing, varies to suit need;
- Site-specific subgrade conditions.

The pavement design has been based on experience combined with the anticipated truck use.

5.4 Subgrade Evaluations

Subgrade would typically consist of granular embankment fill and native stiff silt soil. Note that the silt subgrade may be prone to frost heaves and weak conditions during spring thaw. In consideration of these subgrade conditions, our past experience on other similar projects and empirical correlations, we have considered representative subgrade parameters for pavement design purposes.

5.5 Existing Materials

The test holes encountered granular materials overlying stiff silt.

Based on the soils encountered in the test holes, it is judged that some of the on-site granular soils may generally be suitable for re-use as Select Granular Subbase.

5.6 Source Materials

It is understood that road surfacing materials would be available as follows:

- Granular fill from a pit located in the vicinity of the site.
- Hot mix asphaltic concrete from local supplier.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

The exploration test holes generally encountered sand & gravel fill overlying firm to stiff silt. Gravel over asphalt (Sandwich asphalt) was encountered at far east end. No groundwater seepage was encountered.

It is recommended that the existing asphalt encountered below the gravel surfacing should be removed and a new pavement should be placed for the proposed roadway upgrade.

The following outlines discussions and geotechnical recommendations.



Memorandum (cont'd)

Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015

6.2 Estimated Stripping Depths

A summary of stripping depths is provided as follows:

Estimated Stripping Depths		
Test Pit	Estimated Stripping Depths (m)	Anticipated Subgrade
TP15-01	0.5	Stiff SILT
TP15-02	0.3	Stiff SILT
TP15-03	0.4	Stiff SILT

The stripping should be done for the new pavement, to remove any existing asphalt materials, topsoil and organic rich soils, water-softened soils and any unsuitable materials. It may be feasible to reuse some of the granular materials as a Select Granular Subbase material. The viability and recommendations for materials reuse should be evaluated in the field by the Geotechnical Engineer. If the exposed subgrade differs significantly from that encountered in the test pits, the Geotechnical Engineer should be given an opportunity to review the conditions in the field.

6.3 Roadway Excavation and Drainage

It is estimated that it would be practical to use conventional excavation equipment to excavate soils encountered in test holes at the site. Based upon the test hole results, it is considered that excavations could be kept free of standing water using conventional pumping from sumps to facilitate excavation, where required.

It is anticipated that granular surfacing materials would be placed on stable subgrades after unsuitable materials have been stripped and removed.

6.4 Pavement Design

The new design pavement section may be taken as follows:

Table 6.4.1 – Pavement Structure

Assumed Subgrade	Pavement Structure		Equivalent Pavement
	Material Type	Thickness	Thickness
Stiff Silt or Granular over stiff Silt	Asphalt Pavement	75mm	75mm
	19mm Crushed Base	225mm	400mm
	Select Granular Sub-base	300mm	-
	Total	600mm	475mm



Memorandum (cont'd)

Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015

The standard pavement structure has a greater thickness than an equivalent structure comprised of asphalt over base gravels, however, use of one granular material may have some cost benefits over use of two materials.

It is recommended that the asphalt paving be constructed in accordance with current Master Municipal Construction Documents (MMCD). The base and subbase materials should conform to MMCD specifications and should be compacted to at least 95% of their Modified Proctor Maximum Dry Density (ASTM D-1557). It is recommended that the hot mix asphalt be placed in a single lift (75mm thick) and the asphalt mixture should comply with 19mm Class 1 Medium Mix.

6.5 Overlay on Existing Pavement – East End

Existing pavement, capped by sand and gravel was observed at the far east end to be in relatively good condition. Therefore, consideration can be given to removing the gravel and milling the existing pavement 30mm in depth and resurfacing with 50mm of Class 1 Medium mix contiguous with the upper lift of the new construction for blending and leveling purposes. The pavement should be inspected to assess viability of an overlay after the gravel has been removed. The transition between the existing and new pavement should include saw cut transverse joint and the existing asphalt should be removed to at least 0.6m below finished grade under the new pavement areas.

7.0 CLOSURE

Please note that this report was prepared for the exclusive use of **exp's** Client, Public Works and Government Services Canada, and their designated consultants and agents. The attached Interpretation & Use of Study and Report (Appendix A) forms part of this report, and it should be included with copies of the report.

We trust that this report satisfies your present requirements. Should you have any questions regarding any aspect of the above-noted, please call the undersigned.

Submitted by:

Reviewed by:

exp Services Inc.


Don Sargent, P.Eng.
Senior Engineer


Ben Weiss, P.Eng.
Senior Geotechnical Engineer

Attachments: Appendix A – Interpretation & Use of Study and Report
Appendix B – Figures (Location Plan, Figure 1)
Appendix C – Test Hole Summary Logs (TP15-01 to TP15-03)
Appendix D – Laboratory Tests (Sieve Analysis Reports #1 and #2)



Memorandum (*cont'd*)

*Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015*

Appendix A

Interpretation & Use of Study and Report



INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

- a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b. Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.
- c. To avoid misunderstandings, **exp Services Inc. (exp)** should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp's** recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp's** instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp's** instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp's** instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

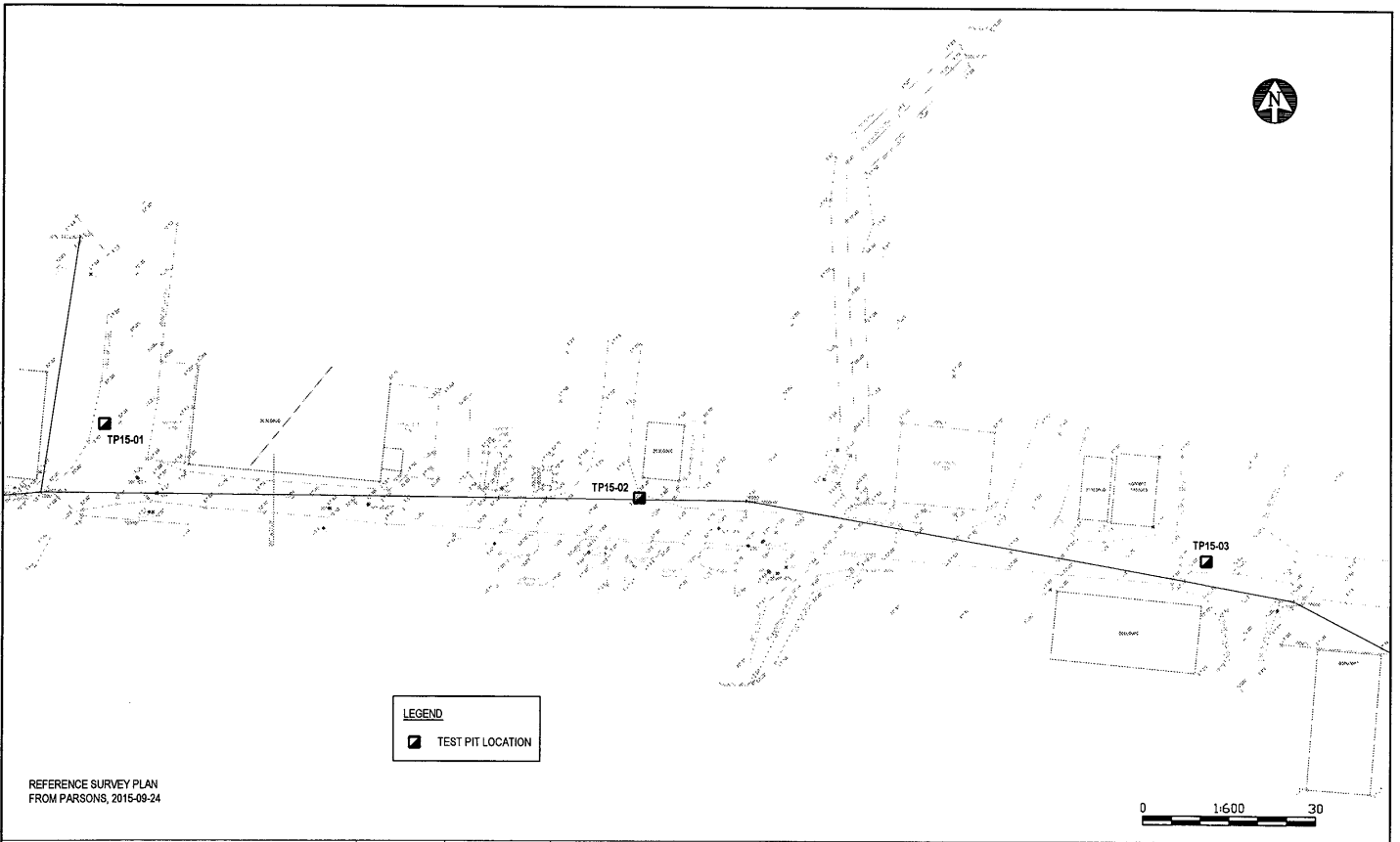


Memorandum (cont'd)

*Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015*

Appendix B

Figures
Location Plan, Figure 1



LEGEND
 TEST PIT LOCATION

REFERENCE SURVEY PLAN
 FROM PARSONS, 2015-09-24

0 1:600 30



exp Services Inc.
 275-3001 Wayburne Drive
 Burnaby, British Columbia V5C 4W3
 Telephone: 604-874-1245
 Fax: 604-874-2358
 exp.com

DPT.	MG	REVISIONS	
		NO.	DESCRIPTION
DRGN.	RK		
CHK.	DWS		

CLIENT	Public Works and Government Services Canada
PROJECT	Pavement Rehabilitation Agricultural Research, Agassiz, BC
PROJECT NO.	VAN-00228940-A0

TITLE	Test Pit Location Plan		
DATE	2015-09-30	SCALE	1:600
DWG. NO.			Figure 1

04.15.2015 - 1:45pm - C:\Users\jg\Documents\Projects\2015\Agricultural Research\Agricultural Research - Test Pit Location Plan\DWG\01 - Test Pit Location Plan.dwg



Memorandum (cont'd)

*Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015*

Appendix C

Test Hole Summary Logs
TP15-01 to TP15-03

PROJECT NUMBER VAN-00228940-01
 PROJECT NAME Pavement Rehabilitation
 EXCAVATION DATE 2015-09-25
 EXCAVATION CONTRACTOR Feenstra Backhoe Ltd.
 EXCAVATION METHOD Test Pit
 EQUIPMENT TYPE Backhoe
 LOGGED BY RK CHECKED BY DWS

CLIENT Public Works and Government Services Canada
 PROJECT LOCATION Agricultural Research, Agassiz, BC
 TEST PIT LOCATION _____
 ELEVATION _____
 GROUND WATER LEVELS: AT TIME OF EXCAVATION --
 AT END OF EXCAVATION --
 AFTER EXCAVATION --

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES			SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400	FINES CONTENT (%) □ 20 40 60 80			
				NUMBER	TYPE	RECOVERY %				DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FIELD VANE SHEAR (kPa) Peak Remold ● ○ 100 200 300 400	PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL ----- ----- 20 40 60 80
		SAND and GRAVEL, grey, moist, (compact to dense), (125mm thick), (FILL)		S1	GB							
		CHIPS SEAL, thin layers (100mm thick)	0.1									
		SAND and GRAVEL, (75mm pit run gravel, rounded), trace silt, brown, damp, (compact), (FILL)	0.2	S2	GB							
		SAND, some rounded pit run gravel, trace silt, rusty brown, moist, (compact), (FILL)	0.4	S3	GB							
		SILT, laminated, trace sand, brown, moist, (stiff)	0.5									
				S4	GB			47 ○				
1		SANDY SILT to SILT and SAND, light brown, moist, (stiff/loose to compact)	0.9									
				S5	GB			27 ○				

Bottom of test pit at 1.3m.



exp Services Inc

RECORD OF TEST PIT : TP15-02

PAGE 1 OF 1

PROJECT NUMBER VAN-00228940-01
 PROJECT NAME Pavement Rehabilitation
 EXCAVATION DATE 2015-09-25
 EXCAVATION CONTRACTOR Feenstra Backhoe Ltd.
 EXCAVATION METHOD Test Pit
 EQUIPMENT TYPE Backhoe
 LOGGED BY RK CHECKED BY DWS

CLIENT Public Works and Government Services Canada
 PROJECT LOCATION Agricultural Research, Agassiz, BC
 TEST PIT LOCATION _____
 ELEVATION _____
 GROUND WATER LEVELS: AT TIME OF EXCAVATION --
 AT END OF EXCAVATION --
 AFTER EXCAVATION --

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES			SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80	POCKET PEN. (kPa) ⊙ 100 200 300 400	FINES CONTENT (%) □ 20 40 60 80			
				NUMBER	TYPE	RECOVERY %				DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FIELD VANE SHEAR (kPa) Peak Remold ● ○ 100 200 300 400	PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL ----- ----- 20 40 60 80
0.5		SAND and GRAVEL, crushed, trace silt, grey, moist, (compact to dense), (FILL)	0.1	S6	GB							
		SAND and GRAVEL, (75mm minus pit run gravel, rounded), trace silt, brown, moist, (compact), (FILL)										
	SILT, trace to some sand, trace gravel and organics, brown, (stiff)	0.3	S7	GB			24 ⊙					
	SILTY SAND, fine grained, light brown, moist, (loose to compact)	0.5	S8	GB			20 ⊙					

Bottom of test pit at 0.9m.

PROJECT NUMBER VAN-00228940-01
 PROJECT NAME Pavement Rehabilitation
 EXCAVATION DATE 2015-09-25
 EXCAVATION CONTRACTOR Feenstra Backhoe Ltd.
 EXCAVATION METHOD Test Pit
 EQUIPMENT TYPE Backhoe
 LOGGED BY RK CHECKED BY DWS

CLIENT Public Works and Government Services Canada
 PROJECT LOCATION Agricultural Research, Agassiz, BC
 TEST PIT LOCATION _____
 ELEVATION _____
 GROUND WATER LEVELS: AT TIME OF EXCAVATION _____
 AT END OF EXCAVATION _____
 AFTER EXCAVATION _____

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES			SPT N VALUE BLOWS/0.3m	POCKET PEN. (kPa)	FINES CONTENT (%)
				NUMBER	TYPE	RECOVERY %	▲	⊙	□
							20 40 60 80	100 200 300 400	20 40 60 80
1		SAND and GRAVEL to SANDY GRAVEL, crushed, trace silt, grey, (dense), (FILL)		S9	GB				
		COBBLY GRAVELLY SAND, trace to some silt, occasional concrete chunks and asphalt bits, brown, (dense), (FILL)	0.1	S10	GB				
		SILT, trace sand, laminated, trace gravel, brown, (firm to stiff)	0.4	S11	GB			19	○
		SAND, fine grained, some silt, trace gravel, light brown, moist, (loose to compact)	0.7	S12	GB			17	○
		SAND, fine grained, some cobbles and rounded gravel, trace to some silt, brown, moist, (compact to dense)	1.1	S13	GB			38	○

Bottom of test pit at 1.4m.



Memorandum (cont'd)

*Re: Geotechnical Assessment – Pavement Upgrades,
Pacific Agri-Food Research Centre, Agassiz, BC
Reference No.: VAN-0028940-A0
October 26, 2015*

Appendix D

**Laboratory Tests
Sieve Analysis Reports
No. 1 and 2**



exp Services Inc.
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
604-874-1245

Kamloops Branch
250-372-5321



CERTIFIED TESTING
LABORATORY

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

PROJECT NO. 002-28940-1
CLIENT PUBLIC WORKS & GOV'T SERVICES
c.c. exp - DON SARGENT
exp - RENEE KORHONEN

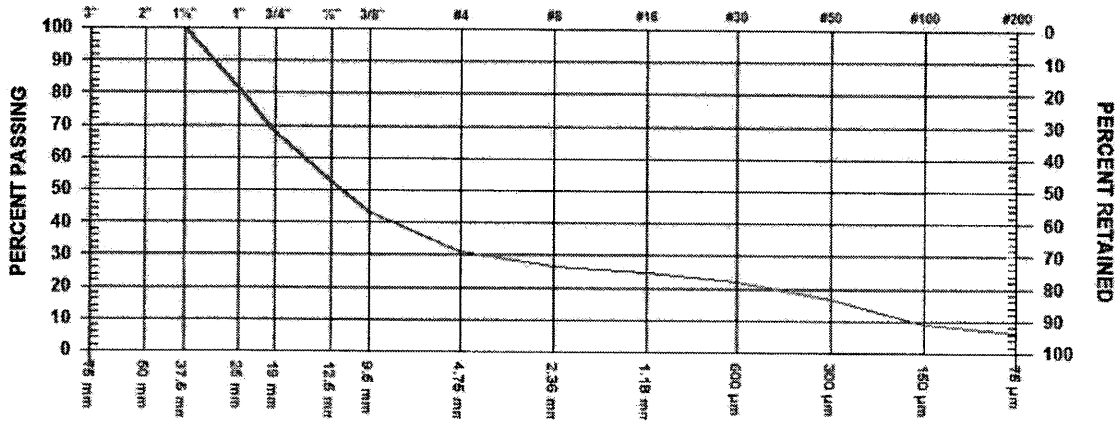
TO exp - DON SARGENT

ATTN: DON SARGENT

PROJECT PAVEMENT REHABILITATION - GEOTECHNICAL
PACIFIC AGRIFOODS RESEARCH CENTRE
CONTRACTOR FRASER VALLEY

SIEVE TEST NO. 1 DATE RECEIVED Oct 07, 2015 DATE TESTED Oct 13, 2015 DATE SAMPLED ~~SEP 25~~, 2015

SUPPLIER EXISTING MATERIAL SAMPLED BY R. KORHONEN
SOURCE TP-1 @ 1' TESTED BY R. MILLARES
SPECIFICATION TEST METHOD WASHED
MATERIAL TYPE SANDY GRAVEL, TRACE SILT



GRAVEL SIZES	PERCENT PASSING	GRADATION LIMITS
3" 75 mm		
2" 50 mm		
1 1/2" 37.5 mm	100.0	
1" 25 mm	81.4	
3/4" 19 mm	67.9	
1/2" 12.5 mm	52.9	
3/8" 9.5 mm	43.1	

SAND SIZES AND FINES	PERCENT PASSING	GRADATION LIMITS
No. 4 4.75 mm	31.2	
No. 8 2.36 mm	26.6	
No. 16 1.18 mm	24.7	
No. 30 600 µm	22.2	
No. 50 300 µm	16.7	
No. 100 150 µm	9.0	
No. 200 75 µm	6.2	

MOISTURE CONTENT 2.8 %

COMMENTS

TEST METHOD: SIEVE, ASTM C136, C117; MOISTURE CONTENT, ASTM D2216.



exp Services Inc.
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
604-874-1245

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CERTIFIED TESTING
LABORATORY

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

TO exp - DON SARGENT

PROJECT NO. 002-28940-1
CLIENT PUBLIC WORKS & GOV'T SERVICES
c.c. exp - DON SARGENT
exp - RENEE KORHONEN

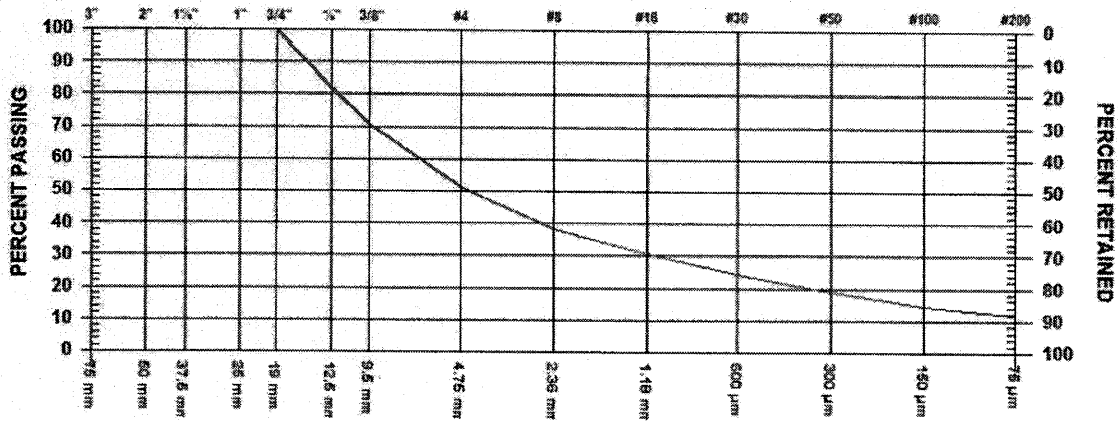
ATTN: DON SARGENT

PROJECT PAVEMENT REHABILITATION - GEOTECHNICAL
PACIFIC AGRIFOODS RESEARCH CENTRE
CONTRACTOR FRASER VALLEY

SIEVE TEST NO. 2 DATE RECEIVED Oct 07, 2015 DATE TESTED Oct 13, 2015 DATE SAMPLED Sep 25, 2015

SUPPLIER EXISTING MATERIAL
SOURCE TP-3 @ 4"
SPECIFICATION
MATERIAL TYPE SANDY GRAVEL, TRACE SILT

SAMPLED BY R. KORHONEN
TESTED BY R. MILLARES
TEST METHOD WASHED



GRAVEL SIZES	PERCENT PASSING	GRADATION LIMITS
3" 75 mm		
2" 50 mm		
1 1/2" 37.5 mm		
1" 25 mm		
3/4" 19 mm	100.0	
1/2" 12.5 mm	81.8	
3/8" 9.5 mm	70.7	

SAND SIZES AND FINES	PERCENT PASSING	GRADATION LIMITS
No. 4 4.75 mm	51.4	
No. 8 2.36 mm	38.3	
No. 16 1.18 mm	30.5	
No. 30 600 µm	24.1	
No. 50 300 µm	18.9	
No. 100 150 µm	14.6	
No. 200 75 µm	11.6	

MOISTURE CONTENT 4.7 %

COMMENTS

TEST METHOD: SIEVE, ASTM C136, C117; MOISTURE CONTENT, ASTM D2216.