Public Works and Government Services Canada

Requisition No.: EZ897-201126/A

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Specifications for

Remediation of Contaminated Soil & Backfill

K19, Alaska Highway, BC

Project No. R.080705.007/.008
August 14, 2019

APPROVED BY:

Regional Manager ES — Date: 2019/08/15

Construction Safety Coordinator — Date: 2019.08.16.

TENDER:

Project Manager — Date: Aug 15, 2019

Real Property Services Branch, Professional and Technical Services, Pacific Region
#219 – 800 Burrard Street, Vancouver, B.C. V6Z 0B9

Canada

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BRITISH COLUMBIA INSTITUTE OF AGROLOGISTS
3133
David Young
P.Ag.
Sept 30, 2019

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Not Used.

1.4. Work Covered by Contract

1.4.1. Work to be performed under the Contract includes, but is not limited to, the following items, including all ancillary Work, covered further in the Contract:

1.4.1.1. Site access restrictions are as follows:

1.4.1.1.1. Access to K19 Former Townsite of Trutch (K19) is off of the former alignment of Highway 97 (refer to Drawings 1 and 2).

1.4.1.2. Neighbouring or sensitive sites restrictions are as follows:

1.4.1.2.1. There are no pre-existing arrangements for access to K19 from the neighbouring properties. Arrangements for access from the neighbouring properties are the responsibility of the Contractor

1.4.1.3. Classes of Soil based on Environmental Quality Criteria are:

1.4.1.3.1. Hazardous Waste Quality

1.4.1.3.2. Waste Quality

1.4.1.3.3. Non-Contaminated Quality

1.4.1.4. Soil classification based on in-situ testing; ex-situ testing may be required as directed by the Departmental Representative.

1.4.1.5. Treatment of Contaminated Water, will be offsite at an approved water treatment facility. Contractor responsible for transportation of water to the treatment facility.

1.4.1.6. Excavation of Contaminated Soil as per Drawings. Contractor solely responsible for excavating to Contaminated Material Limits. Excavation Limits on Drawings based on a nominal 1:1 slope for volume estimating purposes only; actual shoring and/or slope requirements responsibility of the Contractor.

1.4.1.7. Transportation of Contaminated Soil to facilities.

1.4.1.8. Disposal of Contaminated Soil. All material identified as Contaminated on the Site must be disposed of at a Disposal Facility, including material that has been Treated.

1.5. Location

1.5.1. The Site location is shown on Drawings.

1.6. Project/Site Conditions

1.6.1. Contractor must provide personnel and equipment with appropriate experience for site conditions, including experience in remediating site-specific Contaminated Material. Contractor to provide specialized material handling, health and safety, and environmental protection procedures, and must have knowledge of appropriate regulations.

1.6.2. Work at Site involves Work with Contaminated Material. Complete list of anticipated contaminants and concentration levels on the Site available separately in Appendices and/or Drawings.

1.6.3. Existing condition on the Site identified according to Drawings.

1.7. Other Contracts

1.7.1. Other contracts are currently in progress at Site.

1.7.2. Other contracts are:

1.7.2.1. Environmental and other consultants.

1.7.2.2. Site users as identified in Contract Documents.

1.7.3. Further contracts may be awarded while the Contract is in progress.

1.7.4. Cooperate with other contractors in carrying out their respective works and carry out directions from Departmental Representative.

1.7.5. Coordinate Work with that of other contractors. If any part of Work under the Contract depends for its proper execution or result upon Work of another contractor, report promptly to Departmental Representative, in writing, any defects which can interfere with proper execution of this Work.

1.8. Contractor's Use of Site

1.8.1. Use of Site:

1.8.1.1. For the sole benefit of Canada.

1.8.1.2. Exclusive and only for completion of the execution of Work.

1.8.1.3. Assume responsibility of Prime Contractor and control for assigned premises for performance of this Work.

1.8.1.4. Be responsible for coordination of all Work activities onsite, including the Work of other contractors engaged by the Departmental Representative.

1.8.2. There are no pre-existing arrangements for access or encroachment on neighbouring properties. Offsite access, occupancy, or encroachment is the responsibility of the Contractor.

1.8.3. Perform Work in accordance with Contract. Ensure Work is carried out in accordance with schedule accepted by Departmental Representative.

1.8.4. Do not unreasonably encumber Site with material or equipment.

1.8.5. Accommodate common areas with other Site users, including roadways.

1.8.6. Segregate Contractor's work area from common areas to prevent unintentional multiple employer worksite, as required.

1.9. Existing Permits

1.9.1. Existing permits are:

1.9.1.1. None

1.9.2. Contractor assumes responsibility for relevant portions of existing permits.

1.9.3. Changes to existing permits must be approved by Departmental Representative. Changes to existing permits responsibility of Contractor, including resubmission to regulators as determined by the Contractor's Qualified Professional. Contractor assumes all responsibility for changed permits.

1.9.4. Permits required other than the existing permits responsibility of Contractor.

1.10. Schedule Requirements

1.10.1. Work to be initiated: as soon as practical after Contract Award.

1.10.2. Pre-Mobilization Submittals: within 10 Working Days of Contract Award.

1.10.3. Site Works: Final Completion no later than 2019 December 23.

1.10.4. Completion of the Work: no later than 2020 January 22. Includes all final Submittals including as-built documents, the Certificate of Completion, and the Statutory Declaration at Final Completion.

1.11. Hours of Work

1.11.1. Restrictive as follows:

1.11.1.1. Working Days are Monday to Sunday.

1.11.1.2. Working Hours are 07:00 to 19:00.

1.11.2. Work outside of Working Day and Working Hours must be approved by Departmental Representative by Submission.

1.12. Security Clearances

1.12.1. Not Used.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. Advisory: notices, instructions, or directions issued by the Departmental Representative to the Contractor.

1.2.2. Certificate of Completion: see General Conditions.

1.2.3. Change Order: PWGSC form issued by the Departmental Representative to the Contractor as per the relevant Contemplated Change Notice.

1.2.4. Classification: material (including soil and water) categorized into different classes based on Environmental Quality Criteria. Includes Hazardous Waste Quality, Waste Quality, Non-Contaminated Quality. Sub-classification based on specific parameters as identified in Contract. Re-classification must have approval of Departmental Representative.

1.2.5. Confirmation Samples: soil and sediment samples collected from the base and walls of the excavation by the Departmental Representative to confirm that the remedial objectives for the Work have been met.

1.2.6. Contaminated Material: material where substances occur at concentrations that: (i) are above background levels and pose, or are likely to pose, an immediate or long-term hazard to human health or the environment, or (ii) exceed the levels specified in policies and regulations. Includes Hazardous Waste Quality and Waste Quality. Does not include Non-Contaminated Quality material. Relevant regulations, unless otherwise in accordance with the Contract or as directed by the Departmental Representative, include:

1.2.6.1. Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines*, the CCME *Canada-wide Standard for Petroleum Hydrocarbons (PHC) in Soil*, and the Federal Contaminated Sites Action Plan (FCSAP) *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*.

1.2.6.2. BC *Hazardous Waste Regulation*, BC *Contaminated Sites Regulation*, and BC *Approved Water Quality Guidelines*.

1.2.6.3. Yukon *Special Waste Regulation*, Yukon *Contaminated Sites Regulation*.

1.2.7. Contaminated Soil Extents: lateral and vertical extents of Contaminated Soil to be remediated to meet remediation objectives. Does not include Topsoil, Overburden, or other Non-Contaminated Quality Soil excavated incidentally. Extents on Drawings are approximate and may vary based on field observations or Confirmation Samples.

1.2.8. Contaminated Water Treatment Plant: an existing offsite facility located in Canada that is designed, constructed and operated for the handling or processing of Contaminated Water in such a manner as to change the physical, chemical or biological character or composition of the water to lower than the site-specific remedial objective, Discharge Approval, and in compliance with all regulations.

1.2.9. Contemplated Change Notice: PWGSC form issued by the Departmental Representative to the Contractor requesting Contractor to provide a quote, which may result in a Change Order.
1.2.10. Contract: see General Conditions.
1.2.11. Contract Amount: see General Conditions.
1.2.12. Contractor: see General Conditions.
1.2.13. Departmental Representative: see General Conditions.
1.2.14. Discharge Approval: permit, certificate, approval, license, or other required form of authorization issued by appropriate federal agency, province, territory, or municipality having jurisdiction and authorizing discharge.
1.2.15. Disposal Facility: an offsite facility specifically used to introduce Contaminated Material into the environment for the purpose of final burial.
1.2.16. 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 environment aesthetically, culturally and/or historically.
1.2.17. Environmental Protection: prevention, control, mitigation, and restoration of pollution and habitat or environmental 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; vibrations; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
1.2.18. Environmental Protection Plan: plan developed by the Contractor to ensure Environmental Protection and prevent Environmental Pollution and Damage identifying all environmental risks and mitigation measures, including: personnel requirements, emergency contacts, Environmental Protection methods, procedures, and equipment, and emergency response including a Spill Control Plan.
1.2.19. Environmental Quality Criteria: numerical material criteria used on Site based on Standards and/or Guidelines specified by the Canadian Council of Ministers of the Environment and/or BC *Contaminated Sites Regulation* or Yukon *Contaminated Sites Regulation*, as applicable, using appropriate Land Use and Site-specific Factors.
1.2.20. Excavation Extents: lateral and vertical extents of Soil to be excavated to meet Contaminated Soil Extents. Includes Overburden. Extents on Drawings are approximate and may vary based on field observations or Confirmation Samples.
1.2.21. Extension of Time: see General Conditions.
1.2.22. Extension of Time on Contracts: PWGSC form requesting an Extension of Time.
1.2.23. Facility Authority:
1.2.23.1. For facilities within provincial or territorial jurisdiction: the relevant provincial or territorial ministry.

1.2.23.2. For facilities on First Nation reserve land in Canada not subject to the First Nation Land Management regime: Indigenous and Northern Affairs Canada.

1.2.23.3. For facilities on First Nations land in Canada subject to the First Nation Land Management Act regime: the relevant First Nation Council. Documentation must be provided that the facility is on land subject to the First Nation Land Management Act regime.

1.2.23.4. For facilities in the United States of America: either or both of the Environmental Protection Agency and the relevant State, as appropriate.

1.2.24. Final Completion: see General Conditions.

1.2.25. Hazardous Waste Quality: Contaminated material which meets the applicable Regulatory definition of Hazardous Waste.

1.2.26. Land Treatment Facility (LTF): equivalent of Soil Treatment Facility.

1.2.27. Landfill Facility: an offsite facility specifically used to introduce Non-Contaminated Quality Soil into the environment for the purpose of final burial.

1.2.28. Master Plan: baseline schedule determined by Contractor compliant with Schedule Requirements. Duration for any portion of the Work based on Master Plan.

1.2.29. Materials Source Separation Program: consists of a series of ongoing activities to separate reusable and recyclable waste into categories from other types of waste at point of generation.

1.2.30. Non-Contaminated Quality: material that does not exceed applicable Environmental Quality Criteria.

1.2.31. Onsite Soil Treatment Facility (Onsite STF): a facility constructed and operated on property under the control of PWGSC specifically used to bioremediate Contaminated Soil originating only from federal Sites.

1.2.32. Overburden: Non-Contaminated Quality Soil excavated incidentally as required above or adjacent to Contaminated Soil. Includes Topsoil.

1.2.33. Oversize Debris: Waste that is required to be excavated and is: larger than 1 cubic metre or larger than 2 metres in one dimension, cannot be removed with a typical excavator with bucket, and requires the use of special equipment (e.g., saws, hydraulic cutters, excavator hammers, vibratory pile extractors). Includes bedrock, boulders, pilings, pipes, building structures, and concrete foundations.

1.2.34. Prime Contractor: see General Conditions “Contractor”, BC Occupational Health and Safety Regulations “Prime Contractor”, and Yukon Occupational Health and Safety Act “Constructor”.

1.2.35. Progress Payment: see General Conditions.

1.2.36. Progress Survey: Survey conducted using equipment such as tape measurements, non-differential GPS, theodolite, or truck counts. Not a survey conducted by a Qualified Professional Surveyor.

1.2.37. PWGSC: Public Works and Government Services Canada (also known as PSPC: Public Services and Procurement Canada). Representative of Canada with control of the Site.

1.2.38. Qualified Professional: a person who is registered in relevant jurisdiction (BC or Yukon, as appropriate) with his or her appropriate professional

college/association, acts under that professional college/association's code of ethics, and is subject to disciplinary action by that professional college/association, and through suitable education, experience, accreditation and knowledge can be reasonably relied on to provide advice within his or her area of expertise. Only full membership will be considered to be a Qualified Professional (i.e. no "in training" designations). Includes:

1.2.38.1. Association of the Chemical Profession of British Columbia.
1.2.38.2. British Columbia College of Applied Biology.
1.2.38.3. British Columbia Institute of Agrologists.
1.2.38.4. Engineers and Geoscientists British Columbia.
1.2.38.5. Engineers Yukon.

1.2.39. Qualified Professional Surveyor: a person who is registered in relevant jurisdiction (BC, Yukon, or Canada, as appropriate) with his or her appropriate professional college/association, acts under that professional college/association's code of ethics, and is subject to disciplinary action by that professional college/association, and through suitable education, experience, accreditation and knowledge can be reasonably relied on to provide advice within his or her area of expertise. Only full membership will be considered to be a Qualified Professional (i.e. no "in training" designations). Includes:

1.2.39.1. Association of British Columbia Land Surveyors.
1.2.39.2. Association of Canada Lands Surveyors.
1.2.39.3. Applied Science Technologists & Technicians of British Columbia registered in Site Improvements Surveys.
1.2.39.4. Engineers and Geoscientists British Columbia.

1.2.40. Quote: Quotation for Design Change or Additional Work. Contractor’s cost proposal issued to the Departmental Representative as per the relevant Contemplated Change Notice. May be either a Lump Sum Arrangement or a Unit Price Arrangement.

1.2.41. Remediation by Excavation: complete excavation of Contaminated Soil and incidental Non-Contaminated Quality Soil to the Site boundaries for the purpose of remediating the Site to meet numerical standards. Includes full treatment and disposal. Does not include risk assessment or risk management of material onsite. Does not include encapsulation or solidification in place.

1.2.42. Request For Information: notice or other communication issued by the Contractor to the Departmental Representative.

1.2.43. Sewage: liquid waste which is not suitable for direct discharge to the environment, and which must be either treated offsite or discharged to a sanitary sewer. Includes water from hand basin, shower, personal hygiene facilities, or other liquid waste from sanitary facilities.

1.2.44. Site: work area available to Contractor according to Drawings. Does not include shared or public areas, including common roads.

1.2.45. Soil: unconsolidated mineral or organic material, rock, fill, and sediment deposited on land, and other solid material excavated incidentally. Includes Topsoil and Overburden. Includes cleared and grubbed vegetation, litter,

rubbish, debris, cobbles, boulders, excess construction material, lumber, steel, plastic, concrete, and asphalt and other waste material.

1.2.46. Soil Treatment Facility: facility for bioremediating contaminated soil. Includes Treatment Cells, Staging Cells, and ancillary Access Roads.

1.2.47. Special Waste: Yukon equivalent of Hazardous Waste.

1.2.48. Subcontractor: see General Conditions.

1.2.49. Submit/Submittals: documents from the Contractor to the Departmental Representative as: required by Contract; stipulated in permit, certificate, approval, license, or any other form of authorization; by convention or industry practice. Submittals are final only after review and accepted in writing by Departmental Representative.

1.2.50. Substantial Performance: see General Conditions.

1.2.51. Superintendent: see General Conditions

1.2.52. Supplier: see General Conditions.

1.2.53. Topsoil: Overburden excavated incidentally above Contaminated Soil Extents that is a surface organic layer to facilitate vegetation growth.

1.2.54. Transfer/Interim Storage Facility: an offsite facility specifically used to transfer or short term storage Contaminated Soil during offsite transport.

1.2.55. Treatment Facility: an offsite facility specifically used to treat Contaminated Soil or Contaminated Water. Treatment Facility may treat soil, sediment, or water. All material Treated at a Treatment Facility is still considered Contaminated Material in the Contract. All material Treated at a Treatment Facility must be Disposed at a Disposal Facility.

1.2.56. Waste Quality: material that exceeds applicable Environmental Quality Criteria.

1.2.57. Wastewater: Non-Contaminated Quality Water that is not Sewage.

1.2.58. Work: see General Conditions.

1.3. Action and Informational Submittals

1.3.1. Permits: at least 10 Working Days prior to mobilization to Site, Submit copies of all permits, certificates, approvals, or any other form of authorizations and all reporting required.

1.3.2. Daily Work Records: at the end of each shift Submit daily Work records, during onsite Work. Include:

1.3.2.1. Quantities for each Description of Work identified in the Unit Price Table and Change Orders.

1.3.2.2. Description of Work performed.

1.3.2.3. Current Site conditions.

1.3.2.4. General information including: date, time shift started and ended, Subcontractor(s) onsite, Health and Safety items, and Environmental Protection items.

1.3.2.5. Signature of Superintendent.

1.3.3. Cash Flow: with each Progress Payment, Submit a cash flow forecast. Include:

1.3.3.1. Calculation of planned cost versus actual cost and schedule forecasting and cash flow projections on a monthly basis, indicating anticipated value of

future Progress Payments, for each Description of Work identified in the Unit Price Table.

1.3.3.2. Progress Payments will not be processed until cash flow has been accepted by the Departmental Representative.

1.3.4. Coordination Meeting Minutes and Drawings: at least 5 Working Days prior to relevant Work commencing, Submit final meeting minutes and drawings from coordination with Subcontractors.

1.3.5. Quality Management Plan: within 10 Working Days after Contract award, Submit a quality management plan. Include:

1.3.5.1. Details on planned review, inspection and testing to provide Quality Assurance and Quality Control for the Work.

1.3.5.2. Subcontractors responsible for review, inspection and testing.

1.3.5.3. Schedule of submittals of review, inspection and testing results.

1.3.6. Review, Inspection, and Testing Results: within 5 Working Days of receipt, Submit all results of reviews, inspection, and testing performed as part of the Work, including laboratory reports and sampling chains of custody.

1.3.7. Weigh Scale Certification: at least 5 Working Days prior to use, Submit a copy of the Measurement Canada, Weigh Scale Certification for any onsite or offsite weigh scale used during excavation, transportation, treatment or disposal.

1.3.8. Weigh Scale Slips: within 10 Working Days of measurement, Submit all onsite and offsite weigh scale slips for material.

1.4. Laws and Regulations

1.4.1. Generally, provincial, territorial and municipal laws, regulations, bylaws and other requirements do not apply to federal lands, works or undertakings. Soil, sediment, water or other materials that are removed from federal lands may become subject to provincial, territorial or municipal laws and regulations.

1.4.2. Provincial, territorial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term "standards" is used in this part in order to maintain consistency in terminology throughout this document, and does not imply that standards contained in provincial, territorial or municipal laws and regulations apply on Federal lands, activities or undertakings.

1.5. Green Requirements

1.5.1. Use only environmentally responsible green materials/products with no Volatile Organic Compounds (VOC) emissions or minimum VOC emissions of indoor off-gassing contaminants for improved indoor air quality – subject of acceptance of Submittal of Materials Safety Data Sheet (MSDS) Product Data.

1.5.2. Use materials/products containing highest percentage of recycled and recovered materials practicable – consistent with maintaining cost effective satisfactory levels of competition.

1.5.3. Adhere to waste reduction requirement for reuse or recycling of waste materials, not including soil or water, thus diverting materials from Landfill Facility.

1.6. Smoking Environment

1.6.1. Smoking on the Site is not permitted.

1.7. System of Measurement

1.7.1. The metric system of measurement (SI) will be employed on the Contract.

1.8. Documents Required

1.8.1. Maintain 1 copy each of the following posted at the job Site:

1.8.1.1. General Conditions.
1.8.1.2. Drawings.
1.8.1.3. Specifications.
1.8.1.4. Addenda or other modifications to Contract.
1.8.1.5. Change orders.
1.8.1.6. Current Work schedule.
1.8.1.7. Reviewed and final Shop Drawings Submittals.
1.8.1.8. One set of record Shop Drawings and Specifications for “as-built” purposes.
1.8.1.9. Field and laboratory test reports.
1.8.1.10. Reviewed and accepted Submittals.
1.8.1.11. Health and Safety documents, including all daily toolbox meetings, Notice of Project, and utility clearances.
1.8.1.12. Environmental Protection Plan.
1.8.1.13. Final Meeting Minutes, Agendas and associated attachments.
1.8.1.14. Permits and other approvals.

1.9. Setting out of Work

1.9.1. Assume full responsibility for and execute complete layout of Work to locations, lines and elevations according to Drawings.
1.9.2. Provide devices needed to layout and construct Work.
1.9.3. Supply such services and devices in accordance with the Contract to facilitate Departmental Representative’s inspection of Work.

1.10. Works Coordination

1.10.1. Coordinate Work of Subcontractors.

1.10.1.1. Designate one person to be responsible for review of Contract and Shop Drawings and managing coordination of Work.

1.10.2. Convene meetings between Subcontractors whose Work interfaces and ensure awareness of areas and extent of interface required.

1.10.2.1. Provide each Subcontractor with complete Drawings and Specifications for Contract, to assist them in planning and carrying out their respective work.
1.10.2.2. Develop coordination drawings when required, illustrating potential interference between Work of various trades and distribute to affected parties.
1.10.2.3. Facilitate meeting and review coordination drawings. Ensure Subcontractors agree and sign off on coordination drawings.
1.10.2.4. Publish minutes of each meeting.

1.10.2.5. Submit a copy of coordination drawings and meeting minutes as directed by the Departmental Representative.
1.10.3. Submit Shop Drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
1.10.4. Work coordination:
1.10.4.1. Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
1.10.4.2. Ensure that each trade provides all other trades reasonable opportunity for Final Completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed Work.
1.10.4.3. Ensure disputes between Subcontractors are resolved.
1.10.5. Failure to coordinate Work is responsibility of Contractor.

1.11. Record Keeping

1.11.1. Advisory: Contractual correspondence from the Departmental Representative to the Contractor. Does not include Change Documents. To be sequentially numbered. Include cross references to applicable Request For Information. The status of the Contractor, including the function of Prime Contractor, must not change by reason of any Advisory.
1.11.2. Request For Information: Contractual correspondence from Contractor to the Departmental Representative. Includes Submittals. Does not include Change Documents. Must be sequentially numbered. Include cross references to applicable Advisory. Status of the Contractor, including the function of Prime Contractor, must not change by reason of any Request For Information.
1.11.3. Maintain adequate records to support information provided to Departmental Representative.
1.11.4. Maintain asbestos waste shipment records or other Hazardous Waste Manifests for minimum of 3 years from date of shipment or longer period required by applicable law or regulation.
1.11.5. Maintain bills of ladings for minimum of 300 Working Days from date of shipment or longer period required by applicable law or regulation.

1.12. Change Documents

1.12.1. Change Documents do not relieve Contractor of any obligation.
1.12.2. Change Documents do not change the Contractor’s responsibility for sequencing, methods and means.
1.12.3. Change Documents do not change by any reason the status of the Contractor, including the function of Prime Contractor or as supervisor.
1.12.4. Change Documents include:
1.12.4.1. Change Order: There may be a change to the Contract Amount by reason of any Change Order. No Extension of Time for completion of the Work by reason of any Change Order.
1.12.4.2. Contemplated Change Notice: No increase to the Contract Amount by reason of any Contemplated Change Notice. No Extension of Time for completion of the Work by reason of any Contemplated Change Notice.

1.12.4.3. Extension of Time on Contracts: There may be a change to the completion of the Work by reason of an Extension of Time on Contracts. No increase to the Contract Amount by reason of any Extension of Time on Contracts.

1.12.4.4. Quote: No increase to the Contract Amount by reason of any Quote. No Extension of Time for completion of the Work by reason of any Quote.

1.13. Inspection

1.13.1. Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Site, allow access to such Work whenever it is in progress. Work at locations other than Site includes offsite Facilities.

1.13.2. Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative or applicable law.

1.13.3. If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

1.13.4. Departmental Representative will order 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.

2. PART 2 - PRODUCTS

2.1. Asbestos Containing Materials Prohibition

2.1.1. Any material containing any degree of asbestos is banned from use in any and all sites, designs and projects.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Pre-Mobilization Submittals will be paid in accordance with lump sum price established for all Preconstruction Meetings, final design, planning, health and safety, and other Submittals in accordance with the Contract or required and accepted by the Departmental Representative as in accordance with the Contract prior to mobilization to Site. Also includes Preconstruction Condition Survey and Preconstruction As-Built Documents.

1.1.2. Mobilization will be paid in accordance with lump sum price established for mobilizing all necessary equipment, materials, supplies, facilities, and personnel associated with the Works to the Site.

1.1.3. Site Preparation will be paid in accordance with lump sum price established to prepare the Site for planned construction works. Includes clearing and grubbing, demolition, temporary removal of existing infrastructure, utility location, rerouting, and protection, and construction of temporary onsite access roads. Also includes removal of any debris, incidental or generated material.

1.1.4. Standby Time will be paid in accordance with unit rate price established for time when construction Work is unable to proceed and that is directly attributable to any neglect or delay that occurs after the date of the Contract on the part of the Departmental Representative in providing any information or in doing any act that the Contract expressly requires the Departmental Representative. Measurement as recorded time by Departmental Representative. Includes machinery and labour standby costs. Does not include items covered by Site Facilities Operation. Standby Time may be pro-rated based on hours of work. Make all efforts to minimize impacts due to delays caused by the Departmental Representative, including re-sequencing Work. Provide documentation of a sufficient description of the facts and circumstances of the occurrence to enable the Departmental Representative to determine whether or not the Standby Time is justified. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work for reviews, sampling, or other work conducted by the Departmental Representative that have time allowances in accordance with the Contract.

1.1.5. Site Restoration will be paid in accordance with the lump sum price established to restore the Site to make suitable for post-Work use according to Drawings. Includes re-establishment of pre-existing infrastructure, final grading, topsoil reuse or supply and placement, revegetation with native seed, and deconstructing and removal from Site all temporary facilities and removal of any incidental or generated material.

1.1.6. Demobilization will be paid in accordance with lump sum price established for demobilizing all equipment and personnel associated with the Works from the Site. Includes decontaminating all equipment prior to removal from Site.

1.1.7. Closeout Submittals will be paid in accordance with lump sum price established for Final Site Inspection (for Certificate of Completion purposes), Closeout

Meetings, Postconstruction Condition Survey and final As-Built Documents as directed by the Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Preconstruction As-Built Documents: at least 5 Working Days prior to commencing any disturbance, Submit drawings identifying all infrastructure, including utilities, on the Site. Update drawings as directed by the Departmental Representative.

1.3.2. Preconstruction Condition Survey: at least 5 Working Days prior to commencing any disturbance, Submit a report documenting condition of buildings, utilities, roadways, pathways, landscaping, significant vegetation, and other infrastructure both onsite and adjacent sites that may be potentially impacted by the Work.

1.3.3. Breakdown of Lump Sum Prices: at least 5 Working Days prior to submitting the first Progress Payment, Submit a breakdown of the Contract lump sum prices including labour, material and time, in detail as directed by the Departmental Representative and aggregating Contract Amount.

1.3.4. As-Built Documents: within 10 days of completing site Work, provide Drawings showing all Work, including infrastructure, utilities, excavation limits, backfill material limits and compaction, final grades, and any other improvements or reinstatements.

1.3.5. Postconstruction Condition Survey: within 10 days of completing site Work, Submit a report documenting condition of buildings, utilities, roadways, pathways, landscaping, significant vegetation, and other infrastructure both onsite and adjacent sites that may be potentially impacted by the Work.

1.3.6. Closeout Documents: within 20 Working Days of Final Completion of Site Restoration, Submit Completion Documents.

1.4. Mobilization and Demobilization

1.4.1. Move all personnel, equipment, supplies, and incidentals to and from the Site.

1.5. Site Preparation

1.5.1. Protection:

1.5.1.1. Protect existing features with temporary barriers and enclosures as required by applicable local regulations.

1.5.1.2. Protect natural and man-made features required to remain undisturbed. Protect existing trees from damage unless otherwise required or located in an area to be occupied by new construction.

1.5.1.3. Protect buried utilities that are required to remain undisturbed or in continuous operation during the Work, as identified on Drawings.

1.5.1.4. Provide temporary structures to divert flow of surface water as appropriate.

1.5.2. Security and Safety:

1.5.2.1. Provide safety measures to ensure worker and public safety.
1.5.2.2. Ensure Site is secure during onsite Work, provide, install, and remove fencing, temporary hoarding, and other security measures as appropriate. Provide onsite personnel security 24 hours/ day 7 days/week as appropriate or in accordance with Contract.
1.5.2.3. Site including all construction areas should be secured with locked fencing, temporary hoarding and security personnel as required.

1.6. Existing Services

1.6.1. Size, depth and location of existing utilities and structures as specified are for guidance only. Completeness and accuracy are not guaranteed.
1.6.2. Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative. All utilities entering Site must be confirmed prior to subsurface disturbance (i.e. do not rely on as-built documents). As appropriate, confirm locations of buried utilities by independent utility locator and using hand test excavations or hydrovac methods.
1.6.3. Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.
1.6.4. Maintain and protect from damage all utilities and structures encountered, unless Work involves temporarily breaking, rerouting, or connecting existing utilities.
1.6.5. Where Work involves temporarily breaking, rerouting, or connecting into existing utilities, obtain permission from utility companies of intended interruption of services, and carry out Work at times determined by the authorities having jurisdiction.
1.6.6. Submit schedule to and obtain approval for any shutdown or closure of active service. Adhere to schedule accepted by Departmental Representative and provide notice to affected parties.
1.6.7. Provide temporary services as required to maintain critical systems.
1.6.8. Where unknown utilities are encountered, immediately verbally notify Departmental Representative and confirm findings in writing.

1.7. As-Built Documents

1.7.1. The Departmental Representative will provide paper copies of the Construction Documents as per the Special Instructions to Bidders. Electronic copies of data and drawings in their native format are available on request.
1.7.2. As directed by Departmental Representative or as required by Contractor, preconstruction survey to be completed by Contractor's Qualified Professional Surveyor to confirm existing site including property lines, structures, infrastructure, surface elevation contours, physical features, and other relevant items.
1.7.3. As Work progresses, maintain accurate records to show all deviations from the Contract. Note changes as they occur on as-built Specifications, Drawings and Shop Drawings.

1.7.4. Drawings and Shop Drawings: legibly mark each item to record actual construction, including:
1.7.4.1. Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
1.7.4.2. Field changes of dimension and detail.
1.7.4.3. Changes made by change orders.
1.7.4.4. Details not on original Drawings.
1.7.4.5. References to related Shop Drawings and modifications.
1.7.5. Contract Specifications: legibly mark each item to record actual workmanship of construction, including:
1.7.5.1. Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
1.7.5.2. Changes made by addenda and change orders.
1.7.6. As-built information:
1.7.6.1. Record changes in red ink.
1.7.6.2. Mark on 1 set of Drawings, Specifications and Shop Drawings at Final Completion of project and, before final inspection, neatly transfer notations to second set.
1.7.6.3. Submit 1 set in editable AutoCAD file format with all as-built information.
1.7.6.4. Submit all sets as directed by the Departmental Representative.
1.7.7. As required, surveying to be completed by Contractor's Qualified Professional Surveyor for as-built documents.

1.8. Pre-existing Stockpile or Onsite Soil Treatment Facility Preparation

1.8.1. As required, prior to working soil in pre-existing stockpile or Onsite Soil Treatment Facility:
1.8.1.1. Remove vegetation that could potentially damage liner, including roots.
1.8.1.2. Inspect berms. Grade or place material to maintain height and integrity of berms.
1.8.1.3. Inspect granular base protective layer of liner. Grade base layer to allow uniform slope to sump. Notify Departmental Representative if less than 0.5 m thick at any location.
1.8.1.4. Inspect visually liner for damage, including both the base and the berms. Excavate protective base layer in suspect areas (e.g. depressions that may be due to piping through a liner hole or areas where previous excavations may have led to a liner tear) to inspect liner for damage. Notify Departmental Representative of any significant damage.
1.8.1.5. Make good repairs of any pre-existing damage to liner, both berms and base. Be prepared to repair a minimum of 10 square meters of liner or as shown on Drawings.
1.8.1.6. Pump any collected or sump water from pre-existing stockpile or Onsite Soil Treatment Facility. Treat or otherwise discharge water as required according to Contract or as directed by Departmental Representative.
1.8.1.7. Grade surface of soil to allow stockpiling or bioremediation activities.

1.9. Onsite Access Roads

1.9.1. Maintain onsite access roads as follows:

1.9.1.1. Obtain permission to use existing onsite access roads or to construct temporary roads.

1.9.1.2. Maintain and clean roads for duration of Work, keep dry and free of mud.

1.9.1.3. Repair damage incurred from use of roads.

1.9.1.4. Provide photographic documentation of roads used by construction vehicles before, during and after Work.

1.9.1.5. Clean onsite access roads as directed by the Departmental Representative.

1.10. Site Restoration

1.10.1. Final site grades must be within 5 cm of pre-existing grades before Work commenced, unless otherwise specified.

1.10.2. Re-establish pre-existing drainage, unless otherwise specified.

1.10.3. Re-establish topsoil reusing existing stripped topsoil. If insufficient existing topsoil, import additional topsoil as required. Imported topsoil must, at a minimum, contain: between 50% and 70% sand, less than 25% silt and clay, and between 4% and 15% organic matter (dry weight basis) unless otherwise identified according to Drawings.

1.10.4. Clean permanent access roads of contamination resulting from project activity as required or as directed of Departmental Representative, with no increases to Contract Amount or Extension of Time for completion of the Work.

1.10.5. Upon Final Completion of Work, remove Non-Contaminated Quality Soil and Debris, trim slopes, and correct defects as directed by the Departmental Representative.

1.10.6. Protect newly graded areas from traffic and erosion and maintain free of trash or debris until demobilization is completed and accepted by the Departmental Representative.

1.10.7. Reinstate pre-existing utilities and other infrastructure to original location and condition, meeting current standards, codes, and other requirements, unless otherwise identified according to Drawings or as directed by the Departmental Representative.

1.10.8. Reinstate surface to pre-existing conditions, including surface material (e.g. vegetation, gravel, pavement), unless otherwise identified according to Drawings or as directed by the Departmental Representative.

1.10.9. Seeding, to be consistent with *Canadian Landscape Standards* for lawns or current version of BC Ministry of Transportation and Infrastructure *Standard Specifications for Highway Construction* unless otherwise identified according to Drawings.

1.11. Completion Documents

1.11.1. Submit as directed by the Departmental Representative, a written certificate that the following have been performed:

1.11.1.1. Work has been completed, and inspected and accepted by the Departmental Representative, in accordance with the Contract.

1.11.1.2. Treatment and Disposal of treatable soils have been completed and Disposal of all other soils has been completed.

1.11.1.3. Damage has been repaired, deficiencies have been completed, missing items have been provided, and non-conformance has been corrected, in the opinion of the Departmental Representative.

1.11.1.4. Contractor's Qualified Professional report documenting backfilling has met all requirements of the Contract.

1.11.2. Defective products will be rejected, regardless of previous inspections. Replace defective products.

1.11.3. Prepare all documentation required as part of any permits or other authorizations obtained or otherwise the responsibility of the Contractor.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Preconstruction Meeting Minutes: within 2 Working Days of the Preconstruction Meeting, Submit meeting minutes.

1.3.2. Progress Meeting Minutes: within 2 Working Days of a Progress Meeting, Submit meeting minutes. Submit revised minutes within 2 Working Days of receiving comments by Departmental Representative.

1.3.3. Information for Progress Meetings: at least 2 Working Days prior to scheduled Progress Meetings, Submit all information in accordance with the Contract for Progress Meetings. Include:

1.3.3.1. Agenda for the proposed Progress Meeting.

1.3.3.2. Updated Project Schedule.

1.3.3.3. Copies of transport manifests and disposal receipts for all materials removed from Site.

1.3.3.4. Other information as directed by the Departmental Representative or relevant to agenda for upcoming progress meeting.

1.3.4. Final Site Inspection: within 2 Working Days of the Final Site Inspection, Submit meeting minutes.

1.3.5. Closeout Meetings: within 2 Working Days of the Closeout Meeting, Submit meeting minutes.

1.4. Administrative

1.4.1. Schedule and administer project meetings throughout the progress of the Work weekly and at the call of the Departmental Representative.

1.4.2. Prepare agenda for meetings.

1.4.3. Submit written notice with agenda of each meeting 2 Working Days in advance of meeting date as directed by the Departmental Representative.

1.4.4. Provide physical space and make arrangements for meetings, or arrange for teleconference meetings, as directed by Departmental Representative.

1.4.5. Preside at meetings.

1.4.6. Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

1.4.7. Maintain records of meeting minutes for a minimum of 2 years after Work is completed.

1.4.8. Representative of Contractor, Subcontractor(s) and Supplier(s) attending meetings must be qualified and authorized to act on behalf of party each represents.

1.5. Preconstruction (Kickoff) Meeting

1.5.1. Within 5 Working Days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.

1.5.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.

1.5.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.

1.5.4. Agenda to include:

1.5.4.1. Appointment of official representative of participants in the Work, including Contractor's Superintendent and Departmental Representative.

1.5.4.2. Schedule of Work including Master Plan.

1.5.4.3. Schedule of Submittals including premobilization Submittals including Insurance, Contract Security, Health and Safety Plan, and Environmental Protection Plan.

1.5.4.4. Requirements for temporary facilities.

1.5.4.5. Site security, Health and Safety, Environmental Protection, coordination with other Site users including consultants and other contractors.

1.5.4.6. Change orders, procedures, approvals required, administrative requirements.

1.5.4.7. Monthly Progress Payments, administrative procedures, hold backs.

1.5.4.8. Appointment of inspection and testing agencies or firms.

1.5.4.9. List of Subcontractor(s).

1.6. Progress Meetings

1.6.1. During course of Work schedule progress meetings weekly subject to approval by Departmental Representative.

1.6.2. Contractor, Superintendent, major Subcontractor(s) involved in Work, and Departmental Representative are to be in attendance.

1.6.3. Agenda to include:

1.6.3.1. Review and acceptance of minutes of previous meeting.

1.6.3.2. Review health and safety, including incidents, near misses, and corrective measures.

1.6.3.3. Review Environmental Protection, including incidents, near misses, and corrective measures.

1.6.3.4. Review contractual compliance.

1.6.3.5. Review regulatory compliance.

1.6.3.6. Review communications, problems or concerns with community.

1.6.3.7. Review of Work progress since previous meeting.

1.6.3.8. Field observations, problems, conflicts.

1.6.3.9. Updated progress schedule detailing activities planned over next 2 week period. Include review of progress with respect to previously established dates for starting and stopping various stages of Work.

1.6.3.10. Problems which impede construction schedule.

1.6.3.11. Corrective measures and procedures to regain projected schedule.
1.6.3.12. Revision to construction schedule.
1.6.3.13. Progress schedule, during succeeding Work period.
1.6.3.14. Review submittal schedules: expedite as required.
1.6.3.15. Maintenance of quality standards.
1.6.3.16. Quantities of material transported, treated, and disposed.
1.6.3.17. Review proposed changes for effect on construction schedule and on Final Completion date.
1.6.3.18. Other business.
1.6.4. Submit draft Progress Meeting Minutes for review and comment by Departmental Representative. Incorporate comments into final Progress Meeting Minutes.

1.7. Toolbox Meetings

1.7.1. During the course of the Work, schedule daily toolbox (tailgate) meetings at the start of each Work shift. Multiple meetings are required if the Contractor works multiple shifts within a 24-hour period.
1.7.2. All on Site workers to attend, including Contractor, Superintendent, major Subcontractor(s), and environmental consultants. Departmental Representative may attend.
1.7.3. Agenda to include:
1.7.3.1. Planned Work activities and environmental considerations for that shift, including hazards, mitigation measures, and emergency procedures.
1.7.3.2. Review previous relevant incident or near-miss reports, both from Site and other Sites.
1.7.3.3. Coordination activities, and roles and responsibilities, required between Contractor, Subcontractor(s), Departmental Representative, other contractor(s) including environmental consultant, site users, and protection of general public and offsite resources.
1.7.3.4. Health and Safety items, including PPE requirements.
1.7.3.5. Environmental Protection items, including emergency equipment.

1.8. Final Site Inspection

1.8.1. Within 5 Working Days of completion of Site Works but prior to Demobilization, request a meeting on Site to review the Site.
1.8.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.
1.8.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.
1.8.4. Agenda to include:
1.8.4.1. Inspect removal of all temporary equipment, materials, supplies, and facilities.
1.8.4.2. Inspect final surface grades.

1.8.4.3. Inspect final vegetation.
1.8.4.4. Inspect permanent facilities for performance and damage.
1.8.4.5. Document all damage, deficiencies, missing items, and non-conformance.
1.8.5. If required, and in the opinion of the Departmental Representative, perform another Final Site Inspection after resolving all documented damage, deficiencies, missing items, and non-conformance.

1.9. Closeout Meeting

1.9.1. Within 10 Working Days of completion of the Work, request a meeting to review the project.
1.9.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.
1.9.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.
1.9.4. Agenda to include:
1.9.4.1. Review Certificate of Completion.
1.9.4.2. Review final payment.
1.9.4.3. Identify lessons learned.
1.9.4.4. Perform Contractor Performance Evaluation Report Form.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Master Plan: within 10 Working Days after Contract award, Submit a Master Plan.

1.3.2. Schedule of Interruption of Services: at least 5 Working Days prior to any shutdown or closure of active utilities or facilities Submit a schedule identifying type of service and dates of shutdown or closure.

1.3.3. Project Schedule and Updates: with Progress Payment, Submit a Project Schedule updated as appropriate. Progress Payment submission is incomplete without an updated Project Schedule acceptable to Departmental Representative.

1.4. Requirements

1.4.1. Ensure Master Plan and detail Project Schedules are practical and are compliant with Schedule Requirements.

1.4.2. Plan to complete Work in accordance with prescribed milestones and time frame.

1.4.3. Limit activity durations to maximum of approximately 10 Working Days, to allow for progress reporting.

1.4.4. Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4.5. Include Work sequencing description and schedule:

1.4.5.1. Work Sequencing description must describe methods, means, and sequences to perform each major task.

1.4.5.2. Work Sequencing schedule must show on a Gantt chart, start, end and dependencies of each major task and also indicates Work to be performed in sequence and in parallel.

1.4.5.3. Major tasks includes all items identified on Unit Price Table.

1.5. Master Plan

1.5.1. Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

1.5.2. Departmental Representative will review and return revised schedules within 5 Working Days.

1.5.3. Revise impractical schedule and resubmit within 5 Working Days.

1.5.4. Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6. Project Schedule

1.6.1. Develop detailed Project Schedule as updates to Master Plan.

1.6.2. Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

1.6.2.1. Dates of commencement and completion of Work for each Description of Work identified on the Unit Price Table.

1.6.2.2. Dates of Submittals including Shop Drawings, product data, MSDS sheets and samples.

1.6.2.3. Dates of inspection and testing.

1.6.2.4. Final Completion date within the time period in accordance with the Contract, including Amendments.

1.7. Project Schedule Reporting

1.7.1. Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.

1.7.2. Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8. Project Meetings

1.8.1. Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

1.8.2. Weather related delays with their remedial measures will be discussed and negotiated

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Shop Drawings: at least 5 Working Days prior to commencing applicable Work, Submit Shop Drawings signed by a Contractor's Qualified Professional.

1.4. General

1.4.1. Submission details to be commensurate for type of Work and Site conditions. Details depend on Work performed and Contractor's methods, means, and sequences.

1.4.2. Contractor’s responsibility for errors and omissions in Submittals is not relieved by the Departmental Representative’s review of Submittals.

1.4.3. Notify Departmental Representative in writing at time of Submittals, identifying deviations from requirements of Contract and stating reasons for deviations.

1.4.4. Contractor’s responsibility for deviations in Submittals from requirements of Contract is not relieved by the Departmental Representative’s review of Submittals unless Departmental Representative gives written acceptance of specific deviations.

1.4.5. Make any changes in Submittals which Departmental Representative requires to be in accordance with the Contract and resubmit.

1.4.6. Notify Departmental Representative in writing, when resubmitting, of any revisions other than those directed by the Departmental Representative.

1.4.7. Do not proceed with Work until relevant Submittals are finalized and have been accepted.

1.4.8. Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to Submit in ample time is responsibility of Contractor.

1.4.9. 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. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

1.4.10. Verify field measurements and affected adjacent Work are coordinated.

1.4.11. Adjustments made on Submittals by the Departmental Representative will not result in an increase the Contract Amount nor an Extension of Time for completion of the Work.

1.4.12. Keep one final copy of each Submittal onsite.

1.5. Submission Requirements

1.5.1. Coordinate each Submittal with the requirements of the Work and the Contract. Individual Submittals will not be reviewed until:

1.5.1.1. Submittals are complete.

1.5.1.2. All related information is available.

1.5.2. Allow 10 Working Days for Departmental Representative's review of each Submittal, unless otherwise specified. No Standby Time charges or increases to Contract Amount or Extension of Time for Departmental Representative's review.

1.5.3. All Submittals are to be sent to Departmental Representative in duplicate as a hardcopy and in electronic format compatible with Departmental Representative's software.

1.5.4. Submittals must include:

1.5.4.1. Date and revision dates.

1.5.4.2. Project title and number.

1.5.4.3. Name and address of:

1.5.4.3.1. Subcontractor.

1.5.4.3.2. Supplier.

1.5.4.3.3. Manufacturer.

1.5.4.4. Signature of Superintendent, certifying approval of Submittals, verification of field measurements and in accordance with the Contract.

1.5.4.5. Contractor's Qualified Professional to sign and seal Submittals in accordance with the Contract or as required by the nature of the Submittal. Submittals to include at a minimum 1 hard copy of original ink sealed document.

1.5.4.6. Details of appropriate portions of Work as applicable.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Soil and Water Management Plan: within 10 Working Days after Contract award and prior to mobilization to Site, submit methods, means, and sequences for Contaminated Soil and Contaminated Water Management onsite for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include

1.3.1.1. Personnel and equipment decontamination.

1.3.1.2. Segregation of different Classifications are segregated.

1.4. Sequencing and Scheduling

1.4.1. Commence Work involving contact with Contaminated or potentially Contaminated Soil or Water after all applicable Environmental Protection procedures (including those identified in Contaminated Soil and Water Management Plan and Environmental Protection Plan) and facilities (including those identified in Site Layout) are operational and accepted by Departmental Representative.

1.4.2. Plan work sequencing and traffic patterns to prevent contamination of clean areas due to traffic or debris.

1.5. Drums

1.5.1. Provide, maintain, and operate drum staging pad as required.

1.5.2. Construct drum staging pad with sump capable of collecting leachate and rain runoff. Place impermeable liner that contours over top of berm, and collects leachate and runoff from staging pad which is conducted solely to sump on staging pad. Leachate is Contaminated Water.

1.5.3. Storage of solid or liquid waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

1.6. Personnel Decontamination Facility

1.6.1. Provide an area or areas close to the workers' changing facilities to enable workers and other personnel leaving areas such as exclusion area to remove deleterious and Contaminated Soils from boots, clothing and skin surfaces.

1.6.2. Be responsible for ensuring that all materials, chemicals, protective clothing, wash water and deleterious materials are collected, treated and disposed of in accordance with applicable environmental standards and regulations.

1.6.3. Personnel Decontamination Facility to be available for use by persons other than the Contractor's workers and Subcontractors, including federal employees, other contractor(s), and environmental agencies. Provide use of facilities to other persons.

1.7. Equipment Decontamination Facility

1.7.1. Prior to commencing Work involving equipment contact with potentially Contaminated Soil, construct equipment decontamination facilities to accommodate the largest potentially contaminated equipment onsite.

1.7.2. Collect and contain equipment decontamination wastewater and sediment. Transfer collected wastewater and sediment to treatment facilities accepted by Departmental Representative.

1.8. Equipment Decontamination

1.8.1. At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated rinsate generated.

1.8.2. If required, as directed by the Departmental Representative, use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in clean area before removing from Site or travelling on clean areas. Perform assessment as directed by the Departmental Representative to determine effectiveness of decontamination.

1.8.2.1. Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

1.8.2.2. Collect decontamination wastewater and sediment which accumulate in decontamination location. Treat collected wastewater as Contaminated Water. Manage decontamination sediment as Hazardous Waste Quality.

1.8.3. In the opinion of the Departmental Representative, each piece of equipment must be inspected by the Departmental Representative after decontamination and prior to travel on clean areas or demobilization from Site. Perform additional decontamination as required in the opinion of the Departmental Representative.

1.8.4. Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.9. Progress Decontamination

1.9.1. Decontaminate equipment after working in potentially contaminated Work areas and prior to subsequent Work or travel on clean areas.

1.10. Final Decontamination

1.10.1. Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially Contaminated Soil prior to demobilization from Site.

1.11. Contaminated Soil and Water Management

1.11.1. Remove all Contaminated Soil and Water within Work areas in accordance with the Contract and as directed by the Departmental Representative. Remove Non-Contaminated Quality Soil and Water incidental to the Work or as directed by the Departmental Representative.

1.11.2. Material and Water will be Classified by the Departmental Representative based on insitu results, field observations, field measurements, and/or ex-situ characterization. Departmental Representative responsible for Classification. Contractor cannot re-Classify material.

1.11.3. Handle (including Excavate, Transport, Treat, and Dispose) material separately into the classifications in accordance with the Contract or as directed by the Departmental Representative. Take necessary precautions to avoid mixing of different classifications. Do not blend, or mix and dilute, different material Classifications.

1.11.4. Contractor responsible for Transportation, Treatment, and Disposal based on Classification by Departmental Representative. Contractor responsible for material blended, or mixed and diluted, based on re-Classification by Departmental Representative. No increases to Contract Amount or Extension of Time due to material blended, or mixed and diluted.

1.11.5. Material characterization (e.g. sampling and testing) of parameters additional to information provided in Contract as required by the Contractor (e.g. for Transportation, Treatment Facility or Disposal Facility purposes) responsibility of Contractor (including more recent analytical results).

1.11.6. Material segregation additional to Contract as required for Transportation, Treatment Facility or Disposal Facility responsibility of Contractor.

1.12. Soil Stockpile Construction

1.12.1. Stockpile material within work area in locations identified by Departmental Representative.

1.12.2. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor's Site Layout.

1.12.3. Segregate Contaminated Soil into separate Classifications, and segregate Contaminated Soil from Non-Contaminated Quality Soil, into separate stockpiles to prevent cross-contamination.

1.12.4. Prevent precipitation into Stockpiles from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable cover during periods of Work stoppage including at end of each Working Day and as directed by the Departmental Representative.

1.12.5. Securely fasten covers over stockpiled material until material is loaded for transport.

1.12.6. Store excavated Non-Contaminated Quality Soil only on Non-Contaminated Quality surface areas. Ensure no contact between Non-Contaminated Quality Soil and Contaminated Soil.

1.12.7. Store excavated Contaminated Soil in temporary stockpiles.

1.12.7.1. Install impermeable liner (e.g. asphalt or minimum 20 mil (0.5 mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.

1.12.7.2. Cover stockpiled material when not being worked or sampled to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material. Cover to be impermeable (e.g. minimum 5 mil polyethylene) and securely fashioned to prevent blowing off.

1.12.7.3. Prevent Non-Contaminated Quality Water, including surface runoff water, from coming into contact with Contaminated Soil stockpiles.

1.12.8. Segregate different suspect material in discrete stockpiles to facilitate ex-situ characterization for Classification as directed by the Departmental Representative.

1.12.9. Assist Departmental Representative in collection of stockpile samples for exsitu characterization. Ex-situ characterization may take up to 5 Working Days, not counting the day the sample is collected. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Samples results provided within 5 Working Days, not counting the day the sample is collected.

1.12.10. Do not remove Contaminated Soil from stockpiles until exsitu characterization completed and as directed by Departmental Representative.

1.13. Stockpile or Onsite Soil Treatment Facility Loading

1.13.1. Place Contaminated Soil in Stockpiles or Onsite Soil Treatment Facility in locations and thicknesses according to Contract.

1.13.2. Soil cannot be placed within 1.5 m of the berms or sump to maintain adequate drainage and to avoid damaging the liner or geotextile material

1.13.3. Mechanical equipment cannot work within 1.5 m of the sump or berms.

1.13.4. Trucks are only to operate in Stockpiles or Onsite Soil Treatment Facility when there is a minimum of 1 m of soil present. Trucks should minimize or eliminate turning while in facility. Trucks cannot dump directly on liner but only on areas with 1 m of soil present and the dumped soil must remain 1.5 m from the sump and berms when placed.

1.13.5. Tracked equipment is only to operate in Stockpiles or Onsite Soil Treatment Facility when there is a minimum of 0.5 m of soil present.
1.13.6. Be responsible for, and make good repairs of, any damage to Stockpiles or Onsite Soil Treatment Facility caused by placement or amendment.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Submit to Departmental Representative Submittals listed for review.
1.3.2. Work affected by Submittal must not proceed until review is complete.
1.3.3. Submit the following:
1.3.3.1. Health and Safety Plan.
1.3.3.2. Copies of reports or directions issued by federal and provincial health and safety inspectors.
1.3.3.3. Copies of incident and accident reports.
1.3.3.4. Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
1.3.3.5. Emergency Procedures.
1.3.3.6. Notice of Project.
1.3.4. 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 Working Days after receipt of the plan.
1.3.5. If changes are required, revise the plan as appropriate and resubmit to Departmental Representative within 5 Working Days.
1.3.6. Submittal of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It will not:
1.3.6.1. Be construed to imply approval by the Departmental Representative.
1.3.6.2. Be interpreted as a warranty of being complete, accurate and legislatively compliant.
1.3.6.3. Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.4. References

1.4.1. Government of Canada:
1.4.1.1. Canada Labour Code - Part II.
1.4.1.2. Canada Occupational Health and Safety Regulations.
1.4.2. National Building Code of Canada (NBC):
1.4.2.1. Part 8, Safety Measures at Construction and Demolition Sites.
1.4.3. Canadian Standards Association (CSA) as amended:
1.4.3.1. CSA Z797-2009 Code of Practice for Access Scaffold.
1.4.3.2. CSA S269.1-1975 (R2003) Falsework for Construction Purposes.
1.4.3.3. CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.

1.4.4. National Fire Code of Canada 2010 (as amended):
1.4.4.1. Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
1.4.4.2. FCC No. 302, Standard for Welding and Cutting.
1.4.5. American National Standards Institute (ANSI):
1.4.5.1. ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
1.4.6. Province of British Columbia (as appropriate):
1.4.6.1. Workers Compensation Act Part 3-Occupational Health and Safety.
1.4.6.2. Occupational Health and Safety Regulation.
1.4.7. Yukon Territory (as appropriate):
1.4.7.1. Occupational Health and Safety Act.
1.4.7.2. Workers' Compensation Act.
1.4.7.3. Occupational Health and Safety Regulation

1.5. Regulatory Requirements

1.5.1. Comply with codes, acts, bylaws, standards and regulations applicable to the performance of the Work in accordance with the Contract to ensure safe operations at Site.
1.5.2. 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 direct on the course of action to be followed.

1.6. Worker's Coverage

1.6.1. Comply fully with the relevant Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the Final Completion of the Work.
1.6.2. Maintain Workers coverage as required by relevant acts and regulations during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.7. Compliance with Regulations

1.7.1. 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.
1.7.2. It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the Work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.8. Responsibility

1.8.1. Assume responsibility as the Prime Contractor for Work under this Contract.
1.8.1.1. Be responsible for health and safety of persons onsite, safety of property onsite and for protection of persons adjacent to Site and environment to extent that they may be affected by conduct of Work.

1.8.1.2. Comply with and enforce compliance by employees with safety requirements of Contract, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9. Health and Safety Coordinator

1.9.1. The Health and Safety Coordinator must:

1.9.1.1. Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the Site to perform Work.

1.9.1.2. Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.

1.9.1.3. Be on Site during execution of Work.

1.10. General Conditions

1.10.1. Provide safety barricades and lights around Site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

1.10.2. Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the Site:

1.10.2.1. Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

1.11. Project/Site Conditions

1.11.1. Work at Site will involve contact with contaminants identified in Specifications and environmental reports.

1.12. Work Permits

1.12.1. Obtain specialty permits related to project before start of Work.

1.13. Filing of Notice

1.13.1. The Prime Contractor must complete and submit a Notice of Project as required by Provincial or Territorial authorities.

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

1.14. Health and Safety Plan

1.14.1. Conduct a site-specific hazard assessment based on review of Contract, required Work, and project Site. Identify any known and potential health risks and safety hazards.

1.14.2. Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

1.14.2.1. Primary requirements:

1.14.2.1.1. Contractor's safety policy.

1.14.2.1.2. Identification of applicable compliance obligations.

1.14.2.1.3. Definition of responsibilities for project safety/organization chart for project.

1.14.2.1.4. General safety rules for project.

1.14.2.1.5. Job-specific safe work procedures.

1.14.2.1.6. Inspection policy and procedures.
1.14.2.1.7. Incident reporting and investigation policy and procedures.
1.14.2.1.8. Occupational Health and Safety Committee/Representative procedures.
1.14.2.1.9. Occupational Health and Safety meetings.
1.14.2.1.10. Occupational Health and Safety communications and record keeping procedures.
1.14.2.2. 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.
1.14.2.3. List hazardous materials to be brought onsite as required by Work.
1.14.2.4. Indicate engineering and administrative control measures to be implemented at the Site for managing identified risks and hazards.
1.14.2.5. Identify personal protective equipment (PPE) to be used by workers.
1.14.2.6. Identify personnel and alternates responsible for site safety and health.
1.14.2.7. Identify personnel training requirements and training plan, including site orientation for new workers.
1.14.3. Develop the plan in collaboration with all Subcontractors. Ensure that work/activities of Subcontractors are included in the hazard assessment and are reflected in the plan.
1.14.4. Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
1.14.5. Departmental Representative's review: the review of Health and Safety Plan by Public Service and Procurement Canada (PWGSC) will 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.

1.15. Emergency Procedures

1.15.1. 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:
1.15.1.1. Designated personnel from own company.
1.15.1.2. Regulatory agencies applicable to Work and as per legislated regulations.
1.15.1.3. Local emergency resources.
1.15.1.4. Departmental Representative and site staff.
1.15.2. Include the following provisions in the emergency procedures:
1.15.2.1. Notify workers and the first-aid attendant, of the nature and location of the emergency.
1.15.2.2. Evacuate all workers safely.
1.15.2.3. Check and confirm the safe evacuation of all workers.
1.15.2.4. Notify the fire department or other emergency responders.
1.15.2.5. Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
1.15.2.6. Notify Departmental Representative and Site staff.

1.15.3. Provide written rescue/evacuation procedures as required for, but not limited to:
1.15.3.1. Work at high angles.
1.15.3.2. Work in confined spaces or where there is a risk of entrapment.
1.15.3.3. Work with hazardous substances.
1.15.3.4. Underground work.
1.15.3.5. Work on, over, under and adjacent to water.
1.15.3.6. Workplaces where there are persons who require physical assistance to be moved.
1.15.4. Design and mark emergency exit routes to provide quick and unimpeded exit.
1.15.5. Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.16. Hazardous Products

1.16.1. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
1.16.2. Where use of hazardous and toxic products cannot be avoided:
1.16.2.1. Notify Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as required.
1.16.2.2. As required, in conjunction with Departmental Representative, schedule to carry out Work during "off hours" when tenants have left the building.
1.16.2.3. Provide adequate means of ventilation as required.

1.17. Unforeseen Hazards

1.17.1. Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the Work, immediately stop Work and notify the Departmental Representative verbally and in writing.

1.18. Posted Documents

1.18.1. Post legible versions of the following documents onsite:
1.18.1.1. Health and Safety Plan.
1.18.1.2. Sequence of Work.
1.18.1.3. Emergency procedures.
1.18.1.4. Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
1.18.1.5. Notice of Project.
1.18.1.6. Floor plans or Site plans.
1.18.1.7. Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the Site for review by employees and workers.
1.18.1.8. Workplace Hazardous Materials Information System (WHMIS) documents.
1.18.1.9. Material Safety Data Sheets (MSDS).
1.18.1.10. List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

1.18.2. Post all Material Safety Data Sheets (MSDS) 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.
1.18.3. 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 accepted by the Departmental Representative.

1.19. Meetings

1.19.1. Attend health and safety preconstruction meeting and all subsequent meetings called by the Departmental Representative.
1.19.2. Ensure all site personnel attend a health and safety toolbox meeting at the beginning of each shift, which must include:
1.19.2.1. Sign-in of all attendees.
1.19.2.2. Planned Work activities and environmental considerations for that shift.
1.19.2.3. Hazards associated with these Work activities, including environmental hazards (e.g. potential for hypothermia, heat exhaustion, heat stroke).
1.19.2.4. Appropriate job-specific safe work procedures.
1.19.2.5. Required personal protective equipment (PPE).
1.19.2.6. Appropriate emergency procedures.
1.19.2.7. Review recent accidents on Site, including near misses.
1.19.3. Retain records of all health and safety meetings onsite during Work, and retain as corporate records for a minimum of 7 years after Work is completed.

1.20. Correction of Non-Compliance

1.20.1. Immediately address health and safety non-compliance issues identified by the Departmental Representative.
1.20.2. Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
1.20.3. The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time.
1.20.4. Correct non-compliance.

1.21. Hazardous Occurrence Investigation and Reporting

1.21.1. Hazard includes:
1.21.1.1. Any source of potential damage, harm or adverse effects on life, health, property or environment at work. It refers to any biological, chemical, ergonomic, physical, psychosocial and safety factor that is reasonably likely to cause harm or damage to humans, other organisms, or the environment in the absence of its control. Sometimes a hazard is referred to as being the actual harm or the health effect it caused rather than the hazard. For example, the disease tuberculosis might be called a hazard by some but in general the tuberculosis-causing bacteria would be considered the “hazard” or “hazardous biological agent”. Exposure to tuberculosis would be the hazardous incident. For types of Hazards refer to Annex 3 of the Standard on Hazard Prevention Program.

1.21.2. Hazardous Occurrence includes:

1.21.2.1. An event occurring at a PWGSC managed building or worksite, or through the course of an employee's work that results in, or has the potential to result in, a fatality, injury, illness, exposure to a hazardous substance or property damage or an escapement of a hazardous material. For the purpose of investigating, recording and reporting hazardous occurrences, the following are included under this term: disabling injuries, minor injuries and near-misses.

1.21.3. Hazardous Occurrence Investigation and Reporting Procedures:

1.21.3.1. Includes information regarding the person involved and the basic circumstances surrounding the hazardous occurrence.

1.21.3.2. Provides a detailed and thorough description of the hazardous occurrence and the sequence of events.

1.21.3.3. Indicates corrective measures that have been taken since the occurrence.

1.21.3.4. Requires the appointment of a qualified investigator.

1.21.3.5. Provides recommendations for additional corrective measures, if required.

1.21.4. Fatal or Serious Accidents Procedures:

1.21.4.1. Call emergency number to advise the police organization having jurisdiction to secure the scene and investigate the matter.

1.21.4.2. Advise the Departmental Representative of the fatality or serious accident within 1 hour.

1.21.4.3. No investigation will be conducted at the scene until the police service having jurisdiction has released the scene.

1.21.4.4. Unless authorized to do so, do not allow anyone to remove or in any way interfere with or disturb any wreckage, article or thing related to the incident except to the extent necessary to: save a life, prevent injury or relieve human suffering in the vicinity; maintain an essential public service; or prevent unnecessary damage to or loss of property.

1.22. Utility Clearance

1.22.1. Contractor is solely responsible for utility clearance.

1.22.2. Contractor will not rely upon Drawings or other information provided with utility locations.

1.23. Personal Protective Equipment Program

1.23.1. Submit Personal Protective Equipment (PPE) program to the Departmental Representative addressing as appropriate:

1.23.1.1. Donning and doffing procedures.

1.23.1.2. PPE selection based upon Site hazards.

1.23.1.3. PPE use and limitations of equipment.

1.23.1.4. Work mission duration, PPE maintenance and storage.

1.23.1.5. PPE decontamination and disposal.

1.23.1.6. PPE inspection procedures prior to, during, and after use.

1.23.1.7. Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.

1.23.1.8. Medical surveillance requirements for personnel assigned to work at Site.
1.23.1.9. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.
1.23.1.10. Site control measures employed at Site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.
1.23.1.11. Decontamination procedures for both personnel and equipment.
1.23.1.12. Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.
1.23.1.13. Written respiratory protection program for project activities.
1.23.1.14. Procedures dealing with heat and/or cold stress.
1.23.1.15. Spill containment program if waste material is generated, excavated, stored, or managed onsite.

1.24. Offsite Contingency and Emergency Response Plan

1.24.1. Prior to commencing Work involving handling of hazardous materials, develop offsite Contingency and Emergency Response Plan.
1.24.2. Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site.

1.25. Personnel Health, Safety, and Hygiene

1.25.1. Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
1.25.2. Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.
1.25.3. Personal Protective Equipment:
1.25.3.1. Ensure all site personnel are furnished with appropriate PPE.
1.25.3.2. Unless identified otherwise in site-specific health and safety plan, minimum PPE to include: industrial protective headwear, high-visibility safety apparel, and protective footwear.
1.25.3.3. Ensure that safety equipment and protective clothing is kept clean and maintained.

1.25.4. Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:

1.25.4.1. Ensure industrial protective headwear is of appropriate CSA Standard and meets other appropriate standards.

1.25.4.2. Ensure high-visibility safety apparel is of appropriate CSA Standard and meets other appropriate standards.

1.25.4.3. Ensure protective footwear is of appropriate CSA Standard and meets other appropriate standards.

1.25.4.4. Dispose of or decontaminate PPE worn onsite at end of each workday.

1.25.4.5. Decontaminate reusable PPE before reissuing.

1.25.4.6. Ensure site personnel have passed respirator fit test prior to entering potentially volatile contaminated work areas, as appropriate.

1.25.4.7. Ensure facial hair does not interfere with proper respirator fit.

1.25.5. Respiratory Protection:

1.25.5.1. Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.

1.25.5.2. Develop, implement, and maintain respirator program.

1.25.5.3. Monitor, evaluate, and provide respiratory protection for site personnel.

1.25.5.4. Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified onsite.

1.25.5.5. In absence of additional air monitoring information or substance identification, retain an industrial hygiene specialist to determine minimum levels of respiratory protection required.

1.25.5.6. Immediately notify Departmental Representative when level of respiratory protection required increases.

1.25.5.7. Ensure appropriate respiratory protection during Work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.

1.25.6. Heat Stress/Cold Stress: implement heat stress or cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.

1.25.7. Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:

1.25.7.1. Suitable containers for storage and disposal of used disposable PPE.

1.25.7.2. Potable water and suitable sanitation facility.

1.25.8. Emergency and First-Aid Equipment:

1.25.8.1. Locate and maintain emergency and first-aid equipment in appropriate location onsite including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.

1.25.9. Site Communications:

1.25.9.1. Identify, supply and implement appropriate dedicated communication devices for Site and post emergency numbers near dedicated devices.

1.25.9.2. Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.
1.25.9.3. Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
1.25.9.4. Furnish selected personnel with 2-way radios.
1.25.9.5. Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or Work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Non-Contaminated Quality Soil Transport and Disposal will be paid in accordance with unit rate price established for weight of material disposed. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Disposal. Includes Treatment or any other processing of material required by Disposal Facility but not required by the Contract.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Environmental Protection Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit a plan detailing protection of the environment. Include:

1.3.1.1. Comprehensive overview of known or potential environmental issues to be addressed during Work.

1.3.1.2. Identify requirements that plan complies with. Includes: permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.1.3. Communications identifying emergency contact list and conditions for implementing emergency contact. Emergency contact to include: Contractor emergency response team including Superintendent; Departmental Representative and alternate, and other contractor(s) and individuals as directed by the Departmental Representative; and federal, provincial, and municipal emergency contacts.

1.3.1.4. Work Area showing proposed activity in each portion of areas, such as exclusion zone(s), decontamination zone(s) and clean zone(s), and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized Work areas.

1.3.1.5. Drawings showing locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials onsite.

1.3.1.6. Historical, Archaeological, Cultural Resources, Biological Resources and Valued Habitat Protection that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and valued habitat. Include procedures if previously unknown historical, archaeological, cultural, and biological resources are discovered during Work. Includes Species At Risk.

1.3.1.7. Non-Contaminated Quality Soil and Water Management including onsite handling to manage Solid Waste, Sewage, and Wastewater.

1.3.1.8. Non-Contaminated Quality Soil Transport and Disposal including transportation frequency and identifying offsite disposal facilities to manage Solid Waste.

1.3.1.9. Traffic Control including signage and traffic control personnel for Site ingress and egress. Vehicles and vehicle traffic must comply with all federal, provincial, and municipal laws and regulations.

1.3.1.10. Noise Control identifying methods, means, and sequences for preventing, monitoring, and controlling noise for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include thresholds and procedures if: noise does not comply with appropriate levels, or if there are public complaints.

1.3.1.11. Vibration Control identifying methods, means, and sequences for preventing, monitoring, and controlling vibration for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; in accordance with the Contract; in accordance with recommendations from the Contractor's Qualified Professional. Include thresholds and procedures if: vibration does not comply with appropriate levels, there are public complaints, or if onsite or offsite damage occurs.

1.3.1.12. Vapours, Dust, and Particulate Control identifying methods, means, and sequences for preventing, monitoring, and controlling vapours, dust and other airborne particulates for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include thresholds and procedures if: vapours, dust, and particulates do not comply with appropriate levels, there are public complaints, or if onsite or offsite damage occurs.

1.3.1.13. Spill Control identifying methods, means, and sequences for preventing, monitoring, and controlling spills for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Identify reporting requirements for spills. Identify locations and contents of spill kits.

1.3.1.14. Erosion and Sediment Control identifying methods, means, and sequences for preventing, monitoring, and controlling erosion and sedimentation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.1.15. Work in or Adjacent to Waterways Control, as required, identifying methods, means, and sequences for preventing, monitoring, and controlling work in or adjacent to waterways for compliance with: applicable permits, certificates,

approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.1.16. Monitoring requirements for general compliance with Environmental Protection Plan.

1.3.2. Submit amended Environmental Protection Plan if there changes to the assumed site conditions, changes to the Work procedures, or in the event that any methods and procedures are inadequate as directed by the Departmental Representative.

1.3.3. Submit Spill and Response Report for all Spills. Include: description of spill (location, time, quantity and quality), notifications (including copies of any reports forwarded to regulatory agencies), and describe any remediation activities (time, quantity, quality, and fate of spill impacted material). Include environmental analytical results for spill or other environmental testing.

1.3.4. After hours work: at least 5 Working Days prior to commencing after hours work Submit a schedule showing requested dates, times, and reasons for after hours work. Approval will only be granted for reasons valid, if request can be reasonably accommodated by other contractors and Site users, and third parties are not adversely affected, in the sole opinion of the Departmental Representative.

1.4. Contractor's Qualified Professional

1.4.1. Perform design, construction, monitoring, reporting, and other required tasks under the supervision of the Contractor's Qualified Professional applicable to the performance of the Work.

1.5. Cleaning

1.5.1. Maintain cleanliness of Work and surrounding Site to comply with federal, provincial, and municipal fire and safety laws, ordinances, codes, and regulations applicable to the performance of the Work.

1.5.2. Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.5.3. Ensure cleanup of the Work areas each day after Final Completion of Work.

1.6. Site Clearing and Plant Protection

1.6.1. Minimize stripping of Topsoil and vegetation. Use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction.

1.6.2. Restrict tree and plant removal to areas in accordance with the Contract or as directed by the Departmental Representative. To greatest extent practicable, prune or top the vegetation instead of grubbing/uprooting. Protect all other trees and plants onsite and offsite.

1.6.3. Salvage all trees and plants to be removed in accordance with the Contract or as directed by the Departmental Representative.

1.6.4. Wrap salvaged trees in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
1.6.5. Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
1.6.6. Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.
1.6.7. Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.
1.6.8. Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
1.6.9. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.

1.7. Archaeological

1.7.1. Attend archaeological awareness training provided by Departmental Representative.
1.7.2. Abide by Chance Find Procedures developed by Departmental Representative, as appropriate.

1.8. Species At Risk

1.8.1. Protect all Species At Risk, including meeting all federal, provincial, and municipal laws and regulations.
1.8.2. Modify Work procedures, including stopping Work, as instructed by Contractor's Qualified Professional or Departmental Representative to protect Species At Risk.

1.9. Non-Contaminated Quality Soil and Water Management

1.9.1. Solid waste
1.9.1.1. Remove all Non-Contaminated Quality Soil within Work areas in accordance with the Contract and as directed by the Departmental Representative.
1.9.1.2. Remove surplus materials and temporary facilities from Site.
1.9.1.3. Do not burn or bury any waste onsite.
1.9.1.4. Do not discharge wastes into streams or waterways.
1.9.1.5. Do not dispose of volatile or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

1.9.1.6. Dispose of all Non-Contaminated Quality Soil at a Landfill Facility or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

1.9.2. Sewage

1.9.2.1. Store Sewage from toilet facilities with wastewater from handbasins, and/or showers, for ultimate disposal.

1.9.2.2. Provide, operate, and maintain Sewage storage tanks to store Sewage.

1.9.2.3. Transport and dispose of Sewage at a Disposal Facility, or discharge to municipal sanitary sewer system in compliance with Municipal requirements, as accepted by Departmental Representative.

1.9.2.4. Discharges: comply with applicable discharge limitations and requirements; do not discharge Sewage to Site sewer systems that do not conform to or are in violation of such limitations or requirements; and obtain approval prior to discharge of Sewage.

1.9.3. Wastewater

1.9.3.1. Dewater various parts of Work including, excavations, structures, foundations, and Work areas, unless otherwise specified or directed by Departmental Representative.

1.9.3.2. Employ construction methods, plant procedures, and precautions that ensure Work, including excavations, are stable, free from disturbance, and dry.

1.9.3.3. Direct surface waters that have not contacted potentially Contaminated Material to surface drainage systems.

1.9.3.4. Control surface drainage including ensuring that gutters are kept open, wastewater is not allowed across or over pavements or sidewalks except through accepted pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.

1.9.3.5. Dispose of Wastewater in manner not injurious to public health or safety, to the environment, to onsite or offsite property, or to any part of Work completed or under construction.

1.9.3.6. Control disposal or runoff of Wastewater containing suspended materials or other harmful substances in accordance with local authority requirements.

1.9.3.7. Ensure pumped Wastewater into waterways, sewer or drainage systems is free of suspended materials. Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

1.9.3.8. Obtain permits to discharge Wastewater to environment or municipal system (sewer, ditches).

1.9.3.9. Do not discharge water which may have come in contact with potentially Contaminated Soil or otherwise be Contaminated directly offsite to the environment or to municipal system.

1.10. Non-Contaminated Quality Soil Transport and Disposal

1.10.1. Assume ownership of, and be responsible for, Non-Contaminated Quality Soil once it is loaded on a vehicle, barge, or other vessel for Transport. Assume ownership of, and be responsible for, Non-Contaminated Quality Soil Disposed.
1.10.2. Transport material as soon as practical; do not unreasonably stockpile onsite.
1.10.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.
1.10.4. Excess water in material must not be allowed to flow out of vehicle or vessel during transport.
1.10.5. Stabilize material as necessary.
1.10.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Non-Contaminated Quality Soil.
1.10.7. Barges must be inspected by an independent Marine Surveyor for stability and safety.
1.10.8. Non-Contaminated Quality Soil Disposal: dispose all Non-Contaminated Quality Soil, at Landfill Facility provided by Contractor and accepted by the Departmental Representative or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.
1.10.9. Landfill Facility must:
1.10.9.1. Be an existing offsite facility located in British Columbia or the Yukon.
1.10.9.2. Be designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility from waste placed in or on land within the facility.
1.10.9.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by the BC government or the Yukon government, as appropriate, for the Disposal of relevant Non-Contaminated Quality Soil.
1.10.9.4. Comply with the BC Environmental Management Act and BC Landfill Criteria for Municipal Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, as appropriate.
1.10.9.5. Comply with applicable municipal zoning, bylaws, and other applicable requirements.
1.10.10. Dispose material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.
1.10.11. Material sent to a Landfill Facility must be permanently stored at that facility.
1.10.12. If proposed Landfill Facility is not acceptable to Departmental Representative, provide an alternate Landfill Facility that is acceptable.

1.11. Traffic Control

1.11.1. Ensure pedestrians have safe and unencumbered access in public areas. Provide traffic control personnel as required or as directed by Departmental Representative.

1.11.2. Comply with requirements of acts, regulations and bylaws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
1.11.3. Comply with current version of WorkSafeBC Occupational Health and Safety Regulation *Part 18 Traffic Control* or Yukon Workers' Compensation Health and Safety Board Occupational Health and Safety Act and Regulations *Public Way 1.46 and 1.47*, as appropriate.
1.11.4. Comply with current version of BC Ministry of Transportation and Infrastructure *2015 Interim Traffic Management Manual for Work on Roadways*.
1.11.5. Obtain all necessary permits or other authorizations regarding traffic control, including access and road usage.
1.11.6. Provide and maintain road access and egress to property fronting Site and in other areas in accordance with the Contract, except where other means of road access exist that are accepted.
1.11.7. Prevent tracking or spilling of debris or material onto public roads.
1.11.8. Immediately sweep or scrape up debris or material on public roads.
1.11.9. Clean public roads within a minimum 200 m radius of the Site entrance or as required at least once per shift, or as directed by Departmental Representative.
1.11.10. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.12. Noise, Vibration, Vapours, and Dust Control

1.12.1. Maintain acceptable levels not injurious or objectionable to public health or safety or to the environment.
1.12.2. Comply with applicable municipal bylaws and other applicable requirements unless otherwise specified or directed by Departmental Representative; otherwise Contractor's Qualified Professional to determine acceptable levels (e.g. noise greater than 65 dBa, vibration greater than 0.315 m/s^2 (based on ISO 2631-1)).
1.12.3. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.
1.12.4. Specific procedures to prevent dust:
1.12.4.1. Cover or wet down relevant Work to prevent vapours and blowing dust and debris, including temporary roads, excavations, and stockpiles. In urban environments or if sensitive neighbouring properties (e.g. residences) provide full time coverage or wetting down.

1.12.4.2. Covers to be impermeable (e.g. minimum 5 mil polyethylene) and securely fashioned to prevent blowing off. Use fresh (non-saline) water for dust and particulate control.

1.12.4.3. Use appropriate covers on vehicles, including trucks, barges, and trains, hauling vapour-generating or fine or dusty material. Use watertight vehicles to haul wet materials.

1.13. Spill Control

1.13.1. Pollution includes spills or other releases from Contractor's activities that could potentially contaminate soil, sediment, water, and atmosphere from discharge of hazardous, deleterious or regulated substances, including from equipment and material handling.

1.13.2. Prevent spills or releases.

1.13.2.1. Maintain temporary erosion and pollution control features.

1.13.2.2. Do not store fuel onsite other than tanks forming part of the equipment.

1.13.2.3. Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the watercourse.

1.13.2.4. Control emissions from equipment and plant to meet applicable authorities' emission requirements.

1.13.2.5. Contractor to regularly inspect all machinery on the Site to ensure it is in good repair and free of leaks.

1.13.3. Be prepared to intercept, cleanup, and dispose of spills or other releases that can occur whether on land or water.

1.13.4. Spill kits and containment are to be maintained onsite and ready for deployment in the event of spills or other releases.

1.13.4.1. Spill kits are to include sufficient quantities of absorbent material, containers, booms, shovels and other tools, and personal protective equipment.

1.13.4.2. Spill response materials must be compatible with type of equipment being used or type of material being handled.

1.13.4.3. Spill kits are to be in close proximity to machinery.

1.13.4.4. During the Work there are to be trained and qualified personnel available that are ready to deploy spill kits when necessary.

1.13.5. Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.

1.13.6. Promptly report spills and releases potentially causing damage to environment to:

1.13.6.1. Authority having jurisdiction or interest in spill or other release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.

1.13.6.2. Contractor emergency response team including Superintendent

1.13.6.3. Departmental Representative and other contractor(s) and individuals as directed by the Departmental Representative.

1.13.7. Departmental Representative can collect samples for chemical analyses prior to, during, and upon Final Completion of Work to monitor potential pollution caused by Contractor's activities. Assist Departmental Representative in collection of samples.
1.13.8. Remediation of soil, sediment or water contaminated by Contractor's activities.
1.13.8.1. Remediate all soil, sediment or water contaminated by Contractor's activities associated with the Work onsite and offsite.
1.13.8.2. Remediation includes excavation, pumping, testing, transport, treatment and disposal as appropriate for the type of contamination incurred, and at a minimum in accordance with the Contract.
1.13.8.3. Submit procedures for remediating soil, sediment or water contaminated by Contractor's activities.
1.13.8.4. Remediate as directed by the Departmental Representative.
1.13.8.5. Contractor is responsible for any additional investigation, testing, and assessments required as acceptable to the Departmental Representative.
1.13.9. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.14. Erosion and Sediment Control

1.14.1. Implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear.
1.14.2. Install effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
1.14.3. Manage water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
1.14.4. Implement site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation).
1.14.5. Contain and stabilize waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry.
1.14.6. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
1.14.7. Repair erosion and sediment control measures and structures if damage occurs.

1.14.8. Remove non-biodegradable erosion and sediment control materials once site is stabilized.

1.14.9. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.15. Work In or Adjacent to Waterways

1.15.1. Approvals and Practices:

1.15.1.1. As required, comply with Fisheries Act Authorization and other relevant authorizations and in accordance with the Contract.

1.15.1.2. Restrict Work as described in, and follow requirements in, Contract including Environmental Effects Determination, Environmental Management Plan, Aquatic Effects Assessment, Environmental Mitigation Strategy, or similar documents. Variations allowed only if recommended by Contractor's Qualified Professional and approved by Departmental Representative.

1.15.1.3. Follow practices described in *Land Development Guidelines for the Protection of Aquatic Habitat* (Fisheries and Oceans Canada, 1993 September) and *Measures to avoid causing harm to fish and fish habitat including aquatic species at risk* (Fisheries and Oceans Canada, 2016 November 18).

1.15.1.4. Follow practices described in *Standards and Best Practices for Instream Works* (BC Ministry of Environment, 2004 March).

1.15.2. Timing

1.15.2.1. Time work in water to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.

1.15.2.2. Minimize duration of in-water work.

1.15.2.3. Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

1.15.2.4. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

1.15.3. Site Selection

1.15.3.1. Design and plan activities and works in wetland and waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.

1.15.3.2. Design and construct approaches to wetland and waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.

1.15.3.3. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.

1.15.3.4. Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.

1.15.4. Shoreline/bank Re-vegetation and Stabilization

1.15.4.1. Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.

1.15.4.2. Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.

1.15.4.3. Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.

1.15.4.4. Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.

1.15.4.5. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.

1.15.4.6. Remove all construction materials from site upon project completion.

1.15.4.7. Do not remove riparian vegetation if the riparian area is identified as part of critical habitat of an aquatic listed Species At Risk.

1.15.5. Aquatic Life Protection

1.15.5.1. Ensure that all in-water activities, or associated in-water structures, do not interfere with aquatic life passage, constrict the channel width, or reduce flows, or result in the stranding or death of aquatic life.

1.15.5.2. Contractor’s Qualified Professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.

1.15.5.3. Any capture and relocation of an endangered or threatened aquatic Species At Risk will require approval from Department of Fisheries and Oceans.

1.15.6. Water Intake or Outlet Pipe Screening:

1.15.6.1. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.

1.15.6.2. Screens should be located in areas and depths of water with low concentrations of fish throughout the year.

1.15.6.3. Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
1.15.6.4. The screen face should be oriented in the same direction as the flow.
1.15.6.5. Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
1.15.6.6. Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
1.15.6.7. Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
1.15.6.8. Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
1.15.6.9. Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.
1.15.6.10. Provision should be made for the removal, inspection, and cleaning of screens.
1.15.6.11. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
1.15.6.12. Pumps should be shut down when fish screens are removed for inspection and cleaning.
1.15.7. Explosives:
1.15.7.1. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
1.15.7.2. Do not use explosives where SARA-listed aquatic species, their residences or critical habitat occur, without review by Department of Fisheries and Oceans.
1.15.8. Operation of Machinery
1.15.8.1. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
1.15.8.2. Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
1.15.8.3. Limit machinery fording of the watercourse to a one-time event (i.e. over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
1.15.8.4. Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g. dominated by organic materials and silts) banks and beds. For fording equipment without a

temporary crossing structure, use stream bank and bed protection methods (e.g. swamp mats, pads) if minor rutting is likely to occur during fording.

1.15.8.5. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

1.15.8.6. Do not ford, place crossing materials or operate machinery on the bed of a waterbody where SARA-listed shellfish occur, or critical habitat or residences of freshwater SARA-listed aquatic species occur.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Site Facilities - Provision will be paid in accordance with lump sum price established to design, temporarily provide for duration of Work, and erect all infrastructure in accordance with the Contract. Includes temporary structures and facilities, environmental protection, stockpile areas, access, onsite roadways, temporary hoarding, security fencing, federal signage, office facilities, sanitary facilities, stormwater management infrastructure, lighting, and utilities.

1.1.2. Site Facilities - Operation will be paid in accordance with lump sum price established to operate and maintain all infrastructure between mobilization and demobilization. Includes temporary structures and facilities, environmental protection, stockpile areas, access, onsite roadways, temporary hoarding, security fencing, federal signage, office facilities, sanitary facilities, stormwater management infrastructure, lighting, and utilities. Also includes ongoing services including administration, overhead, project management, security, surveying, noise monitoring, vibration monitoring, utilities, project meetings, inspections, progress Submittals, traffic control, health and safety, Environmental Protection, cleaning, and operation during inclement weather. Also includes living out allowances, travel and room and board. Lump sum may be pro-rated based on duration to determine aggregate costs.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Site Layout: within 10 Working Days after Contract award and prior to mobilization to Site, Submit Site Layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor. Include:

1.3.1.1. Equipment and personnel decontamination areas.

1.3.1.2. Means of ingress, egress and temporary traffic control.

1.3.1.3. Equipment and material staging areas.

1.3.1.4. Stockpile areas and construction details, including base preparation and water control features.

1.3.1.5. Exclusion areas, contaminant handling areas, and other areas identified in Contractor's site-specific Health and Safety Plan and Environmental Protection Plan.

1.3.1.6. Grading, including contours, required to construct temporary facilities.

1.3.1.7. Location of all temporary facilities including: contaminated water storage tanks, truck wash and decontamination units, office trailers, modular camp structures, parking, storage, environmental monitoring stations, above ground and underground utilities, roads, and other temporary facilities.

1.3.2. Signs: at least 5 Working Days prior to posting, Submit any signs viewable by public.

1.4. Utilities

1.4.1. Utilities not identified as being available on Site must be supplied at the Contractor's expense. Provide supplied utilities for entire work force, including Subcontractors and Departmental Representative and their consultants. No utilities or cellular reception are known to be available at the Site.

1.5. Fire Protection

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

1.6. Access and Delivery

1.6.1. Only the designated entrance in accordance with the Contract can be used for access to Site.

1.6.1.1. Maintain for duration of Contract.

1.6.1.2. Make good damage resulting from Contractor's use.

1.6.2. Use of the Site will be granted to the Contractor through the Departmental Representative.

1.7. Installation and Removal

1.7.1. Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

1.7.2. Identify areas which have to be graveled or otherwise treated to prevent tracking of mud.

1.7.3. Indicate use of supplemental or other staging area.

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

1.7.5. Provide temporary utilities in order to execute Work expeditiously.

1.7.6. Remove from Site all such Work after use.

1.8. Site Storage/Loading

1.8.1. Confine work and operations of employees in accordance with the Contract. Do not unreasonably encumber premises with products.

1.8.2. Storage space must be limited to the Site.

1.8.3. Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.9. Construction Parking

1.9.1. Parking of private vehicles will not be permitted on Site, unless otherwise agreed to by Departmental Representative.

1.9.2. Provide and maintain adequate access to project site.

1.10. Security

1.10.1. Be responsible security of site and contents of site after working hours and during holidays. Provide onsite security personnel as appropriate and in accordance with the Contract.

1.10.2. Control access to Site and maintain a log of all personnel onsite. No non-Work visitors allowed without prior written consent of Departmental Representative.

1.11. Departmental Representative and Consultant Offices

1.11.1. Provide office facilities for the exclusive use of the Departmental Representative and their consultants with the following minimum intent, modified as per the Contract:

1.11.1.1. Two work stations within factory fabricated modular units.

1.11.1.2. Work stations must include; 1 desk (minimum size 120 cm x 50 cm, minimum height 70 cm), 1 swivel desk chair (minimum load requirement 100 kg), 1 bookshelf (minimum 3 shelves with a minimum shelf height of 32 cm), 1 locking filing cabinet (minimum dimensions 50 cm x 39 cm x 60 cm), 1 garbage can, and 1 recycling bin.

1.11.1.3. Building envelope: watertight construction.

1.11.1.4. Completed building: exterior to interior minimum sound attenuation of STC 30.

1.11.1.5. Building interior environment: heated and cooled to maintain temperature of 20 degrees C minimum to 25 degrees C maximum with relative humidity of 35% to 60%.

1.11.1.6. Provide ventilation and outdoor air as per ASHRAE 62.1 – 2010 Standard.

1.11.1.7. Building lighting: maintain measured lighting level of 200 lx at 1500 mm above finished floor, after building finishes and painting complete.

1.11.1.8. Thermal performance of window units: Maximum heat transfer rate (U-value) not to exceed 2.0 W/m2K.

1.11.1.9. Regularly collect refuse and recyclables and keep the office clean and properly maintained with heat and light.

1.11.1.10. Provide private washroom facilities in offices in accordance with the Contract, complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.

1.11.1.11. The work stations and contents must be for the sole use of the Departmental Representative and their consultant(s) for the duration of the Work and may, if necessary, be used concurrently with other inspection agencies.

1.11.2. Installation:

1.11.2.1. Install level and plumb.

1.11.2.2. Install stairs.

1.11.2.3. Adjust doors and windows for smooth operation.

1.11.3. Provide a minimum of 2 parking spaces for Departmental Representative and their consultants adjacent to offices.

1.12. Equipment, Tools and Materials Storage

1.12.1. Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

1.12.2. Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.13. Sanitary Facilities

1.13.1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

1.13.2. Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.14. Construction Signage

1.14.1. Provide and erect 2 project signs within 10 Working Days of mobilization in a location designated by Departmental Representative. Project signs must, unless otherwise directed by Departmental Representative, include: name of Client, name of Project, and information contact number in both official languages using graphic symbols to CAN/CSA-Z321. Project signs to be a minimum of 1200 x 2400 mm.

1.14.2. Contractor signage must be approved by Departmental Representative.

1.14.3. Contractor signage must include at a minimum:

1.14.3.1. Name of Contractor.

1.14.3.2. Emergency contact number.

1.14.3.3. Personal Protective Equipment requirements.

1.14.3.4. Other pertinent safety warnings (e.g. “open excavation”).

1.14.4. Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.15. Protection and Maintenance of Traffic

1.15.1. Where applicable, traffic to include pedestrian traffic.

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

1.15.3. Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

1.15.4. Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

1.15.5. Protect travelling public from damage to person and property.

1.15.6. Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

1.15.7. Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

1.15.8. Construct access and haul roads necessary.
1.15.9. Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic must be avoided.
1.15.10. Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
1.15.11. Dust control: adequate to ensure safe operation at all times.
1.15.12. Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
1.15.13. Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
1.15.14. Provide snow removal during period of Work.
1.15.15. Remove, upon completion of work, haul roads designated by Departmental Representative.

1.16. Truck Wash and Decontamination Units

1.16.1. Supply, install and operate truck wash, including the installation of a water supply.
1.16.1.1. No vehicles which have come in contact with Contaminated Material must leave the Site without passing through the truck wash.
1.16.1.2. The truck wash must provide, at a minimum, the ability to wash truck tires and load boxes to a minimum height of 1.7 m.
1.16.1.3. Truck wash must have a solid separation tank and all solids collected must be classified as Contaminated Soil and disposed of at a Disposal Facility.
1.16.1.4. Recycle or treat as Contaminated Water truck wash water.
1.16.2. Alternatives to a truck wash, including isolating truck traffic from contact with contaminated material, may be approved by the Departmental Representative. Alternatives will not be accepted if, in the opinion of the Departmental Representative, the alternatives are not adequately designed or performing.
1.16.3. Supply personnel decontamination units (minimum of 2) for use by hazardous material, testing and inspection personnel working in areas of hazardous materials and for general clean-up of personal protective equipment to remove Contaminated Material. Provide decontamination units for work force
1.16.3.1. At least one personnel decontamination unit must have overhead shower capability.
1.16.3.2. The personnel decontamination units to be available to Departmental Representative and their consultants.
1.16.3.3. The personnel decontamination units are subject to acceptance of Departmental Representative.
1.16.4. The truck wash and personnel decontamination units must be maintained in good working order during onsite Work.
1.16.5. The truck wash and personnel decontamination units must be removed from the Site during Site Decommissioning.

1.17. Clean-Up

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

1.18. Storage Tanks

1.18.1. Abide by the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations for stored petroleum products and allied petroleum products tank system located on federal or Aboriginal land, or within federal jurisdiction as described in the regulations.
1.18.2. Temporary storage tanks subject to the regulations must be registered with Environment Canada.
1.18.3. Mobile tanks subject to the regulations must be certified to be mobile.
1.18.4. Storage tanks to meet the following minimum requirements:
1.18.4.1. Corrosion protection.
1.18.4.2. Secondary containment.
1.18.4.3. Containment sumps, if applicable.
1.18.4.4. Overfill protection.
1.18.5. All components of tank system must bear certification marks indicating that they conform to the standards set out in the regulations.
1.18.6. Product transfer area must be designed to contain spills.
1.18.7. Prepare an emergency plan.
1.18.8. Prior to first filling, storage tanks must:
1.18.8.1. Be registered.
1.18.8.2. Be certified and marked.
1.18.8.3. Transfer area be constructed.
1.18.8.4. Emergency plan in place.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Water Treatment-Provision will be paid in accordance with lump sum price established to design, temporarily provide for duration of Work, and erect all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample contaminated or potentially Contaminated Water. Includes dewatering of Contaminated Water from excavation. Includes provision of bulk storage tanks and loading facilities for Offsite Water Treatment Facility.

1.1.2. Contaminated Water Treatment-Transport and Disposal will be paid in accordance with the unit rate price established for volume of water transported off-site for treatment and disposal, including Offsite Contaminated Water Treatment Facility. Includes all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample Contaminated or potentially Contaminated Water. Includes dewatering of Contaminated Water from excavation. Includes treating, transport and disposal of Non-Aqueous Phase Liquids. Includes transport to Offsite Contaminated Water Treatment Facility. Includes analytical testing to demonstrate compliance with Contract.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Offsite Contaminated Water Treatment Facility Plan: at least 10 days prior to transporting material to a Treatment Facility, Submit documentation describing Treatment Facility. Include for each Treatment Facility:

1.3.1.1. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Treatment of relevant Contaminated Material.

1.3.1.2. Letter from Contractor’s Qualified Professional that the Treatment Facility is appropriate for the quantity and quality of Contaminated Material to be Treated in accordance with any authorization and complies with appropriate government requirements of a general nature (e.g. BC Landfill Criteria).

1.3.1.3. Letter from Treatment Facility that they can accept the quantity and quality of Contaminated Material to be Treated at the Facility, signed by an authorized representative of the Facility.

1.3.2. Certificate of Treatment: within 30 Working Days of treatment at Offsite Contaminated Water Treatment Facility, Submit documentation verifying that materials have been treated by Contractor. Include:

1.3.2.1. Issued by the Treatment Facility.

1.3.2.2. On company letterhead.

1.3.2.3. Name and location of facility where the material is being treated.

1.3.2.4. Date and weight for each shipment received and total weight received at the offsite facility.

1.3.2.5. Date and weight for each treatment event and total weight treated at the offsite facility.
1.3.2.6. Treatment methodology.
1.3.2.7. Laboratory certificates demonstrating treatment objectives were met.
1.3.2.8. Disposition of treated material.
1.3.2.9. Signed by identified authorized treatment company representative.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Water Transport
3.1.1. Assume ownership of, and be responsible for Contaminated Water once it is loaded on a vehicle, barge, or other vessel for transport offsite.

3.2. Offsite Contaminated Water Treatment Facility
3.2.1. Offsite Contaminated Water Treatment: at Contractor's discretion, treat at Treatment Facility offsite provided by Contractor and accepted by the Departmental Representative.
3.2.2. Offsite Treatment Facility must:
3.2.2.1. Be an existing offsite facility located in Canada or the United States.
3.2.2.2. Be designed, constructed and operated for the handling or processing of waste in such a manner as to change the physical, chemical or biological character or composition of Contaminated Water. Treatment includes bioremediation and filtering. Treatment does not include blending, mixing, or dilution
3.2.2.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the treatment of relevant Contaminated Material.
3.2.2.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.
3.2.3. Treat material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Oversize Debris Removal will be paid in accordance with unit rate price established for time to remove oversize material from excavation. Does not include Transport or Disposal of debris. Measurement as recorded time by Departmental Representative.

1.1.2. Excavation will be paid in accordance with unit rate price established for volume of material removed to excavate to Contaminated Soil Extents according to Drawings. Includes temporary sloping and shoring design and construction. Includes all onsite handling, loading, hauling, unloading and stockpiling, including hauling to Onsite Soil Treatment Facility as required. Measurement as recorded insitu Excavation volume using Progress Survey for interim measurement and Contractor's Qualified Professional Surveyor for final excavation extents (As-Built). Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors.

1.1.3. Backfill–Imported will be paid in accordance with unit rate price established per weight for material imported for Backfill for Excavation. Includes Contractor's analytical testing and inspections to demonstrate compliance with Contract, provision, all onsite and offsite handling, loading, hauling, unloading, placing, grading and compacting. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative.

1.1.4. Backfill–Overburden will be paid in accordance with unit rate price established for volume of Overburden material suitable for reuse as Backfill for Excavation. Includes all onsite handling, loading, hauling, unloading and stockpiling. Measurement as recorded insitu Excavation volume using Progress Survey for interim measurement and Contractor's Qualified Professional Surveyor for final excavation extents (As-Built). Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors.

1.1.5. Backfill–Owner Supplied will be paid in accordance with unit rate price established for volume of material supplied by PWGSC from sources according to Contract for Backfill for Excavation. Includes all onsite and offsite handling, loading, hauling, unloading and stockpiling. Measurement as recorded insitu Excavation volume using Progress Survey for interim measurement and Contractor's Qualified Professional Surveyor for final excavation extents (As-Built). Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Excavation Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Excavation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include:

1.3.1.1. Excavation temporary slope and/or shoring design.

1.3.1.2. Methods, means, and sequences for excavation dewatering and heave protection.

1.3.1.3. Support of structures design.

1.3.1.4. Procedures for excavations adjacent to utilities or other structures if the excavation has the potential to impact utilities or other structures.

1.3.1.5. Backfilling requirements. Meet or exceed requirements in accordance with the Contract and any other codes, bylaws, rules and regulations applicable to the performance of the Work. Backfilling requirements includes Imported Backfill and Owner Supplied Backfill.

1.3.1.6. Backfilling design for utilities or other infrastructure to be reinstated or new.

1.3.1.7. Monitoring and inspection requirements, including frequency or milestones when Contractor's Qualified Professional must inspect Works.

1.3.1.8. Excavation Plan must be signed and sealed by Contractor's Qualified Professional, as required by ground conditions, excavation depth, shoring type, or support type.

1.3.2. Import Backfill Material Quality: at least 5 Working Days prior to bringing material onsite, Submit documentation signed and sealed by Contractor's Qualified Professional verifying that material is acceptable for import and intended use. Include:

1.3.2.1. Grain-size distribution information.

1.3.2.2. Chemical analyses for Potential Contaminants of Concern, including benzene, toluene, ethylbenzene, xylenes, petroleum hydrocarbon fractions F1 to F4, volatile petroleum hydrocarbons, and light and heavy extractable petroleum hydrocarbons, salt parameters (i.e., soluble sodium and chloride) and metals.

1.3.2.3. Testing to be performed by Contractor's Qualified Professional at sufficient frequency to characterize all Imported Backfilled (eg one sample per 500 tonnes). Test using appropriate guidelines and practices.

1.3.3. Import Backfill Samples: at least 10 Working Days prior to bringing material to Site, Submit samples of Imported Backfilled.

1.3.3.1. Samples to be representative of all Imported Backfilled. Sample frequency subject to acceptance by Departmental Representative.

1.3.3.2. Submit sufficient sample size to allow geotechnical and environmental quality testing as directed by Departmental Representative.

1.3.4. Temporary Hoarding and Fencing: at least 5 Working Days prior to installation, Submit a description of temporary hoarding and fencing.

1.3.5. Monitoring and Testing Results: within 5 Working Days of sampling, Submit all monitoring and testing results. Include procedures, frequency of sampling,

Quality Assurance and Quality Control testing and documentation to be provided. Provide monitoring and testing results, including any assessments performed by Contractor's Qualified Professional. Include:

1.3.5.1. Backfill testing results, including geotechnical and environmental quality, confirming results meet requirements in Contract and Excavation Plan.

1.3.5.2. Compaction testing results, confirming results meet requirements in Contract and Excavation Plan.

1.4. Sequencing for Free Phase Products

1.4.1. When floating free phase substance (NonAqueous Phase Liquids) is present, remove free phase from saturated soil or sediment without further contaminating soil, sediment or groundwater prior to commencing other construction Work.

1.4.2. Collect free phase product (NAPL), load, and transport to a Treatment Facility.

2. PART 2 - PRODUCTS

2.1. Materials

2.1.1. Short term temporary liners and covers to be a minimum of 4 mil plastic.

2.1.2. Erosion and sediment control materials to meet the following minimum requirements:

2.1.2.1. Hay or Straw Bale: wire bound or string tied; securely anchored by at least 2 stakes or rebars driven through bale 300 mm to 450 mm into ground; chinked (filled by wedging) with hay or straw to prevent water from escaping between bales; and entrenched minimum of 100 mm into ground.

2.1.2.2. Silt Fence: assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile: uniform in texture and appearance, having no defects, flaws, or tears that would affect its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure.

2.1.2.3. Net Backing: industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.

2.1.2.4. Posts: sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow minimum 450 mm embedment; post spacing 2.4 m maximum. Securely fasten each post to geotextile and net backing using suitable staples.

2.1.3. Gradations to be within limits specified when tested to ASTM C117-13 (Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing) and ASTM C136-06 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates). Sieve sizes to SCC CAN/CGSB-8.1-88 (Sieves, Testing, Woven Wire, Inch Series) and CAN/CGSB-8.2-M88 (Sieves, Testing, Woven Wire, Metric Series).

2.1.4. Import fill materials to meet the following minimum geotechnical requirements:

2.1.4.1. Import fill materials must be granular aggregate composed of inert, clean, tough, durable particles of crushed rock, gravel and sand capable of withstanding the deleterious effects of exposure to water, freeze-thaw, handling, spreading and compacting. The aggregate particles must be uniform in quality and free from clay lumps, wood and free from an excess of flat or elongated pieces.

2.1.4.2. The imported backfill total silt and clay content not to exceed 15% by mass or as required by Contract unless otherwise accepted by Departmental Representative.

2.1.5. Import fill materials to meet the following minimum environmental quality requirements for the site:

2.1.5.1. Import fill materials must originate from a clean source, and be the lesser of the Canadian Council of Ministers of the Environment Soil Quality Guidelines for Agricultural Land Uses, and the British Columbia Contaminated Sites Regulation Schedule 3.1 wildlands reverted (WLr) for the top 3 m and CSR Schedule 3.1 Commercial (CL) below 3 m or as required by Contract unless otherwise accepted by Departmental Representative.

2.1.5.2. Import fill material that is cobble sized or larger (> 64 mm) brought onsite must be tested by the Contractor for Acid Rock Drainage (ARD) and Metals Leaching (ML) potential using Acid Base Accounting (ABA) for assessment of ARD potential and more specifically using the Modified Sobek Test Method. The potential for metals leaching must use Shake Flask Extraction (SFE) Method for analysis of metals leaching. See guidance document *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials* MEND Report 1.20.1, Natural Resources Canada, Price 2009.

2.1.5.3. Any import fill material which has a discrete sample exceeding the environmental quality requirements specified must be removed from the Site and replaced, including relevant placed material, as directed by the Departmental Representative. An alternate source of backfill must be provided, with no increases to Contract Amount or Extension of Time for completion of the Work.

2.1.5.4. Environmental quality requirements may be modified by the Departmental Representative taking into consideration background concentrations, commercially available material, and site-specific factors and/or land use.

2.1.6. Import fill material additional testing:

2.1.6.1. Perform additional testing as directed by the Departmental Representative to confirm suitability.

2.1.6.2. Facilitate testing by the Departmental Representative to confirm suitability.

2.1.7. Asphalt, as required, must, at minimum, meet the specifications for: Upper Course #1 mix-type as specified in Section 32 12 16, Hot Mix Asphalt Concrete Paving; of the current version of the *BC Master Municipal Construction Document (2009) Platinum Edition*.

3. PART 3 - EXECUTION

3.1. Examination

3.1.1. Site Verification of Conditions:

3.1.1.1. Contractor to determine condition of existing Site and requirements to make the Site suitable for Work.

3.2. Site Preparation and Operation

3.2.1. Site Preparation and operation includes construction, operation and maintenance for the duration of the Work,

3.2.2. Remove and dispose all surficial Non-Contaminated Quality Soil at a Landfill to allow access for Work or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

3.2.3. Clearing and grubbing of the Site to allow access for Work.

3.2.3.1. Clearing consists of removing Non-Contaminated Quality Soil vegetation above existing ground surface to facilitate Work. Includes: cutting off trees and brush vegetative growth, felled trees, previously uprooted trees and stumps. Dispose of Non-Contaminated Quality Soil at a Landfill or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

3.2.3.2. Grubbing consists of excavation of Non-Contaminated Quality Soil below existing ground surface to facilitate Work. Includes: stumps, roots, boulders and rock fragments. Dispose of Non-Contaminated Quality Soil at a Landfill or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

3.2.4. Remove obstructions, ice and snow, from surfaces to be worked. Relocate debris present on the surfaces to be worked as directed by the Department Representative.

3.2.5. Stripping of Overburden

3.2.5.1. Commence Overburden stripping of areas according to Drawings after stripping of Topsoil.

3.2.5.2. Strip Overburden to depths according to Drawings. Do not mix Overburden with other soils.

3.2.5.3. Stockpile Overburden as directed by Departmental Representative.

3.2.5.4. Segregate and stockpile Topsoil separately from other Overburden.

3.2.5.5. Testing of Overburden may be required if suspected of being Contaminated. Contaminated Overburden will be considered Contaminated Soil.

3.2.5.6. Reuse Overburden as Backfill as directed by Departmental Representative and agreed to by Contractor's Qualified Professional. Dispose of unused Overburden as Non-Contaminated Quality Soil as directed by Departmental Representative.

3.2.5.7. Reuse suitable Topsoil as final grading surface, as accepted by Departmental Representative. Dispose of unsuitable or unused Topsoil as directed by Departmental Representative, and replace with suitable imported topsoil.

3.2.6. Decommission monitoring wells encountered incidentally within final Contaminated Soil Extents.

3.2.6.1. Decommission monitoring wells extending below the Contaminated Soil Extents in accordance with methods in BC Groundwater Protection Regulation or the Yukon Environment Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning, as appropriate.

3.2.6.2. Protect monitoring wells outside Contaminated Soil Extents. Replace damaged monitoring wells as directed by the Departmental Representative at Contractor's expense.

3.2.7. Protection:

3.2.7.1. Protect existing features with temporary barriers and enclosures as required by applicable local regulations.

3.2.7.2. Protect natural and man-made features required to remain undisturbed. Unless otherwise required or located in an area to be occupied by new construction, protect existing trees from damage.

3.2.7.3. Protect buried utilities that are required to remain undisturbed.

3.2.7.4. Provide temporary structures to divert flow of surface water from excavation.

3.2.8. Security and Safety:

3.2.8.1. Provide safety measures to ensure worker and public safety.

3.2.8.2. Ensure Excavations are secure during onsite Work, provide, install, and remove fencing, temporary hoarding, and other security measures as required and specified.

3.3. Import Fill Material Characterization

3.3.1. Sample, analyse, and compare to Contract requirements all import fill material for each backfill material type and for each import source for grain-size distribution and chemical analyses for Potential Contaminants of Concern at the following frequency:

3.3.1.1. Two random samples for the first 1,000 m^3.

3.3.1.2. One random sample for every subsequent (or portion thereof) 1,000 m^3 up to 10,000 m^3.

3.3.1.3. One random sample for every subsequent (or portion thereof) 10,000 m^3.

3.3.2. Sampling frequency must be increased as directed by the Departmental Representative for each of the following:

3.3.2.1. If the import source does not have a Preliminary Site Investigation-Stage 1 performed by the Contractor’s Qualified Professional with no Areas of Potential Environmental Concern. Sample frequency increases to at least 1 random sample for every 500 m^3.

3.3.2.2. If any sample collected does not meet requirements according to Contract.

3.3.3. Provide two random samples representative of each class and source of imported fill material samples to the Departmental Representative. Samples may be tested for geotechnical and environmental quality by Departmental Representative. Import fill material testing may take up to 5 Working Days not including day of sample provision.

3.3.4. Do not import fill material until Departmental Representative has completed and analysed testing. Testing and analysis will depend on parameters. Testing will be performed at industry regular (standard) turnaround times (i.e. not priority, emergency, same day or other rush turnaround times).

3.3.5. Departmental Representative will inspect import fill material brought onsite, and will not allow import of fill material that varies from Submittal samples.

3.4. Onsite Access Roads

3.4.1. Construct, operate and maintain the onsite access roads as required.

3.4.2. Design of temporary onsite access roads to be signed and sealed by Contractor's Qualified Professional.

3.4.3. Contractor's Qualified Professional to confirm that the temporary onsite access roads allow for the safe transport of materials and equipment.

3.4.4. Construction of the onsite access roads may require the removal of historic infrastructure.

3.4.5. Any temporary access, detour and haul roads associated with the project must be constructed to accommodate all required uses and be maintained throughout the course of construction operations in a safe, environmentally sound manner.

3.4.6. Location, alignment, design and construction of all detour, access and haul roads subject to the acceptance of the Departmental Representative.

3.4.7. Employ suitable measures to maintain quality, visibility, and safe conditions in the use of access, detour and haul roads associated with the Work.

3.5. Temporary Sloping and Shoring

3.5.1. Design, supply, install, and remove appropriate sloping or shoring to allow excavation of Contaminated Soil Extents according to Drawings or as directed by Departmental Representative.

3.5.2. Drawings show nominal slopes and excavation limits for volume estimating purposes only, and are not for construction. Contractor's Qualified Professional to determine safe and optimal slopes and excavation limits.

3.5.3. Design Requirements:

3.5.3.1. Act as sloping or shoring structures for excavations as well as for stability of foundations and infrastructure during remediation/construction excavation procedures.

3.5.3.2. Allow excavation of all Contaminated Soil laterally and vertically on the Site to Contaminated Soil Extents in accordance with the Contract. Allow excavation of additional Contaminated Soil beyond Contaminated Soil Extents in order to result in no residual contamination at the Site based on field observations or Confirmation Samples.

3.5.3.3. Provide a safe working environment for personnel and equipment within the excavation area, including collection of confirmatory samples or other work that may be required at the base of the excavation.

3.5.3.4. Additional sloping or shoring may be required to extend excavation beyond Contaminated Soil Extents according to Drawings. Revise Temporary

Sloping and Shoring design as required by Contractor's Qualified Professional.

3.5.3.5. Temporary shoring cannot have any tiebacks or supports which extend beyond the project Site boundary.

3.5.3.6. Temporary shoring must not flex or bend when exposed while excavations are occurring on the Site.

3.5.3.7. Sloping and shoring structures are temporary structures only. Resistance to seismic loads will be at the discretion of the Contractor's Qualified Professional. Be responsible for any failures and resultant costs should the temporary sloping or shoring fail due to a seismic event during the construction period.

3.5.3.8. All Shop Drawings of sloping and shoring design to be signed and sealed by Contractor's Qualified Professional.

3.5.3.9. Temporary sloping and shoring designs to be completed in accordance with methods in current version of Canadian Foundation Engineering Manual.

3.5.4. Installation:

3.5.4.1. All installation activities must take place on the Site. No staging or construction activities are to take place on adjacent properties.

3.5.4.2. Installation must be regularly inspected by Contractor's Qualified Professional.

3.5.5. Maintain side slopes of excavations in safe condition by appropriate methods and in accordance with relevant regulations.

3.5.6. During backfill operation:

3.5.6.1. Unless otherwise identified according to Drawings or as directed by the Departmental Representative, remove temporary shoring from excavations.

3.5.7. Temporary sloping and shoring excavated material:

3.5.7.1. Material excavated for sloping or shoring may be re-used as backfill to replace material removed as accepted by Contractor's Qualified Professional and Departmental Representative.

3.5.7.2. Material excavated for sloping or shoring that is accepted for backfilling must follow procedures in accordance with requirements of Contractor's Qualified Professional and meet Contract Documents.

3.5.7.3. Material excavated for sloping or shoring not accepted must be removed from Site at Contractor’s expense.

3.6. Dewatering and Heave Protection

3.6.1. Keep excavations free of water while Work is in progress unless otherwise identified according to Drawings or as directed by the Departmental Representative.

3.6.2. Provide to Departmental Representative details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

3.6.3. Plan for excavation below groundwater table to avoid quick conditions or heave.

3.6.4. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

3.6.5. Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
3.6.6. Keep excavations, staging pads, and other Work areas free from water. Provide standby equipment to ensure continuous operation of dewatering system.
3.6.7. Dewatering Methods: includes sheeting and shoring; groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and other measures necessary to enable Work to be carried out in dry conditions.
3.6.8. Separate Contaminated Water from Non-Contaminated Quality Water and collect and divert to Contaminated Water Treatment Plant as required.

3.7. Excavation

3.7.1. Notify Departmental Representative at least 5 Working Days in advance of excavation operations.
3.7.2. Excavate to lines, grades, elevations and dimensions according to Drawings or as directed by Departmental Representative using methods, means, and sequences as determined by Contractor's Qualified Professional.
3.7.3. Excavate all Contaminated Soil laterally and vertically on the Site to Contaminated Soil Extents in accordance with the Contract. Excavate additional Contaminated Soil beyond Contaminated Soil Extents in order to result in no residual contamination at the Site based on field observations or Confirmation Samples.
3.7.4. Excavation must not interfere with bearing capacity of adjacent foundations and infrastructure.
3.7.5. Machine cut banks and slopes.
3.7.6. Protect bottom of excavations from excessive traffic.
3.7.7. Grade excavation top perimeter to prevent surface water run-off into excavation.
3.7.8. Keep excavated and stockpiled materials safe distance away from edge of excavation.
3.7.9. Restrict vehicle operations directly adjacent to open excavations.
3.7.10. Remove Oversize Debris.
3.7.10.1. Piles encountered during excavation must be cut off at base of excavation. Piles are not to be extracted beyond the base of the excavation.
3.7.10.2. Debris that impinges on infrastructure or neighbouring properties is not to be removed unless directed by Departmental Representative. Contractor's Qualified Professional to confirm debris can be removed without impacting infrastructure or neighbouring properties.
3.7.10.3. Reduce size of Oversize Debris to allow to be Transported, Treated, and Disposed, as required, as Non-Contaminated Quality Soil or Contaminated Soil, as appropriate.
3.7.11. Remove Non-Contaminated Quality Soil to Landfill Facility or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

3.7.12. Earth bottoms of excavations to be undisturbed soil or sediment, level, free from loose, soft or organic material.
3.7.13. Notify Departmental Representative when bottom of excavation is reached based on Contaminated Soil Extents.
3.7.14. Provide assistance for collection of Confirmation Samples as directed to the Departmental Representative.
3.7.15. Obtain acceptance by Departmental Representative of completed excavation.

3.8. Soil Stockpiling

3.8.1. Stockpile material within work area in locations identified by Departmental Representative.
3.8.2. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor's Site Layout.
3.8.3. Segregate Contaminated Soil from Non-Contaminated Quality Soil into separate stockpiles to prevent cross-contamination.
3.8.4. Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable cover during periods of Work stoppage including at end of each Working Day and as directed by the Departmental Representative.
3.8.5. Securely fasten covers over stockpiled material until material is loaded for offsite transport.
3.8.6. Store excavated Non-Contaminated Quality Soil only on non-contaminated surface areas. Ensure no contact between excavated Non-Contaminated Quality Soil and drainage of Contaminated Water or Contaminated Soil.
3.8.7. Store excavated Contaminated Soil in temporary stockpiles.
3.8.7.1. Install impermeable liner (e.g. asphalt or minimum 20 mil (0.5 mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.
3.8.7.2. Cover stockpiled material when not being worked or sampled to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material. Cover to be impermeable (e.g. minimum 5 mil polyethylene) and securely fashioned to prevent blowing off.
3.8.7.3. Prevent Non-Contaminated Quality Water, including surface runoff water, from coming into contact with Contaminated Soil stockpiles.
3.8.8. Segregate different suspect material in discrete stockpiles to facilitate ex-situ characterization for Classification as directed by the Departmental Representative.
3.8.9. Assist Departmental Representative in collection of stockpile samples for exsitu characterization. Ex-situ characterization may take up to 5 Working Days, not counting the day the sample is collected. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Samples results provided within 5 Working Days, not counting the day the sample is collected.

3.8.10. Do not remove Contaminated Soil from stockpiles until exsitu characterization completed and as directed by Departmental Representative.

3.9. Backfill Types and Compaction

3.9.1. Use only Imported Backfilled, Overburden Backfill, or Owner Supplied Backfill in accordance with the Contract and which has been recommended by Contractor's Qualified Professional, and previously accepted as a Submittal.

3.9.2. Compact material in accordance with the more stringent of Excavation Plan or Contract to ensure no long term settlement and is suitable for planned post-remediation use. Machine compact all fill materials unless otherwise according to Contract.

3.10. Backfilling

3.10.1. Do not proceed with backfilling operations until completion of following:

3.10.1.1. Confirmation Samples collection, analysis, and assessment has been completed by the Departmental Representative. Confirmation Samples analysis and assessment may take up to 5 Working Days. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Samples results provided within 5 Working Days, not including day of sample collection.

3.10.1.2. Surveying has been completed by the Contractor's Qualified Professional for final excavation limits and As-Built documents, including final utilities locations.

3.10.1.3. Departmental Representative has inspected and accepted Contaminated Material Extents by the Departmental Representative based on survey data and Confirmation Samples results.

3.10.1.4. Departmental Representative has inspected and accepted backfill material.

3.10.1.5. Proposed backfill material can be sampled and tested for geotechnical and environmental quality. Backfill material testing may take up to 5 Working Days not including day of sample collection.

3.10.1.6. Departmental Representative has inspected and accepted compaction results for previous lift.

3.10.1.7. Removal of shoring and bracing; backfilling of voids with satisfactory backfill material.

3.10.2. Areas to be backfilled to be free from debris, snow, ice, water and frozen ground to greatest extent practicable.

3.10.3. Do not use backfill material which is frozen or contains ice, snow or debris to greatest extent practicable.

3.10.4. Place backfill material in uniform layers not exceeding 300 mm compacted thickness, or in accordance with the Contract. Compact each layer to the satisfaction of the Contractor's Qualified Professional and in accordance with the Contract before placing succeeding layer. If backfilling is allowed to proceed in the wet (i.e. underwater), use self-compacting backfill as required by Contractor's Qualified Professional in accordance with Excavation Plan.

3.10.5. Backfill compaction to be tested by Contractor's Qualified Professional in accordance with Excavation Plan.
3.10.6. Notify Departmental Representative when final backfill grade is reached.

3.11. Overburden and Owner Supplied Material Backfilling
3.11.1. Place in locations in excavation as directed by Departmental Representative.
3.11.2. Be responsible for compacting to the satisfaction of Contractor's Qualified Professional and in accordance with the Contract.
3.11.2.1. Collect and test samples as required by Contractor's Qualified Professional prior to placement.
3.11.2.2. Identify any geotechnical concerns prior, and obtain Departmental Representative approval to proceed, prior to placement.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Material Transport: will be paid in accordance with unit rate price established for weight of material transported. Includes all handling, stabilization, loading, hauling, unloading, transfer, interim storage, and transport to and from intermediate locations and final placement location. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Transportation Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Transportation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include for each Transfer/Interim Storage Facility:

1.3.1.1. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Transfer/Interim Storage of relevant Contaminated Material.

1.3.1.2. Letter from Contractor's Qualified Professional that the Transfer/Interim Storage Facility is appropriate for the quantity and quality of Contaminated Material to be Transferred/Interim Stored in accordance with any authorization and complies with appropriate government requirements of a general nature (e.g. BC Landfill Criteria).

1.3.1.3. Letter from Transfer/Interim Storage Facility that they can accept the quantity and quality of Contaminated Material to be Transferred/Interim Stored at the Facility, signed by an authorized representative of the Facility.

1.3.2. Certificate of Seaworthiness: Prior to barge shipments, Submit a Certificate of Seaworthiness by an independent licensed Marine Surveyor for all marine vessels transporting Contaminated Soil.

1.3.3. Transport Manifests: within 5 Working Days of offsite transport, Submit documentation verifying that material has been transported appropriately. Include:

1.3.3.1. Method of transport.

1.3.3.2. Name of transport company.

1.3.3.3. Weigh scale receipt including location, date, and weight of loading, as appropriate.

1.3.3.4. Weigh scale receipt including location, date, and weight of unloading.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Soil Transport

3.1.1. Assume ownership of, and be responsible for, Contaminated Material once it is loaded on a vehicle, barge, or other vessel for transport.

3.1.2. Transport material as soon as practical; do not unreasonably stockpile onsite.

3.1.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leaching from material.

3.1.4. All vehicles must be watertight. Excess water in material must not be allowed to flow out of vehicle or vessel during transport.

3.1.5. Stabilize material as necessary.

3.1.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Contaminated Material.

3.1.7. Barges must be inspected by an independent Marine Surveyor for stability and safety.

3.1.8. Manifest and correlate quantities of all Contaminated Material transported from Site documenting quantity and quality removed from Site. Include all Transfer/Interim Storage, Treatment, and Disposal Facilities. Discrepancies in manifests must be resolved as required by regulations and as acceptable to the Departmental Representative. Discrepancies include:

3.1.8.1. No manifest or an incomplete manifest.

3.1.8.2. Material transported does not match the description in the manifest.

3.1.8.3. Amount transported differs by more than 5% in the manifest.

3.1.8.4. Material transported is in a hazardous condition.

3.1.9. Transfer/Interim Storage Facility must:

3.1.9.1. Be an existing offsite facility located in Canada or the United States.

3.1.9.2. Be designed, constructed and operated for the transfer or interim storage of Contaminated Material.

3.1.9.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the transfer or interim storage of relevant Contaminated Material.

3.1.9.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Soil Treatment will be paid in accordance with unit rate price established for weight of material treated. Only includes Treatment or any other processing of material required by the Contract. Does not include Treatment or any other processing of material not required by the Contract but required by Regulations, Disposal Facility, or for other reasons. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Treatment.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Treatment Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Treatment for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include for each Treatment Facility:

1.3.1.1. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Treatment of relevant Contaminated Material.

1.3.1.2. Letter from Contractor's Qualified Professional that the Treatment Facility is appropriate for the quantity and quality of Contaminated Material to be Treated in accordance with any authorization and complies with appropriate government requirements of a general nature (e.g. BC Landfill Criteria).

1.3.1.3. Letter from Treatment Facility that they can accept the quantity and quality of Contaminated Material to be Treated at the Facility, signed by an authorized representative of the Facility.

1.3.2. Certificate of Treatment: within 30 Working Days of treatment at Treatment Facility, Submit documentation verifying that materials have been treated by Contractor. Include:

1.3.2.1. Issued by the Treatment Facility.

1.3.2.2. On company letterhead.

1.3.2.3. Name and location of facility where the material is being treated.

1.3.2.4. Date and weight for each shipment received and total weight received at the offsite facility.

1.3.2.5. Date and weight for each treatment event and total weight treated at the offsite facility.

1.3.2.6. Treatment methodology.

1.3.2.7. Laboratory certificates demonstrating treatment objectives were met.

1.3.2.8. Disposition of treated material.
1.3.2.9. Signed by identified authorized treatment company representative.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Material Treatment
3.1.1. Assume ownership of, and be responsible for, Contaminated Material treated offsite.
3.1.2. Contaminated Material Treatment - Offsite: treat at Treatment Facility provided by Contractor and accepted by the Departmental Representative.
3.1.3. Offsite Treatment Facility must:
3.1.3.1. Be an existing offsite facility located in Canada or the United States.
3.1.3.2. Be designed, constructed and operated for the handling or processing of waste in such a manner as to change the physical, chemical or biological character or composition of Contaminated Material. Treatment includes bioremediation, thermal desorption, and incineration. Treatment does not include blending, mixing, or dilution.
3.1.3.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Treatment of relevant Contaminated Material.
3.1.3.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.
3.1.4. Treat material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.
3.1.5. Material sent to an offsite Treatment Facility must subsequently be Disposed of at a Disposal Facility after treatment.
3.1.6. If proposed Treatment Facility is not acceptable to Departmental Representative, provide an alternate Treatment Facility that is acceptable.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Soil Disposal will be paid in accordance with unit rate price established for weight of material disposed. Includes Treatment or any other processing of material not required by the Contract but required by Regulations, Disposal Facility, or for other reasons. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Disposal.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Disposal Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Disposal for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include for each Disposal Facility:

1.3.1.1. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Disposal of relevant Contaminated Material.

1.3.1.2. Letter from Contractor's Qualified Professional that the Disposal Facility is appropriate for the quantity and quality of Contaminated Material to be Disposed in accordance with any authorization and complies with appropriate government requirements of a general nature (e.g. BC Landfill Criteria).

1.3.1.3. Letter from Disposal Facility that they can accept the quantity and quality of Contaminated Material to be Disposed at the Facility, signed by an authorized representative of the Facility.

1.3.2. Certificate of Disposal: within 30 Working Days of disposal at Disposal Facility, Submit documentation verifying that materials have been disposed by Contractor. Include:

1.3.2.1. Issued by the Disposal Facility.

1.3.2.2. On company letterhead.

1.3.2.3. Name and location of facility where the material is being disposed.

1.3.2.4. Date and weight for each shipment received and total weight received at the Disposal Facility.

1.3.2.5. Identification of acceptance of final ownership of material.

1.3.2.6. Signed by identified authorized disposal company representative.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Material Disposal

3.1.1. Assume ownership of, and be responsible for, Contaminated Material disposed.

3.1.2. Contaminated Material Disposal: dispose all Contaminated Soil, including onsite or offsite treated Contaminated Material that may no longer be contaminated, at Disposal Facility provided by Contractor and accepted by the Departmental Representative.

3.1.3. Disposal Facility must:

3.1.3.1. Be an existing offsite facility located in Canada or the United States.

3.1.3.2. Be designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility from waste placed in or on land within the facility.

3.1.3.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Disposal of relevant Contaminated Material.

3.1.3.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.

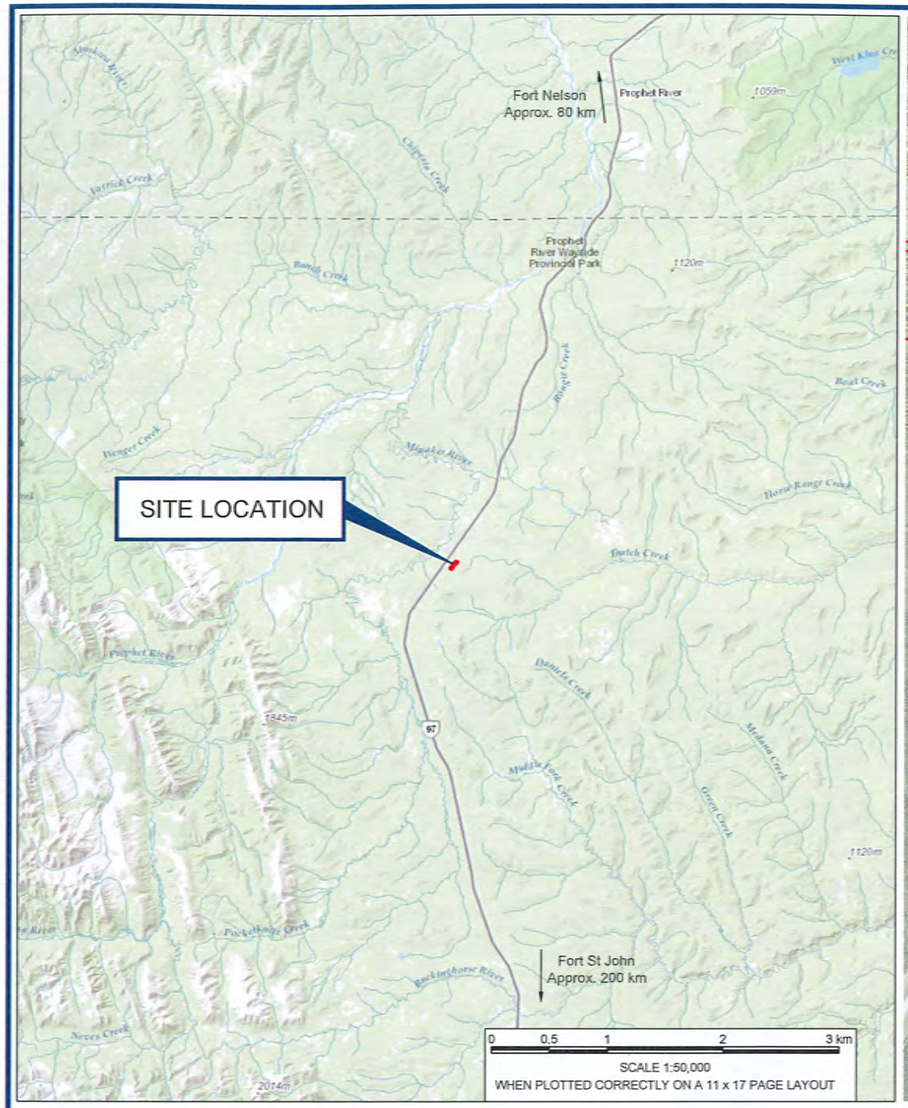
3.1.4. Dispose material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.

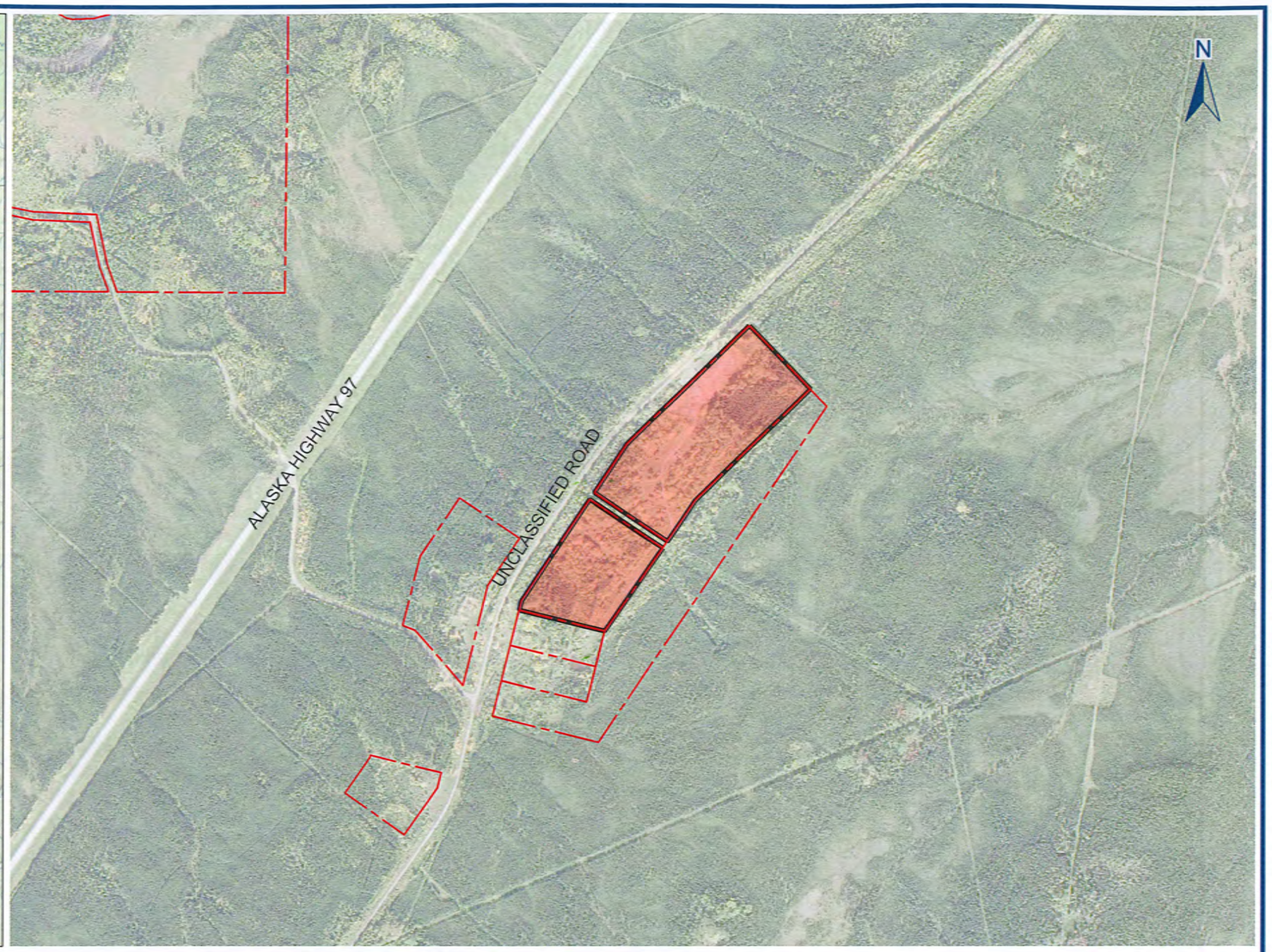
3.1.5. Material sent to a Disposal Facility must be permanently stored at that facility.

3.1.6. If proposed Disposal Facility is not acceptable to Departmental Representative, provide an alternate Disposal Facility that is acceptable.

END OF SECTION

DRAWINGS





NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

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BASEDATA:
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LEGEND:
PROPERTY BOUNDARY
SITE LOCATION

BRITISH COLUMBIA INSTITUTE OF AGROLOGISTS
3133
David Young
P.Ag.
Sept 30, 2019

0 25 50 100 150 m
SCALE 1:2,500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
K-19 TRUTCH FORMER TOWNSITE
KM 320 HIGHWAY 97, BC

TENDER SPECIFICATION FOR REMEDIATION OF CONTAMINATED SOIL

SITE LOCATION

Date:	August 13, 2019	Drawing No.
Project No.	219.05320.00006	1

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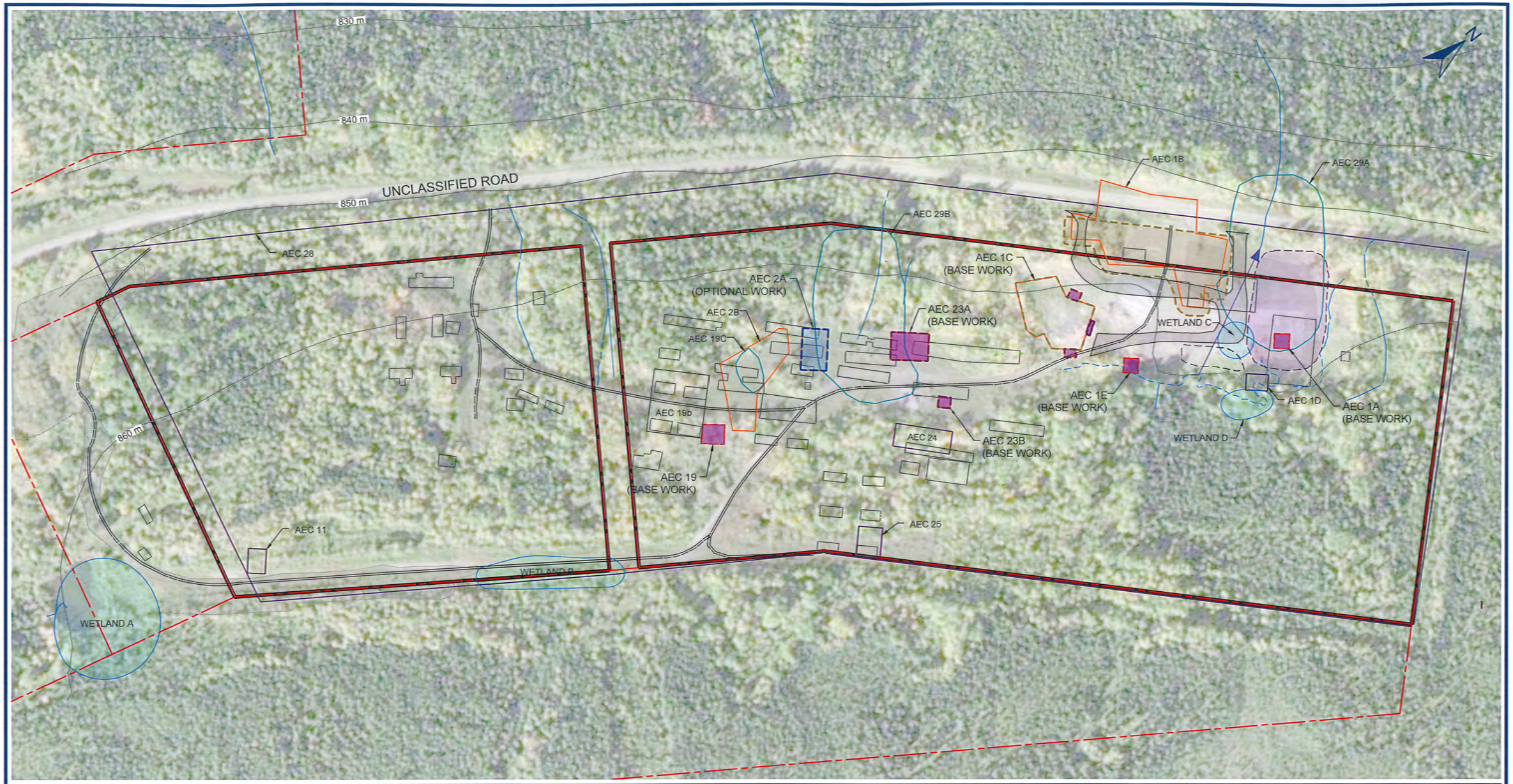
Cadfile name: S_219-05320-00006-A1.dwg



LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- CONTOUR (10 m)
- INFERRED UNDERGROUND WATERCOURSE
- WATERCOURSE
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- APPROXIMATE WETLAND
- APPROXIMATE LOCATION OF HISTORICAL BUILDINGS
- WOOD DEBRIS PILE
- HAUL ROAD
- LIMITS OF EXCAVATION
- LIMITS OF REMEDIAL EXCAVATION (2017)
- AEC BOUNDARY BASED ON METALS CONTAMINATION
- AEC BOUNDARY BASED ON SODIUM AND/OR CHLORIDE CONTAMINATION
- AEC BOUNDARY BASED ON ESTIMATED EXTENT OF PETROLEUM HYDROCARBON CONTAMINATION
- TEMPORARY BACKFILL STORAGE AREA
- BASE WORK
- OPTIONAL WORK
- OPEN AREA REVEGETATION WITH GRASS, SEDGE AND RUSH SPECIES

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NOTES:
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0 25 50 100 150 m

SCALE 1:2,500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
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PUBLIC SERVICES AND PROCUREMENT CANADA
K-19 TRUTCH FORMER TOWNSITE
KM 320 HIGHWAY 97, BC

TENDER SPECIFICATION FOR REMEDIATION OF CONTAMINATED SOIL

INFRASTRUCTURE AND ACCESS

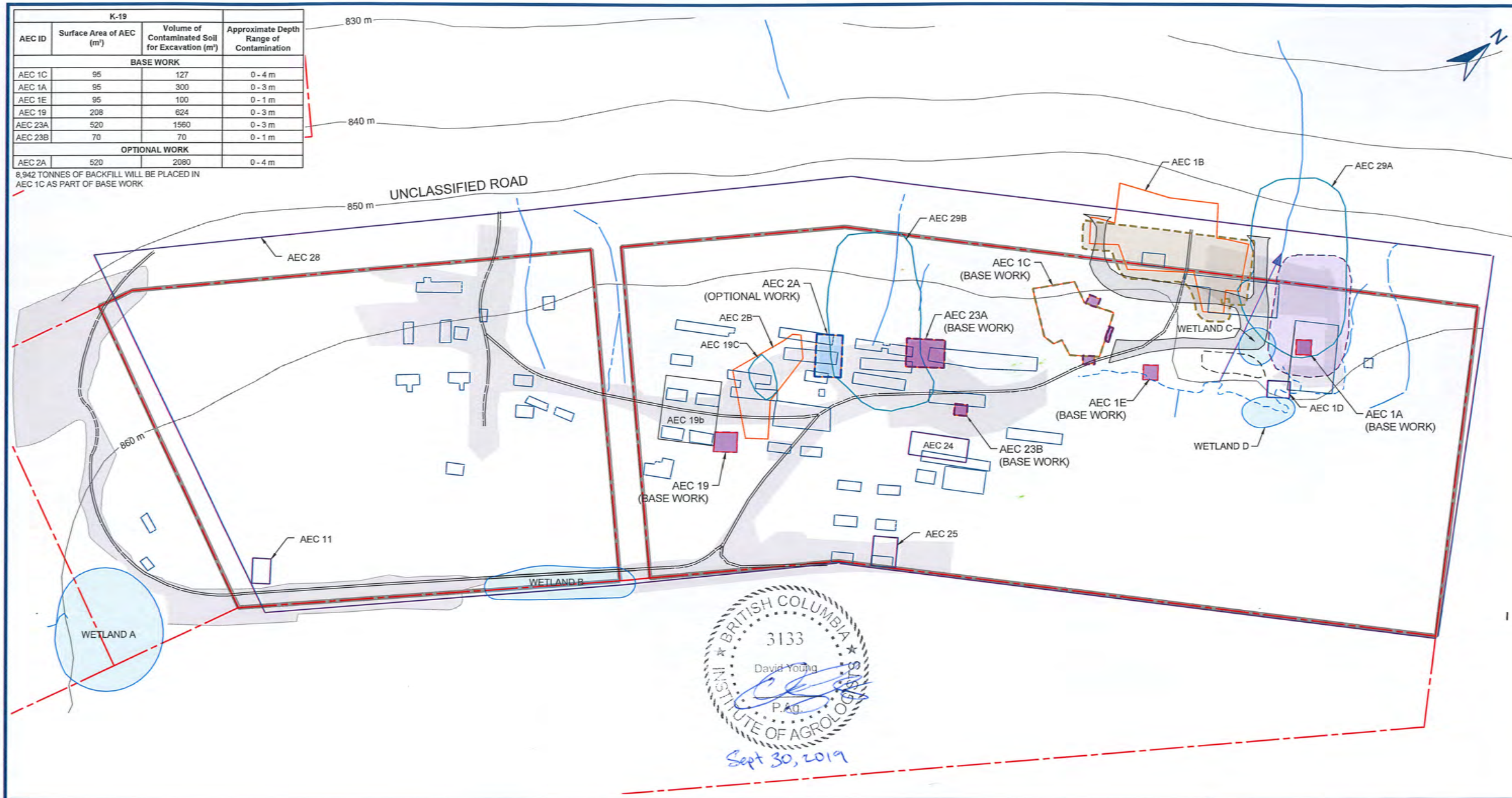
Date: August 13, 2019
Project No. 219.05320.00006
Drawing No. 2

Cadfile name: S_219-05320-00006-A1.dwg

Sept 30, 2019

K-19			
AEC ID	Surface Area of AEC (m^2)	Volume of Contaminated Soil for Excavation (m^3)	Approximate Depth Range of Contamination
BASE WORK			
AEC 1C	95	127	0 - 4 m
AEC 1A	95	300	0 - 3 m
AEC 1E	95	100	0 - 1 m
AEC 19	208	624	0 - 3 m
AEC 23A	520	1560	0 - 3 m
AEC 23B	70	70	0 - 1 m
OPTIONAL WORK			
AEC 2A	520	2080	0 - 4 m

8,942 TONNES OF BACKFILL WILL BE PLACED IN AEC 1C AS PART OF BASE WORK



BRITISH COLUMBIA
3133
David Young
P.Ag.
INSTITUTE OF AGROLOGISTS
Sept 30, 2019

LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- CONTOUR (10 m)
- INFERRED UNDERGROUND WATERCOURSE
- WATERCOURSE
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- APPROXIMATE WETLAND
- APPROXIMATE LOCATION OF HISTORICAL BUILDINGS
- WOOD DEBRIS PILE
- HAUL ROAD
- LIMITS OF EXCAVATION
- LIMITS OF REMEDIAL EXCAVATION (2017)
- AEC BOUNDARY BASED ON METALS CONTAMINATION
- AEC BOUNDARY BASED ON SODIUM AND/OR CHLORIDE CONTAMINATION
- AEC BOUNDARY BASED ON ESTIMATED EXTENT OF PETROLEUM HYDROCARBON CONTAMINATION
- TEMPORARY BACKFILL STORAGE AREA
- BASE WORK
- OPTIONAL WORK
- OPEN AREA REVEGETATION WITH GRASS, SEDGE AND RUSH SPECIES

NOTES:
REFERENCED FROM GOLDER ASSOCIATES FIGURE *SITE PLAN* (JANUARY, 2018).

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0 25 50 100 150 m

SCALE 1:2,500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
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PUBLIC SERVICES AND PROCUREMENT CANADA
K-19 TRUTCH FORMER TOWNSITE
KM 320 HIGHWAY 97, BC

TENDER SPECIFICATION FOR REMEDIATION OF CONTAMINATED SOIL

CONTAMINATED SOIL EXTENTS

Date: August 13, 2019
Project No. 219.05320.00006
Drawing No. 3

Cadfile name: S_219-05320-00006-A1.dwg

LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- CONTOUR (10 m)
- INFERRED UNDERGROUND WATERCOURSE
- WATERCOURSE
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- APPROXIMATE WETLAND
- WOOD DEBRIS PILE
- BASE WORK
- OPTIONAL WORK
- OPEN AREA REVEGETATION WITH GRASS, SEDGE AND RUSH SPECIES
- CONIFER FOREST
- MIXED FOREST
- TALL SHRUB ZONES

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NOTES:
REFERENCED FROM GOLDER ASSOCIATES FIGURE *SITE PLAN* (JANUARY, 2018). IMAGERY © 2018 MICROSOFT CORPORATION © 2018 DIGITALGLOBE ©CNES (2018) DISTRIBUTION AIRBUS DS.

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WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
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THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
K-19 TRUTCH FORMER TOWNSITE
KM 320 HIGHWAY 97, BC

TENDER SPECIFICATION FOR REMEDIATION OF CONTAMINATED SOIL

SITE RESTORATION

Date: August 13, 2019
Project No. 219.05320.00006
Drawing No. 4

Cadfile name: S_219-05320-00006-A1.dwg

APPENDIX A
Site Photographs

Photograph 1: View of K19 during stockpile removal (December 2018).

Photograph 2: View of K19 during stockpile removal (December 2018).

APPENDIX B
Environmental Data

29 March 2018

K-19 TRUTCH FORMER TOWNSITE, ALASKA HIGHWAY, NORTHERN BC

2018 Updated Remedial Action Plan / Risk Management Plan

Submitted to:
Public Services and Procurement Canada
Environmental Services, Pacific Region
Suite 641 - 800 Burrard Street
Vancouver, BC V6Z 2J

REPORT

Report Number: 1657709-048-R-Rev0-6000

Distribution:

1 Electronic Copy - Public Services and Procurement Canada

Golder Associates

Notice to Readers

This report was prepared in accordance with the terms and conditions of the Public Works and Government Services Canada (PWGSC) Remediation Consultants Contract with Task Authorizations (CTA) #EZ897-160027/002/PWY) dated 31 July 2015 and scope of work outlined in Golder's email to PSPC dated 20 December 2017 in regard to refinement of scope related to the original scope of work described in the document titled "*Implementation Work Plan and Cost Estimate: Tasks in Support of Remediation Implementation of Remediation Plan and Contractor Monitoring, at Site K19, Alaska Highway, Northern, BC*", dated 29 June 2017, and scope amendment provided via email communication to Mr. Dave Osguthorpe, dated 20 December 2017. Approval for the original scope of work was provided in TA 700386476 on 20 July 2017. Approval of the scope amendment was provided by Mr. Dave Osguthorpe on behalf of PSPC on 3 January 2018.

The inferences concerning Site conditions contained in this report are based on information obtained during the assessment conducted by Golder personnel, and are based solely on the condition of the properties at the time of the Site reconnaissance, supplemented by historical and interview information obtained by Golder, as described in this report.

This report was prepared, based in part, on information obtained from historic information sources. In evaluating the subject Site, Golder has relied in good faith on information provided. We accept no responsibility for any deficiency or inaccuracy contained in this report as a result of our reliance on the aforementioned information.

The findings and conclusions documented in this report have been prepared for the specific application to this project and have been developed in a manner consistent with that level of care normally exercised by environmental professionals currently practicing under similar conditions in the jurisdiction.

With respect to regulatory compliance issues, regulatory statutes are subject to interpretation. These interpretations may change over time, these should be reviewed.

Executive Summary

Golder Associates Ltd. (Golder) was retained by Public Services and Procurement Canada to provide the following updated 2018 Remedial Action Plan / Risk Management Plan (RAP/RMP) for the K-19 Trutch Former Townsite, Kilometre 320, Alaska Highway, BC (the Site). The updates to the previous RAP/RMP (issued 14 October 2016) were requested by PSPC as the result of additional investigation and remediation work that was undertaken at the Site during Fiscal Year 2017/2018. The Site is located approximately 247 kilometres (km) north of Fort St. John.

The objectives of this report are to:

- provide a summary description of the remedial options considered for application at the Site
- update the remedial action plan for the Site based on investigation and remediation activities conducted at the Site between 14 October 2016 and 15 March 2018
- outline the approach for implementation of the preferred remedial option selected by PSPC for AECs that have not yet been remediated at the Site

The report also provides an updated cost estimate to implement the preferred remedial option for remaining AECs at the Site. The goal of remediation is to reduce future liability related to present environmental conditions at the Site, and to remediate the Site in a manner that will allow PSPC to return the Site to the Province in the future.

This report was prepared in accordance with the Public Works and Government Services Canada (PWGSC) Remediation Consultants Contract with Task Authorizations (CTA) #EZ897-160027/002/PWY) dated 31 July 2015 and scope of work outlined in Golder's email to PSPC dated 20 December 2017 in regard to refinement of scope related to the original scope of work described in the document titled "*Implementation Work Plan and Cost Estimate: Tasks in Support of Remediation Implementation of Remediation Plan and Contractor Monitoring, at Site K19, Alaska Highway, Northern, BC*", dated 29 June 2017, and scope amendment provided via email communication to Mr. Dave Osguthorpe, dated 20 December 2017. Approval for the original scope of work was provided in TA 700386476 on 20 July 2017. Approval of the scope amendment was provided by Mr. Dave Osguthorpe on behalf of PSPC on 3 January 2018.

The Site is located within the former Townsite of Trutch, BC, which historically consisted of a highway construction and maintenance camp, refuelling area and residential area. At the time of the remediation program implemented by Golder in October 2017 the Site consisted of cleared areas, as well as areas that were overgrown by vegetation. Derelict concrete foundations, abandoned motor vehicles, machinery and parts, and various refuse were observed. Infrastructure such as buried pipes and underground storage tank (UST) vents were also noted.

The current remediation strategy for the Site is to remove accessible hydrocarbon and VOC contaminated soil from the Site through excavation and off-site disposal. Implementation of this remedial strategy commenced at the end of September 2017, with excavation and off-site disposal work being conducted at AEC 1B and AEC 1C.

Due to the relatively shallow nature of the petroleum hydrocarbon and solvent contamination present in AEC 1B and AEC 1C (i.e., generally less than 6 m below ground surface [bgs]), excavation of the majority of the petroleum hydrocarbon and solvent contamination was considered successful. For remaining accessible AECs at the Site,

it is anticipated that this remediation approach will also have a high likelihood of success and provide a high degree of certainty that soil would be sufficiently remediated (by removal of the main contaminant source areas) to meet the project objectives. In addition, while excavating to remove petroleum hydrocarbon and solvent contaminated soils, some areas of metals- contaminated soils will also be removed. Contaminated soil that was excavated in the fall of 2017 was transported off-site for disposal at the Northern Rockies Landfill in Fort Nelson; it is anticipated that contaminated soil excavated in the future could also be disposed at this location. Post-remediation monitoring of groundwater and soil vapour will be required in order to confirm that the remediation objectives have been met.

Residual groundwater contamination or inaccessible soil contamination remaining following the remediation will be addressed through risk assessment / risk management. Once remediation has been confirmed, the Site will be evaluated through the Federal Contaminated Sites Action Plan (FCSAP) Site Closure Tool.

The revised 2018 Remedial Plan / Risk Management Strategy continues to adopt the hybrid approach that includes a combination of excavation of contaminated soil for off-site disposal and risk assessment / risk management to address residual soil and groundwater contamination as well as contamination within the weathered bedrock formation. Based on the results of investigation work conducted to 15 March 2018, approximately 39,026 cubic metres (m^3) of known petroleum hydrocarbon and VOC impacted soils are expected to be removed from the Site. Of this volume, approximately 21,865 m^3 was excavated from AEC 1B and AEC 1C as part of a remedial program implemented between September and November 2017 (Golder 2018a). Therefore, approximately 17,161 m^3 of contaminated soil are expected to be excavated as part of future remediation work at the Site.

A description of proposed project activities and the associated construction and consulting costs are summarised in the table below.

Fiscal Year	Description of Activities	Construction Costs	Consulting Costs	Analytical Costs	Total Cost
2018/2019	Transport and off-site disposal of stockpiled material from AEC 1C, backfilling of AEC 1C	$662,000	$72,000	-	$734,000
	Post-Remediation Investigation and Monitoring	-	$109,000	$52,000	$161,000
	Post-Remediation Monitoring Report, Detailed Quantitative Risk Assessment, Project Management	-	$106,000	-	$106,000
2019/2020	Remedial Excavation of Remaining AECs	$3,583,000	$317,000	$69,000	$3,969,000
	Post-Remediation Monitoring Report, Detailed Quantitative Risk Assessment, Project Management	-	$227,000	$23,000	$250,000
Total					**$5,220,000**

The remedial cost estimate provided above includes a risk management component to address residual contamination following physical remediation efforts. The remediation approach used for the cost estimate is designed to reduce liability of PSPC relating to the contamination, and to be protective of human health and the environment. In developing this preliminary high-level cost estimate several key assumptions were made as detailed in Section 4.5.2 and Appendix B of this report.

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FIGURES (WITHIN TEXT)

FIGURES (ATTACHED)

APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Public Services and Procurement Canada to provide the following updated 2018 Remedial Action Plan / Risk Management Plan (RAP/RMP) for the K-19 Trutch Former Townsite, Kilometre 320, Alaska Highway, BC (the Site). The updates to the previous RAP/RMP (issued 14 October 2016) were requested by PSPC as the result of additional investigation and remediation work that was undertaken at the Site during Fiscal Year 2017/2018. The Site is located approximately 247 kilometres (km) north of Fort St. John.

This report was prepared in accordance with the Public Works and Government Services Canada (PWGSC) Remediation Consultants Contract with Task Authorizations (CTA) #EZ897-160027/002/PWY) dated 31 July 2015 and scope of work outlined in Golder's email to PSPC dated 20 December 2017 in regard to refinement of scope related to the original scope of work described in the document titled "*Implementation Work Plan and Cost Estimate: Tasks in Support of Remediation Implementation of Remediation Plan and Contractor Monitoring, at Site K19, Alaska Highway, Northern, BC*", dated 29 June 2017, and scope amendment provided via email communication to Mr. Dave Osguthorpe, dated 20 December 2017. Approval for the original scope of work was provided in TA 700386476 on 20 July 2017. Approval of the scope amendment was provided by Mr. Dave Osguthorpe on behalf of PSPC on 3 January 2018.

1.1 Site Description

The Site is located within the former Townsite of Trutch, BC, which historically consisted of a highway construction and maintenance camp, refuelling area and residential area. At the time of the remediation program implemented by Golder in October 2017 the Site consisted of cleared areas, as well as areas that were overgrown by vegetation. Derelict concrete foundations, abandoned motor vehicles, machinery and parts, and various refuse were observed. Infrastructure such as buried pipes and underground storage tank (UST) vents were also noted. A summary of these features is shown on Figure 2.

According to (Franz 2010a), the Site is described as Land PIN/SID: 8247770 and 8247800; Land Act Parcel: DL 1699 and 1700, Peace River District. Golder understands that the Site is currently owned by the Province of British Columbia (the Province) and leased by the province to PSPC.

1.2 Purpose

The goal of remediation is to reduce future liability related to present environmental conditions at the Site, and to remediate the Site in a manner that will allow PSPC to return the Site to the Province in the future. Remediation, and liability reduction can be achieved through:

a) removing contaminated media from the Site, either physically or chemically; and/or

b) risk based assessment of in situ contaminated media

Contaminated media can be removed and treated on-site or disposed at an off-site permitted facility. Risk assessment includes evaluation of contaminant sources, pathways and receptors and identifying conditions under which sources, pathways and receptors can be eliminated or managed.

1.3 Objective of the Report

The objectives of this report are to:

- provide a summary description of the remedial options considered for application at the Site
- update the remedial action plan for the Site based on investigation and remediation activities conducted at the Site between 14 October 2016 and 15 March 2018
- outline the approach for implementation of the preferred remedial option selected by PSPC for AECs that have not yet been remediated at the Site

The report also provides an updated cost estimate to implement the preferred remedial option for remaining AECs at the Site.

1.4 Regulatory Framework

The Site is under the control of PSPC through granting of Map Reserves from the Province of BC. Generally, provincial and municipal laws, regulations, bylaws, and other requirements do not apply on federal lands, activities or undertakings. Soil and other materials that are removed from federal lands may become subject to provincial or municipal regulations. Provincial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term “standard” is used in this part in order to maintain consistency in terminology throughout this document and does not imply that standards contained in provincial or municipal laws and regulations apply on Federal lands, activities, or undertakings.

Golder understands that PSPC’s overall remedial strategy for the Site will consist of implementing the Canadian Council for Ministers of the Environment (CCME) Method 3 Human Health and Ecological Risk Assessment approach (GoC 1999). The CCME Method 3 approach uses the Provincial Contaminated Sites Regulation (CSR) and associated technical guidance documents, in order to achieve numerical and/or risk-based remediation objectives.

Based on PSPC’s preferred remediation approach, the Provincial CSR document and associated guidance as outlined below was considered the primary regulatory document for the development of this RAP/RMP. Applicable Federal guidelines were considered as part of site characterization works and are therefore also outlined below.

Provincial

- Contaminated Sites Regulation (CSR) (BC Ministry of Environment and Climate Change Strategy [ENV] updated to 1 November 2017)
- Hazardous Waste Regulation (HWR) (BC ENV, updated to 1 November 2017)

Federal

- Canadian Environmental Quality Guidelines (CCME 2008; and CCME 1999)
- Federal Interim Groundwater Quality Guidelines (Government of Canada [GoC] 2015)

1.4.1 Provincial

In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the Ministry of Environment and Climate Change Strategy, pursuant to the Environmental Management Act (EMA, SBC 2003, Chapter 53 assented to 23 October 2003, updated to 30 October 2017). The key regulation under the EMA that relates to the assessment and remediation of contaminated sites is the Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M271/2004, as updated [includes amendments up to BC Reg. 253/2016 and BC Reg. 196/2017, updated to 1 November 2017]). BC Reg. 253/2016 is also known as the Stage 10 or Omnibus amendment; BC Reg. 196/2017 is also known as the Stage 11 or Housekeeping amendment. These two amendments, effective as of 1 November 2017, include significant changes to the text and numerical standards of the CSR, and are accompanied by new technical guidance documents and administrative procedures.

A related regulation under the EMA is the Hazardous Waste Regulation (HWR; BC Reg. 63/88, O.C. 268/88, as updated [includes amendments up to BC Reg. 243/2016, updated to 1 November 2017]). Previous amendments to the CSR and the HWR (in effect 19 July 2016) decoupled the CSR and HWR for the management of contaminated sites, such that the role of the HWR in contaminated sites is limited to cases of off-site transport and disposal of material meeting the criteria of hazardous waste, and cases involving materials that do not meet the definition of on-site media (e.g., drums of hazardous waste, dumped hazardous waste, mine tailings and waste rock).

A third regulation in effect in BC that applies to environmental investigations is the BC Ground Water Protection Regulation (GPWR; BC Reg 39/2016, O.C. 113/2016, including amendments up to BC Reg 152/2016, 10 June 2016). This regulation establishes standards to protect groundwater supplies by requiring wells in BC, including environmental boreholes, test pits and monitoring wells, to be properly constructed, maintained, and, at the end of their service and properly deactivated.

1.4.1.1 Soil

The CSR identifies soil standards based on six land use categories and two sub-categories: Agricultural (AL); Urban Park (PL); Wildlands (WL) (subdivided into natural and reverted); Residential (RL) (subdivided into low density and high density); Commercial (CL); and Industrial (IL). The CSR also includes standards for the protection of human health (including intake of contaminated soil) and environmental protection in consideration of environmental receptors. The standards are further divided into site-specific standards, based on the nature of the land and groundwater use at or in the area of a subject site, including standards for groundwater used for drinking water (DW), groundwater flow to aquatic life in surface water (AW), groundwater used for livestock watering (LW), and groundwater used for irrigation (IW). The CSR also includes provision for the development of site-specific risk-based standards.

Current and future land use of the Site is considered to be Wildlands Reverted (WL_R). For the purposes of remediation, WL_R soil standards were considered applicable for the top three metres of soil, while CSR IL soil standards were considered applicable for soil samples collected deeper than 3 metres below ground surface (m bgs).

The following CSR matrix and generic numerical soil standards (Schedule 3.1, Parts 1 and 2) were considered applicable to the Site:

- Human health protection—intake of contaminated soil
- Human health protection—protection of groundwater used as drinking water
- Environmental protection—toxicity to soil invertebrates and plants
- Environmental protection—groundwater flow to freshwater used by aquatic life

Current land use at the Site is Wildlands land use (WL). Wildland (WL) is defined in the CSR, as follows:

> *The use of land for the primary purpose of supporting natural ecosystems, including the use of land for ecological reserves, national or provincial parks, protected wetlands or woodlands, native forests, tundra and alpine meadows, but does not include uses defined as urban park land use.*

Reverted Wildlands (WL_R) land use refers to wildlands that do not have a designated statutory protection which have or will revert to wildlands use.

Further to the standards outlined in the Schedule 3.1, MoE's Protocol 4 for Contaminated Sites under the CSR provides the regional background soil quality estimates for specified inorganic substances in British Columbia and provides procedures to establish background soil quality on a site-specific basis for use under the Regulation (BC MoE 2010). Where exceedances of the CSR soil standards were identified, the exceedances were compared to Protocol 4 – *Table 1: Regional Background Soil Quality Estimates for Inorganic Substance, Region 7 Omineca/ Peace (Column IX)*. Background soil concentrations for barium and total chromium for the Peace Region of BC in Protocol 4 were greater than the standards set out in the CSR and were used in its place.

Part 6 of the CSR outlines remediation standards at a contaminated. While the applicable land use at the surface of the Site is considered reverted wildlands, Section 17(3) of the CSR states that soil beyond a depth of 3 m below the surface of a site is considered to be remediated in accordance with numerical soil standards, if the soil meets industrial land use standards. As such, CSR IL soil standards were also considered applicable for the development of this RAP/RMP.

1.4.1.2 Groundwater

The CSR identifies groundwater standards for the protection of drinking water (DW), irrigation (IW), livestock watering (LW), fresh water (FW) and marine water (MW) surface water bodies (AW). The CSR groundwater standards (Schedules 6 and 10) for the protection of aquatic life (AW) in freshwater (FW) bodies and for protection of groundwater used as drinking water (DW) were considered applicable to the Site.

1.4.2 Federal

1.4.2.1 Soil

Residential, Parkland, and Agricultural guidelines were considered applicable to the Site in the event that Residential land use is considered in the future. For federal sites in Canada, and provincial sites in BC, the acceptable incremental lifetime cancer risk (ILCR) is 1 in 100,000. Health Canada (Health Canada 2010) considers cancer risks from chemical exposure to be essentially negligible if the ILCR is less than 1 in 100,000. As such, an ILCR of 1 in 100,000 was considered applicable to the Site.

Surface soil as defined by CCME soil quality guidelines advances 1.5 m below ground surface. In order to compare against the most conservative guideline across the Site, fine and surface soil CCME guidelines were applied in all analyses, regardless of depth.

1.4.2.2 Groundwater

Although there are currently no drinking water wells within 1,500 metres of the site, drinking water (DW) guidelines are considered applicable as the bedrock aquifer could potentially be used for water supply in the future. Freshwater aquatic life (FW) guidelines were also considered applicable to this Site due to its proximity to freshwater surface water bodies. CCME (2008 and 2009) drinking water guidelines are published by Health Canada and are based on current, published scientific research related to health effects, aesthetic effects, and operational considerations.

Federal Interim Groundwater Quality Guidelines (GoC 2015) were used to assess groundwater quality at the Site under federal legislation. As detailed in GoC 2015, the Federal Interim Groundwater Quality Guidelines have been generally developed using methods consistent with approved CCME protocols.

1.5 Scope of Work

1.5.1 Previous Environmental Investigations

A history of non-intrusive and intrusive investigations and remediation programs conducted at the Site are summarised in Table 1. Data collected from previous field investigations were summarized and provided in Golder (2016c).

Table 1: Summary of Investigations Completed at the Site (2009-2018)

Reference	Date(s)	Summary of Investigation Efforts
Franz 2010a	August 2009	Phase I Environmental Site visit. Site was mapped and photographed for evidence of actual and/or potential environmental concern
Franz 2010b	October and November 2009	Soil and groundwater investigation
Franz 2011	August and September 2010	Soil and groundwater investigation
Franz 2014	September 2013	Limited surficial soil investigation
Golder 2016c	March 2016	Geophysical study, soil and groundwater investigation, hydraulic conductivity testing and rippability (geotechnical) assessment.
Golder 2016d	June 2016	Groundwater investigation (supplemental to the March 2016 investigation [Golder 2016c]) and Conceptual Site Model
Golder 2016e	September 2016	Soil investigation (characterization and delineation at select AECs)
Golder 2017	July 2017	Soil and groundwater investigation at APECs not previously characterized. Soil delineation at select AECs
Golder 2018a	September – November 2017	Remedial excavation of AEC 1B and AEC 1C
Golder 2018b	January 2018	Supplementary Delineation Investigation and Post-Remediation Monitoring
Golder 2018c	March 2018	Supplementary Delineation Investigation

1.5.1.1 Areas of Environmental Concern

Table 3, below, summarizes the AECs that have been retained for remediation and/or risk assessment (Figure 3), based on the investigations conducted at the Site up to 15 March 2018. As noted earlier, the CSR standards have been adopted as remedial objectives for the Site and as such the classification of AECs and delineation of boundaries have been based on this assumption. Associated Contaminants of Concern (COCs – for AECs where soil and/or groundwater exceedances have been identified) are also shown in Table 2. It should be noted that, as of the date of this report, COCs are limited to soil and groundwater. Post-remediation soil vapour monitoring was conducted in January 2018 and results were less than applicable CSR standards; as such, COCs in soil vapour haves not been identified.

Table 2: Summary of AECs and COCs Identified at the Site

APEC / AEC	Description	Contamination Identified to date[1]	Status
AEC 1 a [(3)]	Suspected Maintenance Garage	**Soil:** salt related parameters (i.e., sodium and chloride) and petroleum hydrocarbon related parameters **Groundwater:** metals, salt related parameters	Carried forward for remediation of hydrocarbon contamination and risk assessment for salt related contamination (AEC 29). Area for hydrocarbon remediation is delineated.
AEC 1b	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, zinc), petroleum hydrocarbon related parameters, VOCs **Groundwater:** metals, salt related parameters, petroleum hydrocarbon related parameters [(2)]	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is partially delineated. Hydrocarbon contamination in soil and groundwater extends to the former alignment. Off-site delineation has not been completed.
AEC 1c	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, nickel, selenium) petroleum hydrocarbon related parameters **Groundwater:** metals, petroleum hydrocarbon related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC/ APEC 1d	Berm of debris (100 m long) near Suspected Maintenance Garage	**Soil:** metals (arsenic, barium and iron) **Groundwater:** metals (lithium[4])	Carried forward as AEC 1d. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 1e	Shallow hydrocarbon contamination on the eastern side of the access road	**Soil:** Metals (arsenic, barium, cadmium), petroleum hydrocarbon related parameters	Carried forward for remediation and risk assessment
AEC 1f	Shallow hydrocarbon contamination between AEC 1b and AEC 1C	**Soil:** benzene	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC 2a	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, beryllium), petroleum hydrocarbon related parameters **Groundwater:** metals (barium), salt related parameters [(2)]	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC 2b	Suspected Maintenance Garage	**Soil:** metals (barium), petroleum hydrocarbon related parameters **Groundwater:** metals (barium, cobalt), salt related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC/ APEC 3a [(3)]	Former residential area with ASTs, minor surface debris	**Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).

APEC / AEC	Description	Contamination Identified to date[1]	Status
AEC/ APEC 3b [(3)]	Former residential area with ASTs, minor surface debris	**Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 4	Former residential area with USTs, and minor surface debris	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 5	Potentially Buried Debris	**Soil:** metals (arsenic, cadmium, and zinc) **Groundwater:** metals (lithium)	Carried forward as part of AEC 24 for metals in soil and as part of AEC 28 for metals in groundwater. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 6	Surface Area Debris	**Soil:** metals (arsenic, zinc) **Groundwater:** metals (lithium)	Area combined with AEC 5 and carried forward as AEC 24. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 7a	Potentially Buried Debris (including Car Parts)	Area addressed with AEC 23a	Area addressed with AEC 23a
APEC 7b	Surface Area Debris	**Groundwater:** Metals (barium and cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 8	Potentially Buried Debris	None	Retired as an APEC. APEC not retained for further investigation
APEC 9	Surface Area Debris including 200-L Drum	None	Retired as an APEC. APEC not retained for further investigation
APEC 10a	Rebar and 200-L Drum	**Soil:** Metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 10b	Partially Exposed Metal Pipe	**Soil:** Metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC/AEC 11	Surface Area Debris including AST, Abandoned Fuel Pumps, and 200-L Drums	**Soil:** metals (arsenic, barium, manganese, zinc) **Groundwater:** metals (lithium)	Carried forward as AEC 11 for metals in soil (manganese and zinc), carried forward as AEC 28 for groundwater. Both to be addressed through site wide risk-based evaluation (further detailed below).

APEC / AEC	Description	Contamination Identified to date[1]	Status
APEC/AEC 12	Surface Area Debris including 200-L Drums, Abandoned Residential Structure, and vehicle parts	**Soil:** metals (barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC/AEC 13	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (barium) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 14	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 15	Inferred industrial building on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 16	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 17	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 18	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 19	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, barium, cobalt) and petroleum hydrocarbon contamination **Groundwater:** metals (cobalt)	Carried forward as AEC 19a and 19b and is carried forward for remediation and risk assessment.
APEC 20	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 21	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 23a	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic), petroleum hydrocarbon related parameters **Groundwater:** metals (barium, cobalt), salt related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is generally delineated.

APEC / AEC	Description	Contamination Identified to date[1]	Status
AEC 23b	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** petroleum hydrocarbon related parameters	Carried forward for remediation (surficial contamination). Step out sampling required to confirm lateral extent fully.
APEC/ AEC 24	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, cadmium and zinc), **Groundwater:** metals (cobalt)	Carried forward as AEC 24 for metals in soil (cadmium and zinc), carried forward as AEC 28 for groundwater and arsenic in soil. To be addressed through site wide risk-based evaluation (further detailed below).
APEC 25	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic, zinc) **Groundwater:** metals (zinc)	Carried forward as AEC 25 for zinc in soil and groundwater. Carried forward as AEC 28 for groundwater. Metals will be addressed through site wide risk-based evaluation (further detailed below).
APEC 26	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Groundwater:** metals (barium, cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 27	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Groundwater:** metals (lithium)	Carried forward as AEC28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 28	Site-wide Metals	**Soil:** metals **Groundwater:** metals	Carried forward for risk-assessment. Related to widespread exceedances of arsenic and barium in soil and dissolved barium, cobalt and lithium exceedances across the Site. Further interpretation and investigation may be required to determine which metals are associated with background concentrations and which are anthropogenic in nature.
AEC 29 a, b and c	Site-Wide Storage and Handling of Salt	**Soil:** sodium and chloride ions **Groundwater:** salt related parameters	Carried forward for risk-assessment. Generally delineated. Further localized refinement of extent of contamination may be required.

Notes:

AEC = Area of Environmental Concern; APEC = Area of Potential Environmental Concern; AST = Aboveground Storage Tank; BTEX = benzene, toluene, ethylbenzene and xylenes; COCs = Contaminants of Concern; F1, F2 and F4 = Fraction 1, Fraction 2 and Fraction 4 (F1 to F4 is inclusive of Fraction 3); HEPH/LEPH = heavy and light extractable petroleum hydrocarbons; L = Litre; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; PCOCs = Potential Contaminants of Concern; PHC = petroleum hydrocarbons; VH_{C6-10} = Volatile Hydrocarbons, carbon range 6 to 10; VOCs = volatile organic compounds; VPH = volatile petroleum hydrocarbons

1.5.2 Previous Remedial Excavations

Based on review of Franz (2010a), some above-ground infrastructure (i.e., historical Site buildings) were removed from the Site between 1974 and 2002.

A remedial excavation program was undertaken between 27 September and 15 November 2017. PSPC retained Golder to monitor and document the remediation of AEC 1B and AEC 1C at the Site. The primary activities conducted at the Site as part of the remediation program included:

- excavation and off-site disposal of contaminated soil from AEC 1B and AEC 1C at the Site (a summary of the soil volumes removed from each AEC is shown on Table 3, below)
- decommissioning of 13 monitoring wells that were located within or in the immediate vicinity of the excavation areas
- backfilling of EX17-01 within AEC 1B
- partial backfilling of EX17-02 within AEC 1C
- site restoration activities

Table 3: Summary of Excavated Soil Volumes

AEC	Surveyed Volume of Contaminated Material Removed (m^3)	Disposal Location	Residual Soil Contaminants of Concern (in situ)	Status
AEC 1B	16,316	Northern Rockies Landfill (37,290 tonnes)	Benzene, toluene, xylene, naphthalene, LEPH, HEPH, VPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls
AEC 1C	5,549	Northern Rockies Landfill (5,793 tonnes) Temporary On-Site Stockpile (6,889 tonnes)	Benzene, toluene, xylene, LEPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls Backfilling of excavation to pre-existing Site grade.

Approximately 19,186 m^3 of backfill material (ex situ volume), was imported to the Site from the Adsette pit, near Prophet River: 17,756 m^3 of imported backfill was placed in situ within AEC 1B, while 1,430 m^3 of imported backfill was placed in situ within AEC 1C. An additional 1,064 m^3 of clean overburden material was backfilled within AEC 1B. Sampling data provided prior to mobilization by Tervita indicated that concentrations of contaminants of concern were below the CSR WL_R standards at the time the results were reviewed. Additional quality assurance sampling and chemical analysis carried out on the backfill material imported to Site by Golder and analysed for metals indicated that concentrations of arsenic in selected backfill samples were above the applicable CSR standards. The arsenic exceedances were considered to be related to background soil quality given the originating source and were the result of regulatory changes that were introduced following the completion of backfilling work at the Site. EX17-01 (AEC 1B) was backfilled, compacted and restored to conditions similar to pre-existing site grades, while the excavated area at EX 17-02 (AEC 1C) was partially backfilled to a depth of approximately 2.0 m bgs.

The overall objective of the remediation activities at the Site was to reduce PSPC's liability associated with contaminated soil and groundwater at the Site. In general, remediation objectives were met, as the majority of the confirmatory soil samples collected from the walls and bases of both excavations meet the applicable CSR WL_R/IL standards. However, multiple confirmatory samples collected in both excavations exceeded these applicable standards. In addition, as noted above, changes to the CSR Protocol 4 relating to background arsenic concentrations that came to force on 1 November 2017 resulted in slight exceedances in multiple backfill material samples which had at the time of sampling and analysis and importation/placement had met the background concentrations.

Based on the scope of the 2017 remediation work that was conducted, residual hydrocarbon contaminated material remains in situ in localized areas within both AEC 1B and AEC 1C. Additional investigation work was conducted at AEC 1B and AEC 1C in January 2018 to laterally delineate the extent of residual contamination in confirmatory wall samples. Additional remediation work will be conducted at AEC 1B and AEC 1C in the future, in order to remove the residual contaminated material that underlies the former Alaska Highway alignment as well as along a portion of the eastern wall of the EX 17-01 at AEC 1B. Similarly, for EX 17-02 at AEC 1C, it is anticipated that the residual contaminated material remaining along localized sections of the excavation walls will be remediated as part of the future remediation program at the Site. Further remediation work at AEC 1C will also include disposal of the existing stockpile of contaminated soils that were excavated as part of the 2017 remediation program.

1.6 Technical Constraints

The selection of a remedial approach for a site is affected by the nature and distribution of the contamination as well as specific features of the site that may impact or constrain remediation. For the subject Site of this RAP/RMP, these features include:

- Remaining historic Site infrastructure:
  - May limit access to some areas of contamination.
  - It is assumed that any concrete foundations, buried utilities or underground storage tanks (USTs) will be removed and disposed (off-site) to gain access to underlying contamination prior to initiation of remediation efforts.
- Remote Sites Location:
  - Shipping of construction materials, e.g., import backfill, will be costly.
  - Disposal options for contaminated soil are limited.
  - Wildlife may be present at the Site.
  - No power, water or sewer facilities are available at the Site.
- Northern climate: work conducted over the winter months, may incur additional cost, schedule and logistical implications.

- Site topography, including heavily wooded/treed areas, marshy areas and a pond at the Site.
- Complex contamination:
  - Soils contamination is a mixture of petroleum hydrocarbon, VOCs, metals, and/or potentially salt (sodium and chloride ion).
  - Groundwater contamination (where present) is a mixture of petroleum hydrocarbons, VOCs, metals, and/or salt (sodium and chloride ion) and is proximal to the source areas as well as widespread as a result of possible contribution associated to back ground concentrations.
  - Contamination is present in multiple areas of the Site. The areas have been delineated for the identified AECs but the specific extents of contamination may vary, based on observations made during the excavation program.
  - Based on the history of the Site, which included multiple work areas, contamination or buried drums, USTs, etc., areas of hydrocarbon contamination could be encountered where investigation was not undertaken or between investigation locations.
- Variable site conditions at bedrock interface:
  - Bedrock is present at the Site at shallow depths. The bedrock is weathered in the upper horizons (residual soils) before transitioning in to less weathered/intact horizons. Based on the results of Golder's March 2016 field program (Golder 2016c), the upper layers of weathered bedrock (residual soils) could be excavated and disposed of off-site.
  - Petroleum hydrocarbon and/or VOC contamination may still be present in bedrock following remediation (this was observed during remediation work conducted in 2017) – this will be risk-assessed as part of a likely risk management option in tandem with an allowance for two years of post-remediation groundwater and vapour monitoring.
- Potential for hazardous building materials to be present on the Site.

2.0 CONCEPTUAL SITE MODEL

The charts below summarise the conceptual site model that describes the potential exposure pathways for ecological and human receptors at the Site.

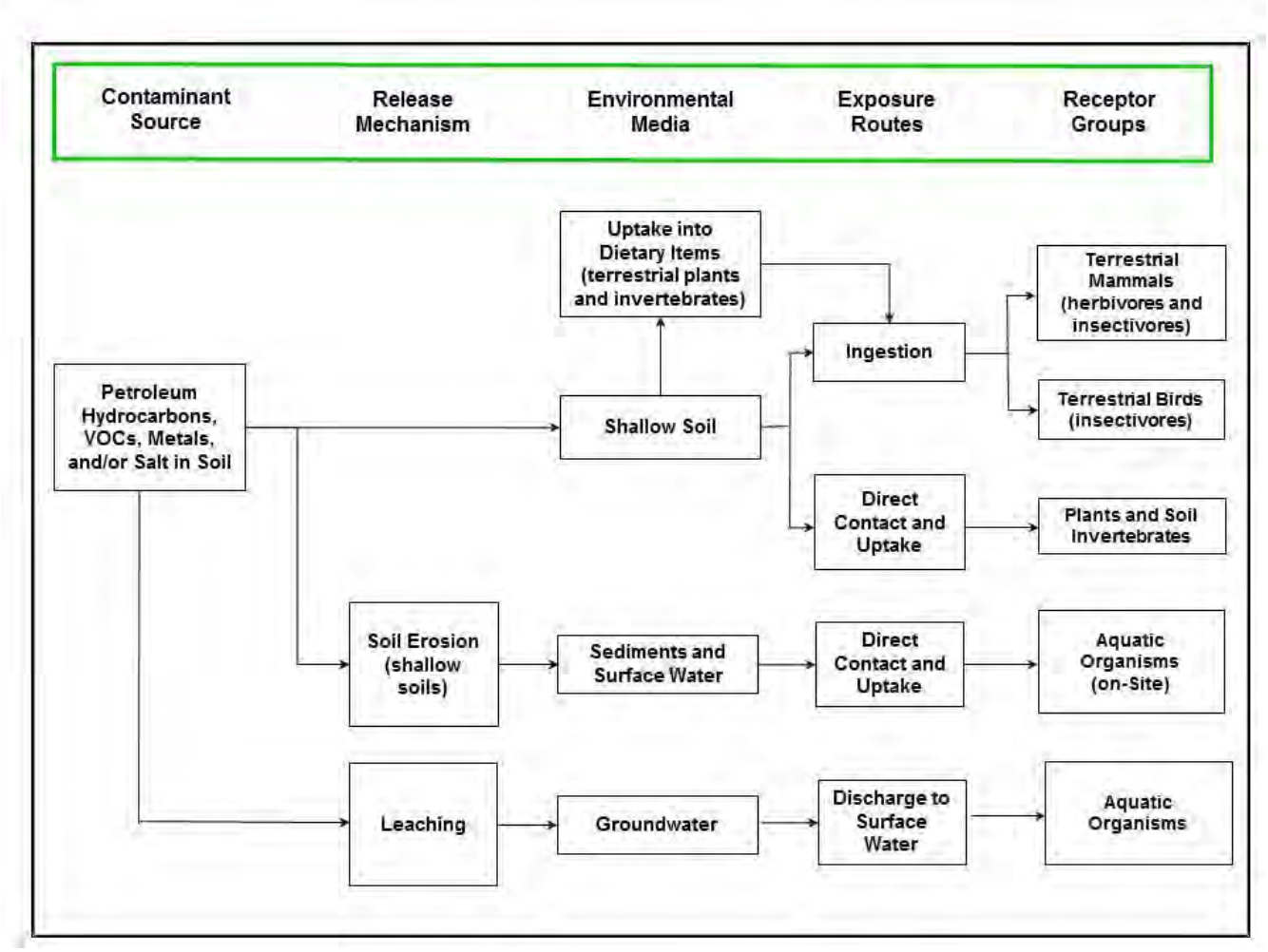

Figure A: Site Conceptual Model for Ecological Exposure to Contaminants

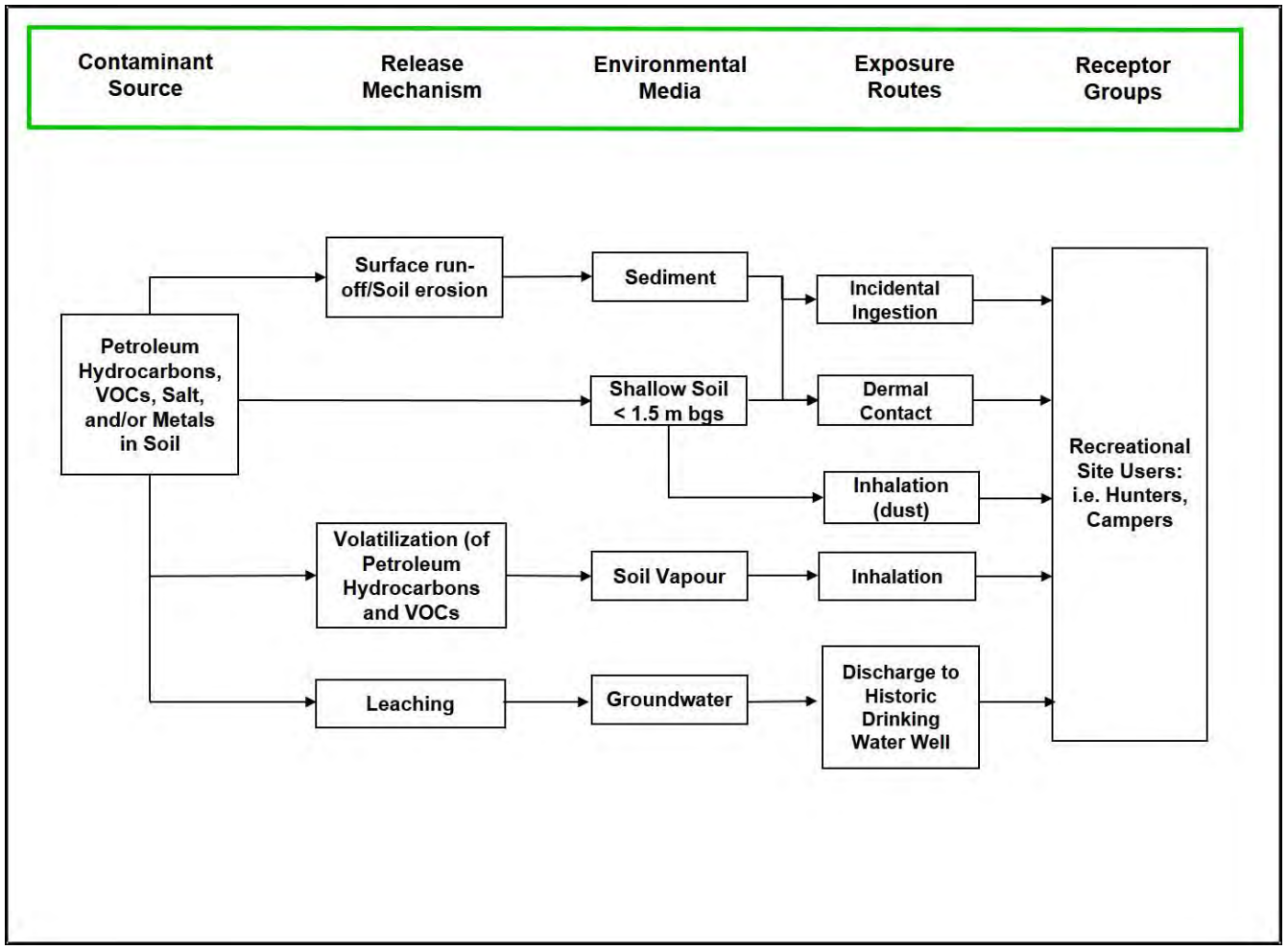

Figure B: Site Conceptual Model for Human Health Exposure to Contaminants

3.0 SITE MANAGEMENT STRATEGY

3.1 Remediation Strategy

The current remediation strategy for the Site is to remove accessible hydrocarbon and VOC contaminated soil from the Site through excavation and off-site disposal. Implementation of this remedial strategy commenced at the end of September 2017, with excavation and off-Site disposal work being conducted at AEC 1B and AEC 1C.

Due to the relatively shallow nature of the petroleum hydrocarbon and solvent contamination present in AEC 1B and AEC 1C (i.e., generally less than 6 m below ground surface [bgs]), excavation of the majority of the petroleum hydrocarbon and solvent contamination was considered successful. For remaining accessible AECs at the Site, it is anticipated that this remediation approach will also have a high likelihood of success and provide a high degree of certainty that soil would be sufficiently remediated (by removal of the main contaminant source areas) to meet the project objectives. In addition, while excavating to remove petroleum hydrocarbon and solvent contaminated soils, some areas of metals- contaminated soils will also be removed. Contaminated soil that was excavated in the fall of 2017 was transported off-site for disposal at the Northern Rockies Landfill in Fort Nelson; it is anticipated that contaminated soil excavated in the future could also be disposed at this location. Post-remediation monitoring of groundwater and soil vapour will be required in order to confirm that the remediation objectives have been met.

Residual groundwater contamination or inaccessible soil contamination remaining following the remediation will be addressed through risk assessment / risk management. Once remediation has been confirmed, the Site will be evaluated through the Federal Contaminated Sites Action Plan (FCSAP) Site Closure Tool.

3.2 Risk Management Strategy

Golder proposes that salt, metals, and residual hydrocarbon contamination identified in the bedrock and groundwater at the Site, are addressed through risk assessment / risk management. Risk assessment / risk management is a commonly implemented remedial option for addressing contamination in areas where the potential exposure of contaminants is relatively low and where remediation of contaminated soils is not considered practical or cost effective. It is expected that the risk assessment / risk management strategy will include:

a) Conclusions that selected metals exceedances in soil (arsenic and barium) represent natural background conditions and/or the observed concentrations associated with other soil metal exceedances do not pose unacceptable risk to human health and ecological receptors.

b) Conclusions that residual hydrocarbon exceedances in bedrock (benzene and toluene in selected base confirmatory sample locations) do not pose unacceptable risk to human health and ecological receptors (including observations from post remediation soil vapour monitoring).

c) Identification of salt and metals contamination (in soil and groundwater) source areas, pathways, and receptors.

d) Assessment and conclusions that any groundwater contamination that may still be present following remedial excavations and two rounds of seasonal groundwater monitoring (four monitoring events in total) do not pose unacceptable risk to human health and ecological receptors.

e) Application of a site-specific Tier 3 guideline for these substances based on the risk-based standards permitted under the CSR.

4.0 REMEDIAL PLAN / RISK MANAGEMENT

4.1 Data Summary

Previous investigations have identified salt, metals, hydrocarbon, and VOC contamination in soil and groundwater at the Site. The estimated extent of contamination in soil and groundwater, based on Site conditions observed during the January 2018 investigation program, is shown in Figure 3. A summary of Site conditions is provided below.

4.1.1 Site Stratigraphy

The geologic conditions encountered during previous investigations at the Site consisted of four units, including:

a) localised, thin (<1 m thick) deposits of fill material, interpreted to have been placed during townsite construction and road building operations

b) surficial soils consisting of native till deposits, 0.6 m to > 4 m thick and comprised of sands, silts and clays, and some gravel and cobbles

c) weathered bedrock consisting of residual sandstone and siltstone

d) competent bedrock consisting of fine-grained sandstone interbedded with siltstone and mudstone (Golder 2016c).

Detailed borehole logs are provided in Golder 2016c.

4.1.2 Site Hydrogeology

The most recent static groundwater level monitoring at the Site was conducted in July 2017 (Golder 2018a). During remediation work conducted in September and October 2017, groundwater infiltration was not observed within the excavation areas. The excavations advanced to a depth of 6.0 m bgs in AEC 1B (Golder 2017b).

Groundwater within the bedrock is interpreted to flow towards the northwest, consistent with topography and an inferred regional groundwater flow direction towards the basin of the Minaker River. The direction of groundwater flow is consistent with those observed during previous events; however, when comparing the water level data from the January 2017 event with the July 2017 event, the groundwater elevations were generally higher in July 2017, ranging from approximately 0.48 m higher in K19-MW16-02 to 2.11 m higher in K19-17-07. This seasonal pattern is interpreted to reflect greater groundwater recharge in the spring and summer months. The magnitude of the seasonal pattern does exhibit a strong relationship with the depth of the monitoring well; however, the groundwater monitoring wells in the northeastern portion of the Site generally demonstrated less seasonal variation, with water levels in a number of monitoring wells in the area varying by less than 1.0 m.

The horizontal hydraulic gradients are estimated to range from over 0.3 in the southeastern portion of the Site near K19b-10MW-15 to approximately 0.07 in the northeastern portion of the Site near K19a-MW10-05. In general, a downward vertical gradient is observed in the bedrock. For example, a downward gradient of approximately 0.73 was calculated between the shallow and deep monitoring wells at K19-MW16-03 in July 2017, indicating potentially perched conditions in the weathered siltstone bedrock unit that the shallow well is screened across.

4.1.3 Contaminants of Concern and Affected Media

During previous investigations, soil and groundwater samples collected from the Site were analyzed for PCOCs, which were identified based on historical land use and Site activities. Parameters which exceeded applicable standards/guidelines were subsequently identified as COCs. PCOCs/COCs are summarised in Table 4. It is noted that the PCOCs/COCs are limited to soil and groundwater, as soil vapour has not been investigated at the Site.

Table 4: Summary of PCOCs and COCs in Soil and Groundwater

Media	PCOCs (Based on Historical Land Use and Site Activities)	COCs (Based on Analytical Results to January 2018)
Soil	PHC F2 to F4, HEPH/LEPH, PAH, VOCs, BTEX/VPH, sodium ion and chloride ion, metals and PCBs	LEPH/HEPH, F1 BTEX, $F1_{C6-C10}$, naphthalene, BTEX VPH, VH_{C6-10}, arsenic, barium, beryllium, cadmium, iron, manganese, nickel, selenium, zinc, dichloromethane, 1,2-dibromomethane, and 1,1,2,2-tetrachloroethane, sodium and chloride ions
Groundwater	HEPH/LEPH, PAH, VOCs, BTEX/VPH, chloride ion, metals and PCBs	1,2-Dichloroethane, 1,1,2,2-Tetrachloroethane, LEPH, naphthalene, benzene, ethylbenzene, chloride (ion), arsenic, barium, cobalt, lead, lithium, nickel, selenium, strontium, thallium, sodium (dissolved), uranium, zinc
Soil Vapour	BTEX/VPH, VOCs, naphthalene	n/a

Notes:

BTEX = benzene, toluene, ethylbenzene and xylenes; COCs = Contaminants of Concern; F1, F2 and F4 = Fraction 1, Fraction 2 and Fraction 4 (F1 to F4 is inclusive of Fraction 3); HEPH/LEPH = heavy and light extractable petroleum hydrocarbons; n/a = not applicable; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; PCOCs = Potential Contaminants of Concern; PHC = petroleum hydrocarbons; VH = volatile hydrocarbons, VOCs = volatile organic compounds, VPH_{C6-C10} = volatile petroleum hydrocarbons, carbon range 6 to 10

4.2 Estimates of Hydrocarbon Impacted Contaminated Soil Volumes

The following sections present the estimated volumes of contaminated soil, applicable exposure pathways, and remediation approach for the AECs identified at the Site. Soil contaminated with petroleum hydrocarbons only, as well as petroleum hydrocarbons in combination with VOCs, and/or selected metals (arsenic, barium, beryllium, cadmium, iron, manganese, nickel, selenium, zinc) and/or salt (sodium and chloride ions) will be excavated and disposed off-site. It is expected that metals-only and/or salt-only contaminated soil and contaminated groundwater will be addressed via risk assessment / risk management as discussed earlier. Similarly, it is anticipated that the groundwater contamination with metals, hydrocarbons and VOCs observed to date will be addressed through source removal of the overlying impacted soils/residual soils or risk assessment following completion of the post remediation monitoring program.

Table 4 provides a summary of the AECs that have been impacted by petroleum hydrocarbons and VOCs in soil and groundwater. These AECs are also overlapped by AEC 28 that exhibit site wide soil and groundwater contamination with metals. The extent, estimated volume of contamination remaining on-Site as well as contaminant exposure pathways for human and ecological health in Table 6 is based on the currently known lateral and vertical extent of petroleum hydrocarbon and VOC concentrations in soil which exceed the applicable CSR standards, as summarised on Figure 3.

Table 5: Summary of AECs, Extent of Petroleum Hydrocarbon Contamination and Exposure Pathways

AEC	Surface Area (m^2)	Estimated In Situ Volume (m^3)	Exposure Pathways	Remediation Approach
AEC 1a	100	300	**Soil:** Eco – U&I	Excavation and Risk Assessment / Risk Management
AEC 1b	1,846	7,030	**Soil:** HH – DC, IG, IH, DW Eco – DC, U&I, AW-F **Groundwater:** DW, AW-F	Excavation and Risk Assessment / Risk Management
AEC 1c	95	127	**Soil:** HH – DC, IG, IH, DW Eco – DC, U&I, AW-F **Groundwater:** DW, AW-F	Excavation and Risk Assessment / Risk Management
AEC 1e	100	100	**Soil:** HH, ECO	Excavation and Risk Assessment / Risk Management
AEC 1f	55	55	**Soil:** HH, ECO	Excavation and Risk Assessment / Risk Management
AEC 2a	520	2,080	**Soil:** HH – DC, IG, IH, DW Eco – DC, U&I, AW-F	Excavation and Risk Assessment / Risk Management
AEC 2b	1,526	5,215		
AEC 19a	208	624	**Soil:** HH, ECO	Excavation and Risk Assessment / Risk Management
AEC 23a	520	1,560	**Soil:** HH, ECO	Excavation and Risk Assessment / Risk Management
AEC 23b	70	70	**Soil:** HH – DW ECO – AW-F	Excavation and Risk Assessment / Risk Management

Notes:

AEC = Area of Environmental Contamination; AW-F = Aquatic Freshwater Life; DC = Direct Contact; DW = Drinking Water; Eco = Ecological; HH = Human Health, IG = Ingestion; IH = Inhalation; m^2 = square metres; m^3 = cubic metres; n/a = not applicable; U&I = Terrestrial Uptake and Ingestion

In addition to the volumes of in situ soil that are outlined in Table 6, above, approximately 6,889 tonnes of contaminated material is stockpiled on-site. This material was stockpiled as part of remedial excavation work conducted in FY 2017-2018 and will require transport and off-Site disposal as part future remediation works at the Site.

4.3 Remedial Options Analysis

A detailed remediation options analysis was completed by Franz (2011). To address (remediate and dispose) petroleum hydrocarbon contamination at the Site, three options were considered to manage impacts (Franz 2011):

- **Option 1:** Excavation of hydrocarbon contaminated surficial soil and on-site treatment of contaminated soil; in situ treatment of hydrocarbon contaminated groundwater; and risk assessment / risk management of metals contaminated soil and groundwater.
- **Option 2:** Excavation of hydrocarbon contaminated surficial soil and off-site disposal of contaminated soil; in situ treatment of hydrocarbon contaminated groundwater; risk assessment / risk management of metals contaminated soil and groundwater.
- **Option 3:** risk assessment / risk management and on-going Site monitoring of soil and groundwater.

The primary goal in Franz (2011) assessment was removal of contaminated material; the secondary goal was risk management of impacted media; and the final goal was Site monitoring and inspections. The following set of criteria were used to evaluate the above-listed options:

- only utilizing treatment methods for compounds derived from anthropogenic sources
- overall protection of human health and the environment
- removal of hazards
- long-term effectiveness;
- ease of implementation
- maximal level of confidence in remediation results
- minimal remediation time
- minimal Site disruption
- regulatory acceptance
- cost effectiveness

The results of Franz's evaluation indicated that the costs for Option 1 and Option 2 were similar in magnitude, with Option 1 being slightly lower in cost (approximately 10%) than Option 2. Option 3 was the least expensive and had an estimated cost that was roughly half the cost of Options 1 and 2. However, as Option 3 (Risk Assessment / Risk Management) did not meet all of the remedial objectives, Franz recommended the next lowest cost option – Option 1 (Excavation and on-site treatment, with in situ treatment and risk assessment).

At the time of Franz's remedial options analysis, sufficient characterization of the groundwater and development of a conceptual site model (CSM) for the contaminated areas in the bedrock had not been completed. In 2016, Golder subsequently conducted further investigation of the Site in order to better understand the conceptual model for the contamination in the bedrock, and to determine if areas of contaminated bedrock could be easily remediated through excavation. Based on those results, and discussions with PSPC, Golder recommended a "hybrid" approach to the remedial options considered by Franz. This option utilizes a combination of Options 2 and 3 proposed by Franz as follows:

- Excavation of hydrocarbon contaminated surficial soil / residual soils (weathered bedrock) and off-site disposal of contaminated soil; risk assessment / risk management of metals contaminated soil and metals-contaminated groundwater.
- As part of Golder's evaluation, consideration was made for the construction of an on-site soil treatment facility as Franz' original evaluation indicated that this would be slightly less expensive than off-site disposal. However, for the reasons outlined below, the construction of an on-site treatment facility was not considered by Golder to be the preferred remedial option for excavated soils at the Site:

    1) Results of the additional investigation by Golder indicated that the upper layers of contaminated weathered bedrock could be easily remediated through excavation. Remediation through excavation of this material would reduce groundwater quality impacts and eliminate the requirement for an in situ treatment system. This would increase the overall certainty in the success of the remediation program.

    2) Given the site constraints (i.e., no power, water, gas, or drainage facilities) options for on-site treatment of the excavated contaminated bedrock materials was not considered practicable or cost effective for the Site.

    3) The weathered bedrock may not be amenable to bioremediation and the remote site location does not allow for cost-effective/regular monitoring of a treatment facility.

Because the remediation options presented by Franz (2011) will not be carried forward in future consideration, cost estimates associated with Franz's remedial options have not been carried forward and instead, cost estimates have been provided for the remedial option proposed by Golder as noted above.

4.4 Remedial Action Plan – Soil Excavation

The following sections provide a brief overview of the Remedial Plan / Risk Management Strategy will be implemented at the Site, while incorporating relevant information from the 2017 remediation program. This section also includes a cost estimate and proposed project schedule of remaining remediation work to be conducted.

4.4.1 Overview

The revised 2018 Remedial Plan / Risk Management Strategy continues to adopt the hybrid approach that includes a combination of excavation of contaminated soil for off-site disposal and risk assessment / risk management to address residual soil and groundwater contamination as well as contamination within the weathered bedrock formation. Based on the results of investigation work conducted to 15 March 2018, approximately 39,026 cubic metres (m^3) of known petroleum hydrocarbon and VOC impacted soils are expected to be removed from the Site. Of this volume, approximately 21,865 m^3 was excavated from AEC 1B and AEC 1C as part of a remedial program implemented between September and November 2017 (Golder 2018a). Therefore, approximately 17,161 m^3 of contaminated soil are expected to be excavated as part of future remediation work at the Site.

Following excavation, post-remediation confirmatory sampling and monitoring will be implemented followed by post remediation soil vapour and groundwater monitoring to confirm that project goals are met. It is anticipated that remaining remedial excavation work could be conducted during a single fiscal year. However, Golder understands that PSPC may wish to conduct the work over the course of two fiscal years (i.e., Fiscal Year 2018-2019 and Fiscal year 2019-2020). Post-remediation monitoring and risk assessment will also be conducted following the remediation work. A detailed schedule for the remediation activities is presented in Section 4.5.1.

4.4.2 Canadian Environmental Assessment Act (CEAA)

Remedial projects such as the one proposed for the Site require triggers associated with CEAA to be taken into consideration on Federal sites. This will typically require the undertaking of an “Environmental Effects Determination” (EED) or similar to help federal clients fulfil their responsibilities under Section 67 of the CEAA (2012). The Site under consideration is currently leased by PSPC from the Province of BC and is therefore not owned by the Federal government as well as being in a remote location. PSPC has advised Golder that Section 67 of the CEAA (2012) is not applicable to the Site.

Golder has completed a habitat assessment of the Site including an assessment of species at risk (SAR) to help address potential impacts to the environment. This assessment identified one confirmed SAR associated with the presence of a barn swallow foraging (Golder 2016f). It is currently envisaged that all activities associated with remediation or tree clearing will be conducted outside the migratory song bird nesting season. Given the remote location of the Site, issues regarding noise and vibration are not considered as causes for concern. In addition, it is proposed that the remediation contractors will be required to provide appropriate mitigation measures to avoid impact to water courses on-site through appropriate environmental protection planning.

4.4.3 Archeological Program

Golder conducted a review of readily available information sources for the Site pertaining to recorded archaeological sites, history, built heritage, and other historical heritage sites (Golder 2016g). The desktop study was conducted in August 2016. Sources of information that were utilized included Provincial Heritage Register (PHR), accessed using the Remote Access to Archaeological Data [RAAD] application maintained by the Archaeology Branch, and the Canadian Register of Historic Places. A review of the PHR did not identify registered archaeological sites within the Site. A review of the Canadian Register of Historic Places did not identify the former town of Trutch, BC as having historical sites recorded within the Site.

The Site is considered to have potential for the presence of archaeological sites, based on the evaluation of archaeological potential and because three recorded archaeological sites lie within 3 km of the Site. Given that planned Environmental Site Assessments and remedial works within the Site are located in areas associated with post contact activities, it is unlikely that such activities will encounter archaeological material or features. As a result, no further archaeological work was recommended. In 2017, a project specific chance find management plan was developed in order to provide PSPC and their contractors with guidelines for appropriate response to the discovery of either disturbed or intact archaeological materials during habitat restoration activities at the Site.

4.4.4 Confirmation of Site Requirements

Confirmation of Site Requirements applicable to the project design will be completed with agreement of PSPC prior to initiation of the project and incorporated into the specifications to be developed for the remedial activities. These requirements include but are not limited to the following:

- review of required regulatory approvals
- geotechnical requirements include sloping, shoring and backfilling
- environmental monitoring requirements
- site restoration requirements

4.4.5 Preparation of Tender Documents

The tendering process for remediation work conducted in Fiscal Year 2017-2018 was led by PSPC, while Golder supported in developing the technical specifications. It is anticipated that this approach will be followed for remediation work to be conducted in the future. Tender documents will include scope of work, specifications and restrictions/limitations applicable to the project. These will be provided to prospective contractors so that they can submit a sound bid.

4.4.6 Contractor Selection

Contractor selection will include meeting on-site with prospective contractors to confirm expectations and constraints, reviewing submitted contractor bids, and negotiating mutually agreeable work budgets, scopes and schedules.

4.4.7 Health and Safety Expectations

Health and safety expectations will include identification of a Prime Contractor, preparation of health and safety plans, preparation of Site rules and expectations, confirmation of Site communication hierarchies and designation of Emergency Response procedures for the Site. A Kick-Off Meeting will be held at the Site prior to initiation of excavation activities.

4.4.8 Site Preparation

Site preparation activities will be conducted prior to the initiation of remedial excavations to ensure that the project proceeds safely and within the proposed schedule. The tasks include but are not limited to the following:

- clearing of heavy bush, snow (if applicable), trees and other vegetation impeding access to AECs
- utility locates and any required protection, re-routing or removal of utilities
- removal of infrastructure, as required
- preparation of temporary site services, such as office trailers, living accommodations, portable washrooms and laydown areas
- set-up of erosion and sediment control measures
- identification and implementation of site security needs
- development of quality control / quality assurance measures for project-specific tasks, such as decommissioning of monitoring wells with the footprints of the proposed remedial excavations.

4.4.9 Excavation and Remediation

4.4.9.1 Excavation Approach

The excavation approach described below is based on the assumptions outlined in Sections 4.2.1 and 4.2.2, as well as the scope of remediation work that was conducted between September and November 2017.

The excavation sequence will be at the discretion of the contractor. Contaminated soil removed within the specified excavation footprints will be “hot-loaded” (i.e., directly loaded into trucks) and transported off-site for disposal at a permitted landfill. It is proposed that surficial material that is not contaminated with hydrocarbons can be side-cast for potential re-use as backfill.

In the event that surficial material, or material excavated for the purpose of creating stable side-slopes, indicate signs of potential contamination, the suspect contaminated soils will be segregated and stockpiled for further testing and evaluation. Refuse found during excavations will also be segregated into separate stockpiles for later disposal. The classification of suspect soil and for the purposes of disposal or potential reuse will be based on the results of stockpile sampling and analyses, as described in Section 4.4.9.4.

4.4.9.2 Excavation Sloping and Shoring

A geotechnical assessment of the subsurface conditions will be undertaken by the Prime Contractor prior to the commencement of excavation activities. The results of the assessment will be used to determine safe side slopes within the excavation areas. It is expected that the depth of the excavations will extend up to a maximum of 6 m bgs.

4.4.9.3 Environmental Monitoring

Prior to initiation of project activities, the Prime Contractor will develop and submit an Environmental Protection Plan (EPP) to address potential sources of environmental impacts due to project activities, through standard work practices and Site-specific mitigation practices. The EPP will include a Site-specific spill response plan.

4.4.9.4 Excavation Sampling

An environmental consultant will observe and record remedial excavations for the duration of the project. Once the excavations reach pre-determined limits, confirmatory samples will be collected from the bases and sidewalls of the excavations, to document that contaminated material has been removed. During excavation monitoring, existing data as well as visual and olfactory observations will be utilized to aid in determining the limits of the excavations. It should be noted that it will not be practical to obtain base samples when the base comprises the intact bedrock. If the results of confirmatory samples do not meet the remediation objectives, then additional material may be removed. Confirmation sampling will generally follow the requirements outlined in BC MoE Technical Guidance 1 (i.e., one sample per 10 linear metres of excavation sidewall, and one sample per 10 m by 10 m grid of excavation base). The extents of the remedial excavations as well as confirmatory sample locations will be surveyed in the field using a combination of handheld GPS and professional surveying services.

Excavation material requiring further characterisation will be stockpiled; stockpiles and stockpile samples will be managed in accordance with the BC MoE Technical Guidance 1.

It is proposed that the remedial excavations will be accurately surveyed and presented as a series of as-built drawings by the Contractor. The as-built drawings will be utilized by Golder to indicate location and results of all confirmatory sampling.

4.4.9.5 Structures and Utilities

It is assumed that utilities present at the Site are no longer active. Any sub-grade utilities encountered during excavation activities will be cut-off and removed.

4.4.9.6 Water Management

Surface water infiltration and groundwater discharge into the excavations was not observed during remediation work conducted in 2017. However, based on historical groundwater elevation data at the Site, the potential for groundwater discharge exists. In the event that groundwater discharge occurs, the water will need to be collected from the excavation and managed in accordance with the applicable environmental legislation.

4.4.9.7 Backfilling

Following completion of remedial excavation work at each AEC, the excavations will be backfilled to existing grade and compacted in accordance with the project specifications. Backfill material may include uncontaminated excavated overburden soil that is able to be risk managed on-site. Imported backfill material must be shown to meet CSR WL_R numerical or risk-based standards prior to placement and must not demonstrate leaching potential. The backfill used during the 2017 remedial works was a PSPC supplied backfill source from the Adsette pit. While initial sampling at this site indicated all parameters were below the applicable CSR standards, after the introduction of updated CSR standards on November 2017, random arsenic exceedances were identified during routine post remediation sampling of the backfill material. The exceedances were generally slightly above the applicable CSR standards and will be addressed as part of the overall risk management for the site that will include a detailed qualitative risk assessment (DQRA). Unless the BC Ministry of Environment and Climate Change Strategy adopts a less stringent arsenic standards in the future, utilizing this site as a future backfill source will result in backfill material exhibiting arsenic exceedances. Therefore, as part of developing the specifications for the project it is recommended that consideration be given to the tenderers identifying their own backfill source that would comply with the project requirements. Alternatively, if a PSPC supplied backfill source option is to be considered, prior sampling can be conducted to confirm suitability of these sites.

4.4.9.8 Surface Restoration

The Site will be restored to pre-excavation conditions and temporary infrastructure/structures must be removed upon completion of remediation activities. A post-remediation Site walk-through will be conducted with a PSPC Representative when the project is completed. It is anticipated that any post remediation residual settlement, following the backfilling of the excavations can be addressed in the following year's remedial excavations or as part of post remediation site restoration.

4.4.9.9 Post-Remediation Monitoring

Following completion of excavation activities, groundwater monitoring wells will be installed within excavation footprints and downgradient of excavation footprints to assess whether the objectives of the remediation strategy have been met. In addition, soil vapour probes will also be installed within the excavation footprints for this purpose (Golder 2016a).

Following the completion of remedial excavation work conducted in 2017, eleven groundwater monitoring wells and four soil vapour probes were installed within, and down-gradient of, AEC 1B for post-remediation monitoring purposes. One post-remediation monitoring event of groundwater and soil vapour has been conducted within this AEC to date. It is anticipated that monitoring of the groundwater wells and soil vapour probes will continue biannually for two years following remediation activities and post-remediation studies.

A scope of work similar to the one described above will be developed and implemented once the remedial works have been completed in remaining AECs at the Site. The scope of work will be adjusted, as necessary, based on the findings of the remedial excavation program.

4.5 Implementation Plan

4.5.1 Schedule

The proposed project schedule is presented in Table 6. The proposed schedule will be regularly reviewed and updated by Golder and in consultation with PSPC. A Gantt Chart is also included in Appendix A.

Table 6: Estimated Completion Schedule

Project Activity	Finish
FY 2017-2018	
Post-Remediation Monitoring and Reporting (2017/2018 Excavations)	31 March 2018
Confirmation of Remediation Reporting (2017/2018 Excavations)	31 March 2018
Supplementary Investigation Works to Support Remaining Excavations and Problem Formulation (PF)	31 March 2018
90% Specification for backfilling AEC 1C and removal of existing AEC 1 C stockpile and Updated RAP for Remaining Remediation Works	31 March 2018
FY 2018-2019	
Submittal of Final Tender Document (2018-2019) for backfilling AEC 1C and removal of existing AEC 1 C stockpile	21 May 2018
Contract Award	9 July 2018
Removal of stockpiled material at AEC 1C and backfilling of AEC 1	31 August 2018
Field Program to Support DQRA (provisional)– includes second round of post-remediation monitoring for 2017-2018 excavations	30 September 2018
DQRA Report	31 December 2018
Update 90% Specifications for Remaining Remedial Excavations	31 March 2019
FY 2018-2019 or 2019-2020[1]	
Submittal of Final Tender Document (2019-2020)	24 May 2019
Contract Award	5 July 2019
Remedial Excavations	6 September 2019
Update Confirmation of Remediation Reporting for 2019/2020 Excavations	31 December 2019
Post-Remediation Monitoring and Reporting for 2019/2020 Excavations (first round)	31 December 2019
Update DQRA	31 December 2019
Post-Remediation Monitoring and Reporting for 2019/2020 Excavations (second round)	31 March 2020

Notes:

AEC = Area of Environmental Concern; APEC = Area of Potential Environmental Concern; FY = Fiscal Year; DQRA = Detailed Quantitative Risk Assessment; PF = Problem Formulation

1. The remediation schedule for remaining excavation work is uncertain at the time of writing this report. For planning purposes, Golder has assumed the work will be conducted in FY2019-2020. The proposed schedule would be the same if work is conducted in FY2018-2019.

4.5.2 Construction and Consulting Costs

A description of remaining project activities and the associated preliminary construction and consulting costs are summarised in Table 7. A liability estimate broken down for FY2018/2019, and 2019/2020 is provided in Appendix B, and includes estimated preliminary consulting and construction costs based on current knowledge of site conditions and PSPCs anticipated priorities for the Alaska Highway program. The costs provided below includes cost for known areas of contamination (summarised in Table 4) and on potential variability in the estimated extents of contamination shown on Figure 3).

Table 7: Estimate of Construction and Consulting Costs

Fiscal Year	Description of Activities	Construction Costs	Consulting Costs	Analytical Costs	Total Cost
2018/2019	Transport and off-site disposal of stockpiled material from AEC 1C, backfilling of AEC 1C	$662,000	$72,000	-	$734,000
	Post-Remediation Investigation and Monitoring	-	$109,000	$52,000	$161,000
	Post-Remediation Monitoring Report, Detailed Quantitative Risk Assessment, Project Management	-	$106,000	-	$106,000
2019/2020	Remedial Excavation of Remaining AECs	$3,583,000	$317,000	$69,000	$3,969,000
	Post-Remediation Monitoring Report, Detailed Quantitative Risk Assessment, Project Management	-	$227,000	$23,000	$250,000
Total					**$5,220,000**

Notes:

1) Refer to Appendix B for a more detailed break of costs and the assumptions used in the preparation of costs. Costs have been rounded to the nearest $1,000.
2) Consulting costs include: travel costs and disbursements, survey costs, and drilling costs. Costs are broken down in further detail in Appendix B. Laboratory costs are based on standard Golder rates for a local, CALA-certified laboratory.

The remedial cost estimate provided above includes a risk management component to address residual contamination following physical remediation efforts. The remediation approach used for the cost estimate is designed to reduce liability of PSPC relating to the contamination, and to be protective of human health and the environment. In developing this cost estimate several key assumptions were made, as follows:

- Costs provided herein are based on actual implementation costs of remediation work conducted at the Site in September and October 2017.
- The remedial costs provided are based on the nature and extent of contamination summarised in the previous reports provided to Golder by PSPC (Franz/Arcadis) supplemented by the results of Golder's investigation work up to and including work conducted in March 2018.
- The remedial costs and associated volumes provided are based on a risk management approach to addressing the residual contamination. Specifically, the approach will target hydrocarbon and VOC contamination within the fill/native soils and residual soils (completely weathered bedrock). This approach is also linked with meeting the CSR approach for wildland use within the upper 3 m and industrial land use standards below 3 m. Remediation will require a post-remediation monitoring program to assess potential

risks of residual contamination to human health and environment and assumes any groundwater contamination or inaccessible soil impacts remaining following the remediation can be addressed through risk assessment / risk management.

- The remediation concept is designed in a manner that will allow PSPC to return the Site to the Province in the future if desired (i.e., evaluate soil, groundwater, and soil vapour data to standards provided under the BC CSR). It should be noted that additional work and cost will be incurred if a Certificate of Compliance (CoC) for the Site is sought. This will typically include updating the various reports to meet the BC Ministry of Environment and Climate Change Strategy specific reporting requirements and fees associated with review by a Contaminated Sites Approved Professional (CSAP). A CSAP review may require additional data for the Site to be collected and interpreted.

4.6 Environmental Controls

An Environmental Protection Plan (EPP) will be prepared prior to project initiation and will incorporate PSPC's Risk Management Form. The EPP will address potential sources of environmental impacts due to project activities and present standard work practices and Site-specific mitigation practices to eliminate or minimise these impacts.

4.7 Emergency Spill Response

A key component of the EPP will be an emergency spill response plan. The spill response plan will include spill response actions to contain spill events, Site-specific hazardous material storage protocol and communication hierarchy in the event of a spill. The spill response plan will also state the required containment and clean-up materials that must be available at the Site during project activities.

4.8 Residual Contaminant Fate

The objective of the excavation plan is to remediate petroleum hydrocarbon and VOC contaminated soil at the Site, through excavation and off-site disposal. It is expected that contaminated soil will be excavated and transported off-site for disposal at a permitted landfill. Soil contaminated with petroleum hydrocarbons only, as well as petroleum hydrocarbons in combination with VOCs, metals, and/or salt will be excavated and disposed off-site. It is expected that residual petroleum hydrocarbon and VOC contamination that remains in localized areas within the bedrock, metals-only and/or salt-only contaminated soil and contaminated groundwater will be addressed via risk assessment / risk management. Similarly, it is anticipated that the groundwater contamination with hydrocarbons and VOCs will be addressed through source removal of the overlying impacted soils/residual soils or risk assessment following completion of post remediation monitoring program.

4.9 Long-Term Monitoring

Upon completion of remediation activities at the Site, post-remediation monitoring will be required. Remediation of petroleum hydrocarbon contamination in soil, groundwater and where appropriate in soil vapour will be confirmed using the following methods:

- confirmatory sampling from soil excavations (completed during excavation work)
- post-remediation groundwater monitoring
- post-remediation soil vapour monitoring

Groundwater monitoring will be conducted bi-annually (i.e. ideally during two seasons, spring and fall) following completion of Site activities to ensure that remediation objectives are met. The costs provided in Section 4.5.2 for post-remedial monitoring are based on the assumption that up to 10 monitoring wells and 10 soil vapour probes will be installed within AECs that have not yet been remediated. Eleven monitoring wells (including three next pairs) and six soil vapour probes were installed as part of post-remediation monitoring work conducted in 2017. It is anticipated that two rounds of post-remediation monitoring will be sufficient to document that remediation objectives are met.

The scope of work described above will be reviewed once the remedial works for each phase of the remediation work have been completed and adjusted where necessary.

5.0 CLOSURE

We trust that the contents of this report are sufficient for your current review purposes. Should you have any questions regarding this report, please do not hesitate to contact the undersigned at 604-296-4200.

GOLDER ASSOCIATES LTD.

Andrew Bruemmer, PEng
Environmental Engineer

Ahmadreza Mehjoo, PEng, PMP
Project Director

AB/ARM/syd/lmk

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6.0 REFERENCES

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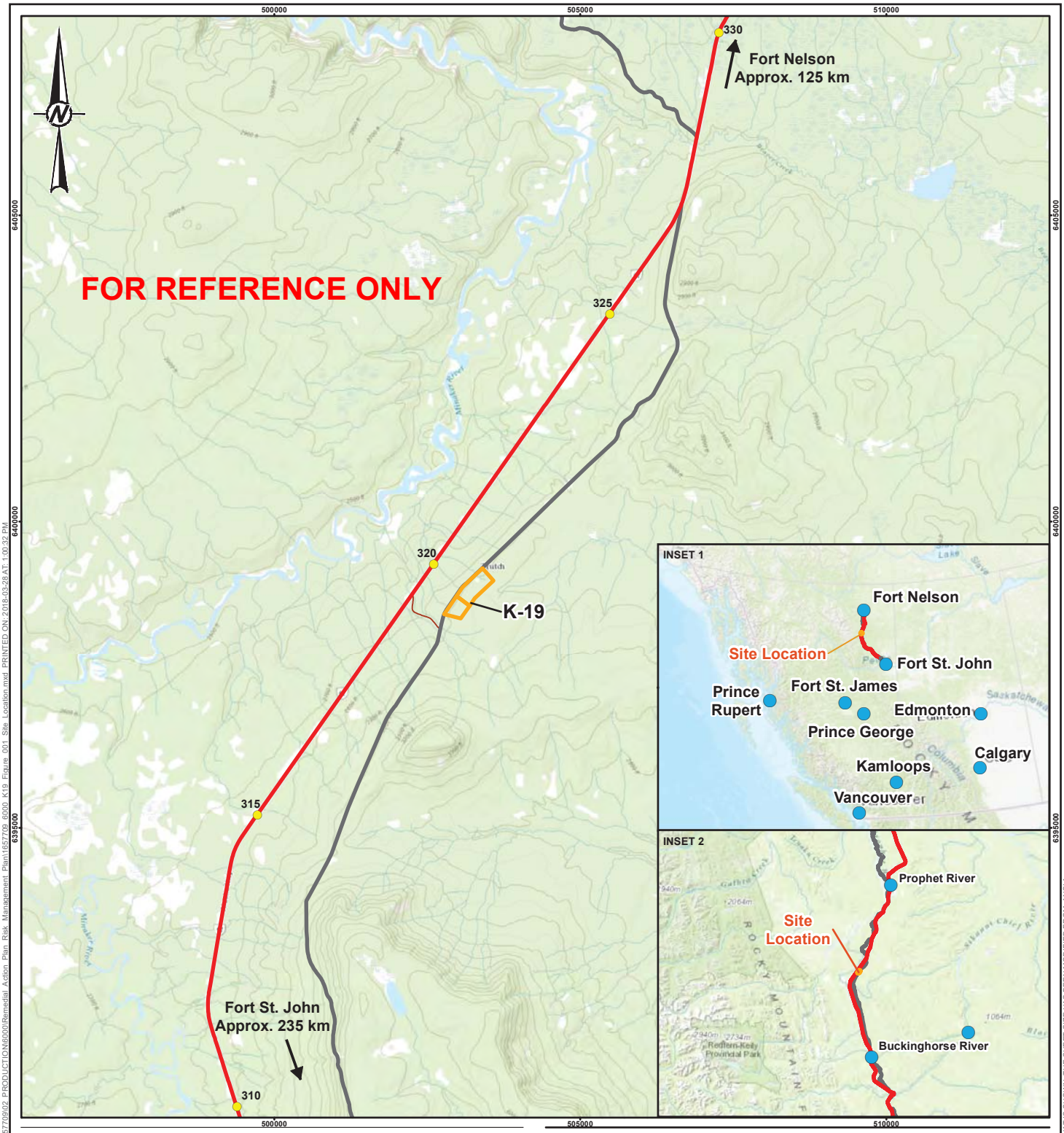
Province of British Columbia. Ministry of Environment. 2006. Hazardous Waste Regulation. [BC Reg. 63/88, O.C. 268/88 including amendments up to BC Reg. 375/2008 and 63/2008 amendments (effective 1 April 2009)].



LEGEND

- COMMUNITY / TOWN / CITY
- KILOMETRE POST
- ALASKA HIGHWAY 2007 SURVEYED ALIGNMENT
- ALASKA HIGHWAY FORMER ALIGNMENT
- SECONDARY ROAD
- SITE LOCATION

0 1.5 3

1:90,000 KILOMETRES

NOTE

KILOMETRE POSTS ARE COUNTED FROM KILOMETRE 0 OF THE ALASKA HIGHWAY IN DAWSON CREEK, BC, APPROXIMATELY 75 KILOMETRES SOUTH OF FORT ST. JOHN.

REFERENCE(S)

1. TOPO MAP OBTAINED FROM ESRI, HERE, DELORME, INTERMAP, GEBCO, USGS, FAO, NPS, NRCAN AND THE GIS USER COMMUNITY.
2. COMMUNITY, TOWN AND CITY LOCATIONS AND NAMES OBTAINED FROM CANVEC AND GEOGRATIS © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
3. KILOMETRE POSTS AND ALASKA HIGHWAY ALIGNMENTS OBTAINED FROM ARCADIS.
4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
SITE LOCATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-03-28
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	CONTROL	REV.	FIGURE
1657709	6000	0	1

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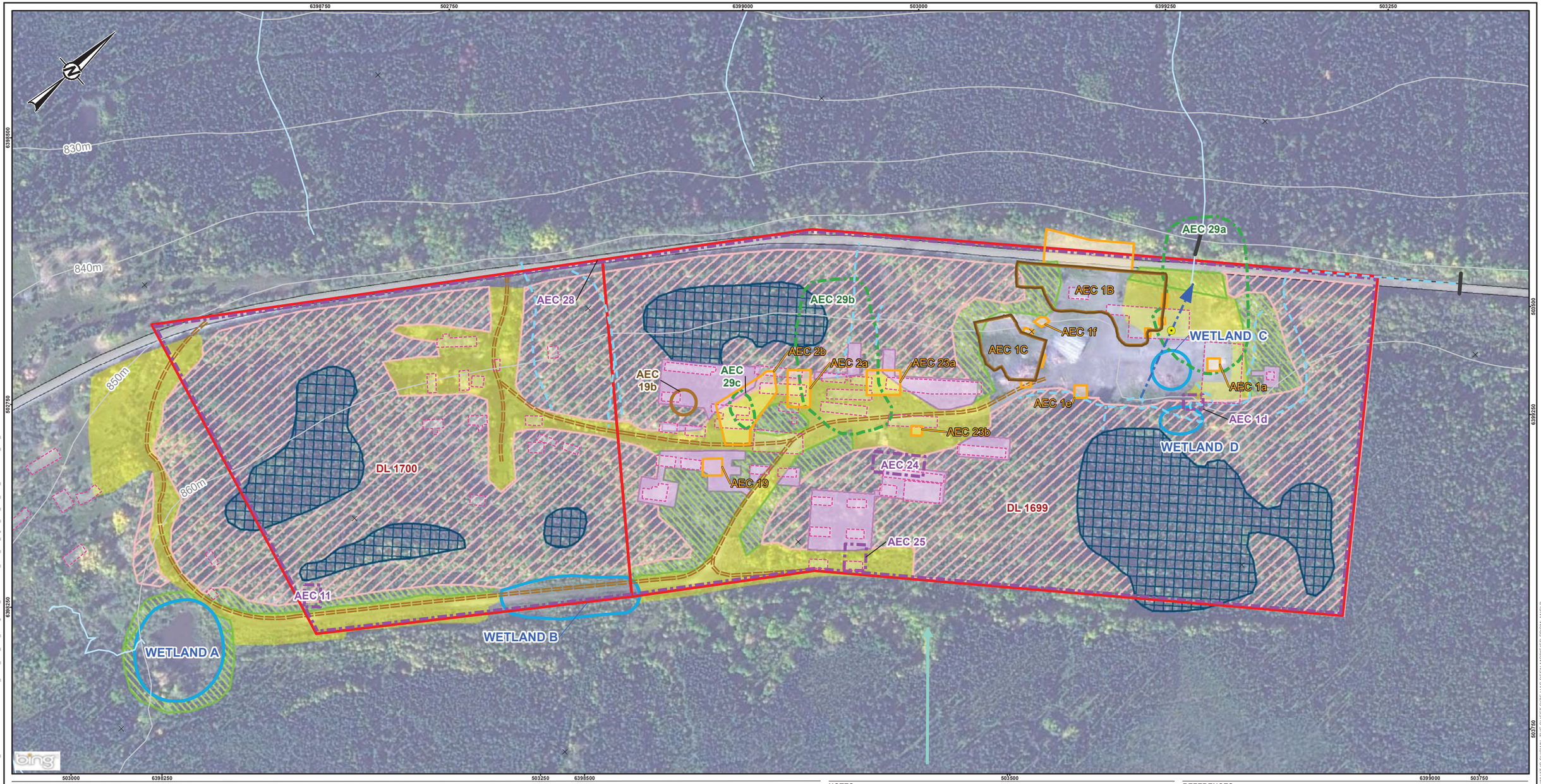

LEGEND

- 2018 CULVERT
- STEEL CULVERT
- CONTOUR (10m)
- SECONDARY ROAD
- INFERRED UNDERGROUND WATERCOURSE
- INFERRED GROUNDWATER FLOW DIRECTION
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- WATERCOURSE
- APPROXIMATE WETLAND
- ALASKA HIGHWAY FORMER ALIGNMENT
- APPROXIMATE LOCATION OF HISTORICAL BUILDINGS
- SITE LOCATION

- AEC BOUNDARY BASED ON ESTIMATED EXTENT OF PETROLEUM HYDROCARBON CONTAMINATION
- AEC BOUNDARY BASED ON METALS CONTAMINATION
- AEC BOUNDARY BASED ON SODIUM AND/OR CHLORIDE CONTAMINATION
- Preliminary AEC boundary based on estimated petroleum hydrocarbon contamination (delineation required)
- AREA OF REMEDIAL EXCAVATION (2017)

- APPROXIMATE EXTENT OF JANUARY 2017 MULCHED AREAS WHERE A SIGNIFICANT PORTION OF THE VEGETATION HAS BEEN REMOVED

VEGETATION

- CONIFER FOREST
- MIXED FOREST
- OPEN AREAS REVEGETATION WITH GRASS, SEDGE AND RUSH SPECIES
- TALL SHRUB ZONES

FOR REFERENCE ONLY

0 50 100
1:3,000 METRES

NOTES

1. CONTAMINATED MATERIAL EXCEEDS CONTAMINATED SITE REGULATION STANDARDS FOR PARKLAND AND/OR COMMERCIAL LAND USES, AS DEFINED IN THE SPECIFICATIONS.
2. VEGETATION ARE AS OF FEBRUARY, 2017 AND ARE BASED ON GOLDER SITE OBSERVATIONS AND A SURVEY CONDUCTED BY VECTOR GEOMATICS LAND SURVEYING LTD.
3. ANY POTENTIAL GROUNDWATER ENCOUNTERED IN THE EXCAVATION, OR OTHER WATER THAT REQUIRES REMOVAL TO CARRY OUT THE INTENDED WORK, WILL BE COLLECTED AND MANAGED IN ACCORDANCE WITH THE APPLICABLE ENVIRONMENTAL LEGISLATION.
4. TRICKLE FLOW WAS OBSERVED TO DAYLIGHT IN AN APPROXIMATELY 50 CM DIAMETER WOODEN CULVERT LOCATED ALONG THE NORTHWEST BOUNDARY OF THE SITE. THE EXTENT AND THE INLET OF THE WOODEN CULVERT WAS NOT IDENTIFIED.

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
2. DW WELL, CULVERT, APPROXIMATE WETLAND AND APPROXIMATE SWALE/DRAINAGE DITCH OBTAINED FROM GOLDER ASSOCIATES LTD.
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. WATERCOURSES OBTAINED BY B.C. MINISTRY OF FORESTS, LAND AND NATURAL RESOURCE OPERATIONS.
5. IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009.
6. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-03-28
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
K19 SITE PLAN - INFRASTRUCTURE AND RESTRICTIONS

PROJECT NO.	CONTROL	REV.	FIGURE
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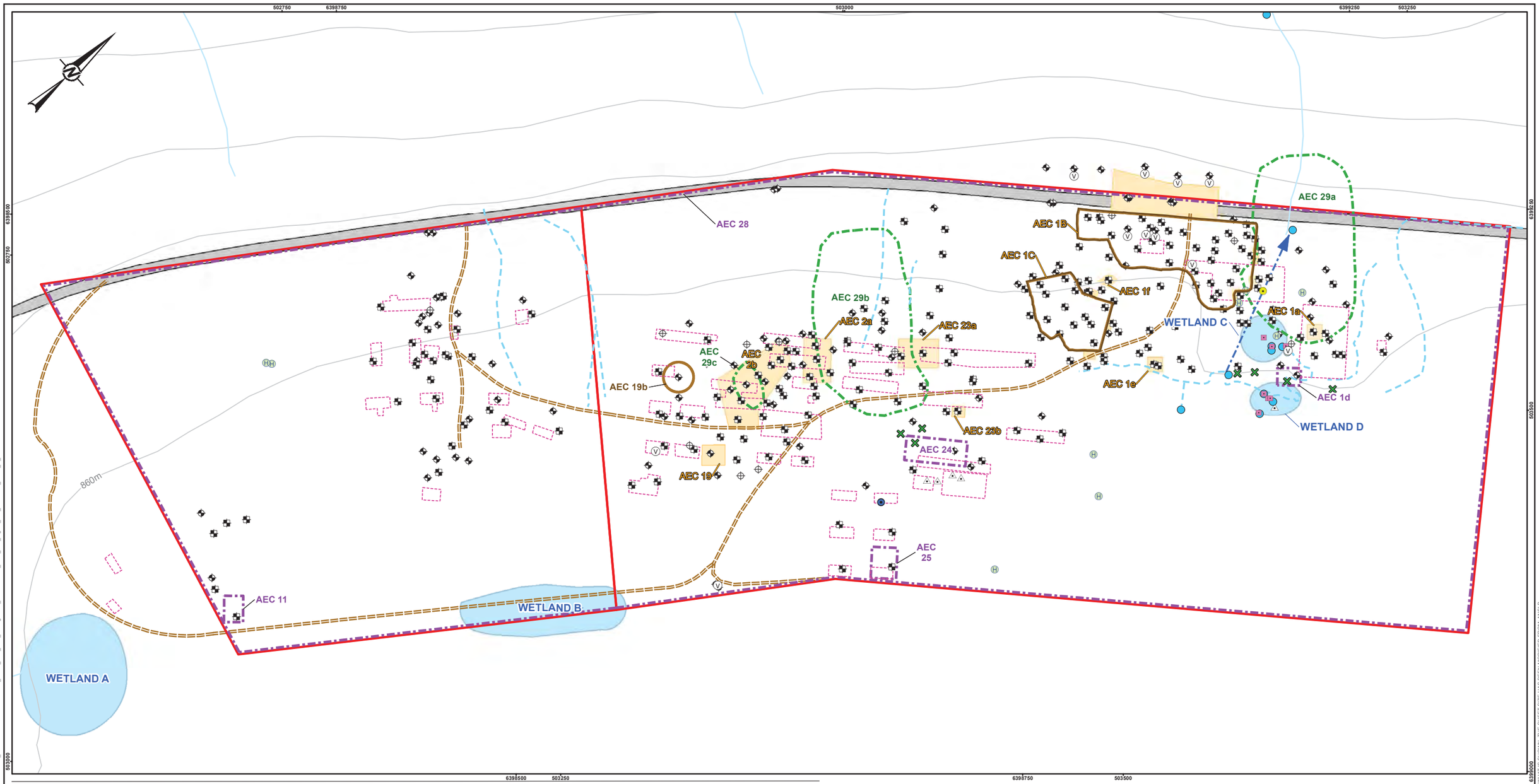

LEGEND

2018 SAMPLE LOCATIONS

- SURFACE SAMPLE
- DW WELL
- BOREHOLE
- MONITORING WELL
- TEST PIT
- MONITORING WELL TO BE DECOMMISSIONED PRIOR TO REMEDIATION
- SOIL VAPOUR PROBE
- CULVERT
- SEDIMENT SAMPLE
- HAND DUG SURFACE SOIL SAMPLE
- HAND AUGER
- SURFACE WATER

- CONTOUR (10m)
- SECONDARY ROAD
- INFERRED UNDERGROUND WATERCOURSE
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- WATERCOURSE
- APPROXIMATE WETLAND
- ALASKA HIGHWAY FORMER ALIGNMENT
- APPROXIMATE LOCATION OF HISTORICAL BUILDINGS
- SITE LOCATION

- AEC BOUNDARY BASED ON ESTIMATED EXTENT OF PETROLEUM HYDROCARBON CONTAMINATION
- AEC BOUNDARY BASED ON METALS CONTAMINATION
- AEC BOUNDARY BASED ON SODIUM AND/OR CHLORIDE CONTAMINATION
- Preliminary AEC boundary based on estimated petroleum hydrocarbon contamination (delineation required)
- AREA OF REMEDIAL EXCAVATION (2017)

FOR REFERENCE ONLY

0 50 100

1:2,500 METRES

REFERENCE(S)

1. CONTOURS OBTAINED FROM ARCADIS.
2. APPROXIMATE WETLAND AND APPROXIMATE SWALE/DRAINAGE DITCH OBTAINED FROM GOLDER ASSOCIATES LTD..
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. WATERCOURSES OBTAINED BY B.C. MINISTRY OF FORESTS, LAND AND NATURAL RESOURCE OPERATIONS.
5. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-03-28
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
ESTIMATED AREAS OF CONTAMINATION

PROJECT NO.	PHASE	REV.	FIGURE
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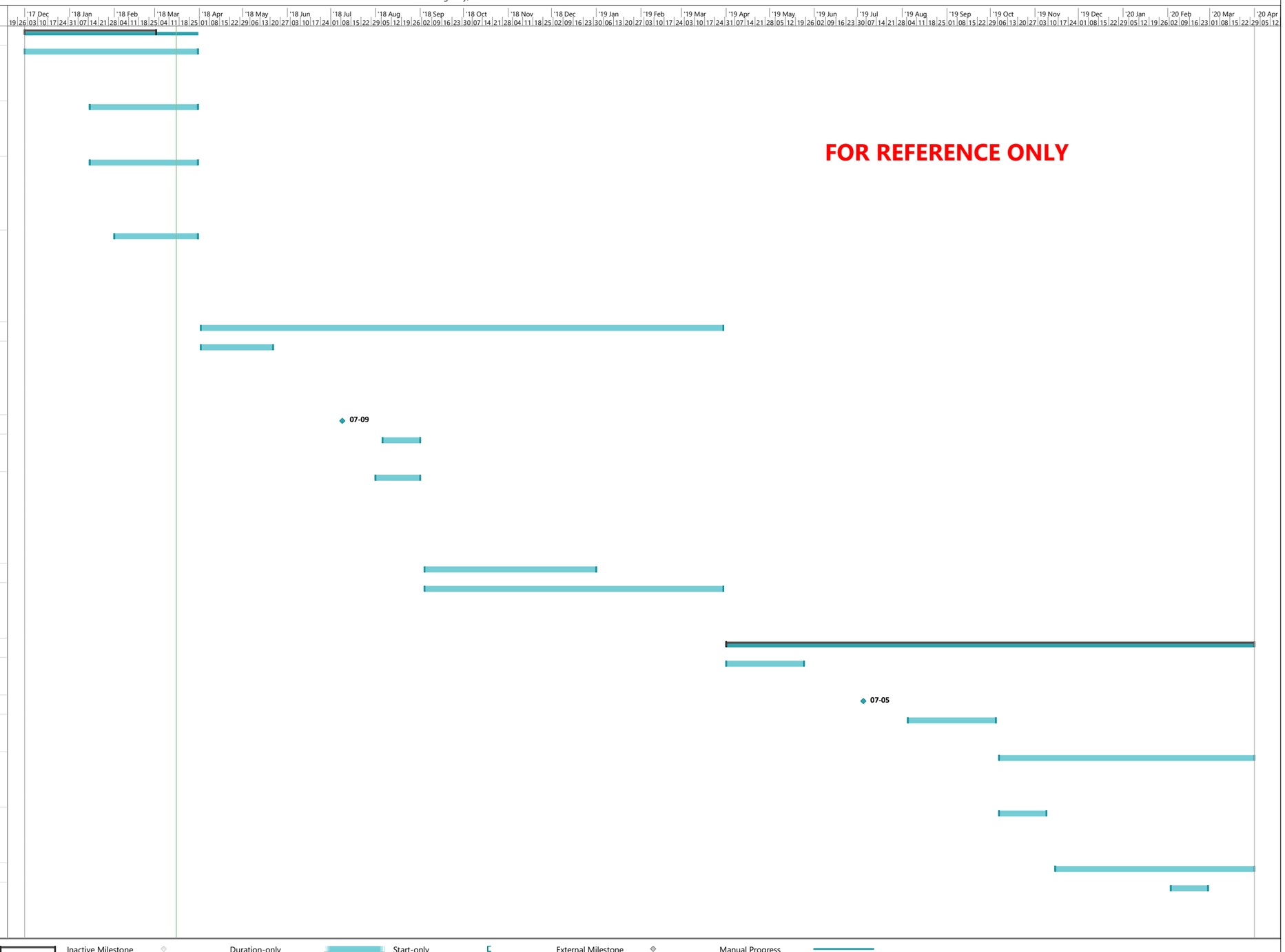
APPENDIX A

Gantt Chart – Proposed Project Schedule

29 March 2018
Report No. 1657709-048-R-Rev0-6000

Appendix A - Project Gantt Chart
PSPC - K-19 Remediation Program
Alaska Highway, BC

ID	Task Name	Start	Finish
1	**Fiscal Year 2017-2018**	**Fri 17-12-01**	**Thu 18-03-01**
2	Confirmation of Remediation Reporting (2017/2018 Excavations)	Fri 17-12-01	Fri 18-03-30
3	Post-Remediation Monitoring and Reporting (2017/2018 Excavations)	Mon 18-01-15	Fri 18-03-30
4	Supplementary Investigation Works to Support Future Excavations and Problem Formulation	Mon 18-01-15	Fri 18-03-30
5	90% Specification for backfilling AEC 1C and removal of existing AEC 1 C stockpile and Updated RAP for Remaining Remediation Works	Thu 18-02-01	Fri 18-03-30
6	**Fiscal Year 2018-2019**	**Mon 18-04-02**	**Fri 19-03-29**
7	Submittal of Final Tender Document (2018-2019) for backfilling AEC 1C and removal of existing AEC 1 C stockpile	Mon 18-04-02	Mon 18-05-21
8	Contract Award	Mon 18-07-09	Mon 18-07-09
9	Removal of stockpiled material at AEC 1C and backfilling of AEC 1	Mon 18-08-06	Fri 18-08-31
10	Field Program to Support DQRA (provisional)– includes second round of post-remediation monitoring for 2017-2018 excavations	Wed 18-08-01	Fri 18-08-31
11	DQRA Report	Tue 18-09-04	Mon 18-12-31
12	Update 90% Specifications for Remaining Remedial Excavations	Tue 18-09-04	Fri 19-03-29
13	**Fiscal Year 2019-2020**	**Mon 19-04-01**	**Tue 20-03-31**
14	Submittal of Final Tender Document (2019-2020)	Mon 19-04-01	Fri 19-05-24
15	Contract Award	Fri 19-07-05	Fri 19-07-05
16	Remedial Excavations (FY19/20)	Mon 19-08-05	Fri 19-10-04
17	Confirmation of Remediation Reporting (FY19/20 Excavations)	Mon 19-10-07	Tue 20-03-31
18	Post-Remediation Monitoring and Reporting (FY18/19 Excavation) - first round	Mon 19-10-07	Fri 19-11-08
19	Update DQRA	Fri 19-11-15	Tue 20-03-31
20	Post-Remediation Monitoring and Reporting (FY18/19 Excavation) - second round	Mon 20-02-03	Fri 20-02-28



FOR REFERENCE ONLY

Project: K-19 Gantt Chart rev 27JU
Date: Fri 18-03-16

Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress		
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline			
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress			