

Public Works and Government Services Canada

**Issued for Tender Specifications for the Environmental
Site Remediation at**

**CAM-E, Keith Bay, Nunavut Project
No.: R.064013**

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Date: March 10, 2015

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Part 1 General

1.1 PRECEDENCE

- .1 Division 1 Sections take precedence over Sections in other Divisions of this specification.

1.2 BACKGROUND INFORMATION

- .1 CAM-E, Keith Bay is a former intermediate DEW Line station historically used by Department of National Defense (DND). The DEW Line station was constructed in 1957 and taken out of service in 1963. Responsibility of the site was assumed by Department of Indian Affairs and Northern Development (DIAND), now Aboriginal Affairs and Northern Development Canada (AANDC) in 1965.
- .2 CAM-E is located near the shores of Keith Bay at Cape Barclay, on the southwestern edge of the Simpson Peninsula (68° 15' 45" N, 88° 8' 38" W) in Nunavut. The closest community to CAM-E is Kugaaruk (formerly Pelly Bay), which is located approximately 75 km to the west. The site is located on Crown land within Nunavut's Kitikmeot region.
- .3 The CAM-E site includes two main areas: Area 1 and Area 2. Area 1 is situated in the northern portion of the Site and includes a small airstrip, former infrastructure (i.e., module train debris, warehouse, garage, Inuit house, POL tanks, Quonset huts, storage pads, and a dismantled radar tower), drum storage areas, and five areas of buried material, including the main station landfill. Area 2 is situated in the southern portion of the Site, on a beach plateau approximately 5.6 km from Area 1. This area includes a larger airstrip, a helipad, some former infrastructure (i.e., two Quonset huts, a bunker), various scattered debris (including wreckage of a plane), two dump areas, one drum cache, and three areas of buried material.
- .4 Based on the climate normals from the nearest Environment Canada Weather monitoring station, the mean annual temperature is -14.1°C. The area has a summer mean of approximately 4°C (June, July, and August) and a winter mean of approximately -20°C. Climate in the area will generally restrict work requiring thawed conditions to the June to September period, and work requiring frozen conditions to the October to May period. Geotechnical assessment at the site has identified permafrost (at several but not all investigated areas) between 0.4 to 1.0 m below the surface, depending on the terrain and landform.
- .5 Site access is limited as there are no access roads to the site. The site can be accessed via fixed wing by two airstrips or by helicopter. In the winter, a winter access trail (CAT-Train) can be constructed to access the site from the communities in the area. It has been reported that commercial barges do not service the area.
- .6 Gravel access roads linking the airstrips, landfills, Fresh Water Lake and Station Area facilities are present at the site and require minor improvements.
- .7 There is no existing camp on site.
- .8 Several historical investigations have been completed at the site. Supporting documents pertaining to this work include but are not limited to the following:
 - .1 Environmental Screening Report, Remediation of the former CAM-E DEW Line Site, Stantec Consulting Ltd., February 2014.
 - .2 Remedial Action Plan: CAM-E (Keith Bay) Site, Nunavut, Stantec Consulting Ltd., January 2014.

- .3 Phase III Environmental Site Assessment: CAM-E (Keith Bay), Nunavut, Stantec Consulting Ltd., October 2013.
- .4 Archaeological Impact Assessment: Former CAM-E DEW Line Site, Keith Bay, Golder Associates, October 2013.
- .5 Limited Environmental Investigation, EK004, Keith Bay, CAM-E, WESA, February 2012.
- .6 Environmental Study of Abandoned DEW Line Sites, Volume One: Overview and Volume Three: Appendices, Environmental Sciences Group, Royal Roads Military College, March 1995.

1.3

HAZARDS

- .1 Hazards that may be encountered at the site include but are not limited to the following:
 - .1 Hazardous waste (polychlorinated biphenyls [PCBs], leachable lead paint, batteries, asbestos)
 - .2 Metals/PCB contaminated soil
 - .3 Petroleum Hydrocarbon (PHC) contaminated soil
 - .4 Polycyclic Aromatic Hydrocarbon (PAH) contaminated soil
 - .5 Physical hazards of scattered debris and dilapidated structures
 - .6 Rugged terrain
 - .7 Fuels and lubrication fluids
 - .8 Remote site location
 - .9 Arctic weather conditions
 - .10 Wildlife

1.4

DEFINITIONS

- .1 Departmental Representative: Within the context of these Specifications, the term Departmental Representative refers to persons exercising the roles and attributes of Canada under the contract including but not limited to Public Works and Government Services (PWGSC) personnel and the Resident Engineer.
- .2 Departmental Representative's Authorized Personnel: Within the context of these Specifications, the term Departmental Representative's Authorized Personnel refers to personnel appointed by Departmental Representative or authorized on-site by Departmental Representative. Departmental Representative's Authorized Personnel provide recommendations/technical guidance to Departmental Representative, as required, for the enforcement of these specifications.
- .3 Contractor: The Contractor procured to undertake the remediation Work at CAM-E, Keith Bay is defined, within the context of these specifications, as the Contractor.
- .4 Contractor's Site Superintendent: Contractor's resident site representative, who is authorized to make decisions on behalf of Contractor.
- .5 Provide: supply and install, operate, submit or any other procedure necessary to complete the Work as intended.
- .6 Authorities Having Jurisdiction (AHJ): Governmental agency or sub-agency that regulates the codes and standards that are to be met during the remediation processes.
- .7 CAM-E Project Area: The limits of the CAM-E site as shown on Drawing C01.

- .8 Type A PHC Soils: Soil containing concentrations of petroleum hydrocarbon (PHC) fractions F3 and F4 as defined in the INAC 2009 Abandoned Military Site Remediation Protocol (AMSRP) for PHC in Soil.
- .9 Type B PHC Soils: Soils containing concentrations of PHC fractions F1, F2 and F3 as defined in the AMSRP for PHC in Soil.
- .10 DCC Tier I/Tier II Soil: soil containing concentrations of inorganic elements (metals) and/or PCBs as defined in the AMSRP Dew Line Cleanup Criteria (DCC) for Soil.
- .11 NHW Landfill: Landfill constructed for the disposal of inert (non-hazardous) waste. A new landfill constructed for the disposal of non-hazardous (inert) debris and building demolition waste. DCC Tier I soil and Type A PHC soil may also be disposed of in these landfills. These landfills do not rely on permafrost for containment nor do they include a geosynthetic liner.
- .12 Tier II Landfill: Landfill constructed for the disposal of DCC Tier II soil. The Tier II Landfill design is based on the containment of contaminated soil in a landfill provided with a geo-synthetic liner and a granular fill cover of sufficient thickness to maintain the contaminated soil in a frozen condition.
- .13 Soil Treatment Cell: Area constructed for the remediation of Type B PHC soil.
- .14 Class A BDA: Defined by AMSRP as a Buried Debris Area (BDA) located in an unstable, high erosion location requiring relocation to a properly engineered landfill.
- .15 Class B BDA: Defined by AMSRP as a BDA located in a suitable, stable location, but with evidence of contaminant migration requiring relocation to a properly engineered landfill.
- .16 Class C BDA: Defined by AMSRP as a BDA located in a suitable, stable location, with no evidence of contaminant migration, that may be left in place with the addition of granular fill placement to ensure erosion protection and proper drainage, as required.

1.5 DESCRIPTION OF WORK

- .1 Work of this Contract comprises the site remediation activities at the CAM-E, Keith Bay site including, but not limited to, the following:
 - .1 Preparation of planning documents and submittals including but not limited to Site Specific Health and Safety Plan (SSHSP) as specified in Section 01 35 32 – Site Specific Health and Safety Plan for Contaminated Sites.
 - .2 Design and planning of a temporary winter access trail (CAT train route), if required, for mobilization and demobilization of equipment, support facilities, and materials to/from the site.
 - .3 Mobilization and demobilization of all personnel, equipment, support facilities and materials required to complete the Work.
 - .4 Improvements and maintenance of the site access roads and airstrips as required to facilitate remediation activities.
 - .5 Construction of on-site NHW Landfill.
 - .6 Construction of on-site Tier II Landfill.
 - .7 Dismantling and demolition of buildings and infrastructure, debris/waste collection, waste stream segregation, and on-site transport and disposal of waste.
 - .8 Emptying and cleaning of barrels and tanks and compaction and disposal at appropriate on-site landfill.
 - .9 On-site incineration of drum/tank contents that meet incineration criteria.
 - .10 On-site incineration of unpainted, untreated, combustible non-hazardous waste and compaction and disposal of remaining non-hazardous waste in NHW

- Landfill.
- .11 Abatement of waste with PCB and/or lead amended paint meeting Tier II disposal requirements and compaction and disposal in on-site Tier II Landfill.
 - .12 Bagging and disposal of asbestos materials in on-site NHW Landfill.
 - .13 Venting of compressed gas cylinders and disposal of cylinders in on-site NHW Landfill.
 - .14 Containerization, off-site transportation and disposal of hazardous waste to Contractor's Designated Hazardous Waste Disposal/Treatment Facility.
 - .15 Excavation of PHC impacted soil and placement in the on-site Soil Treatment Cell (Type B) or NHW Landfill (Type A).
 - .16 Excavation of DCC Tier I soil and placement in on-site NHW Landfill.
 - .17 Excavation of DCC Tier II soil and placement in on-site Tier II Landfill.
 - .18 Design, construction, operation and maintenance of a contaminated soils treatment system for PHC contaminated soil including construction of on-site Soil Treatment Cell. Remediation of Type B PHC contaminated soil operations to be conducted at the on-site proposed Soil Treatment Cell.
 - .19 Sampling, laboratory analysis and excavation of Class A/B Buried Debris Areas (BDAs) and disposal in NHW or Tier II Landfill, or Soil Treatment Cell. Disposal location will be based upon type of debris encountered and sample analytical results.
 - .20 Removal of exposed surface debris at Class C BDAs and disposal at appropriate on-site disposal facility (or off-site if hazardous waste) followed by placement and compaction of specified borrow material, as necessary, to establish a cover layer over the BDAs, including final grading.
 - .21 Development and reclamation of identified on-site borrow sources.
 - .22 Backfilling and grading of all the excavated areas using specified material from the borrow sources.
 - .23 Decommissioning and regrading of on-site Soil Treatment Cell area.
 - .24 NHW and Tier II Landfill cell closure and placement/grading of final cover material.
 - .25 Provision of the following support activities:
 - a. Construction of Camp as specified in Section 01 54 00 - Camp Facilities, including operation, maintenance, catering and janitorial service.
 - b. Provision and maintenance of Departmental Representative's Vehicles as specified in Section 01 52 00 Construction Facilities.
 - c. Safety, fire protection, office and medical services, as specified in Section 01 35 32 - Site Specific Health and Safety for Contaminated Sites.
 - d. Transportation services for Departmental Representative and Departmental Representative's support staff from Kugaaruk to CAM-E, as specified in Section 01 54 00 - Camp Facilities.
 - e. Communication services for the Contractor, Departmental Representative, and Departmental Representative's support staff as specified in Section 01 54 00 – Camp Facilities.
 - f. Provision of Wildlife Monitors, as specified in Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.

1.6

POTENTIAL ADDITIONAL WORK

- .1 The Potential Additional Work Schedule in the Basis of Payment indicates potential additional quantities of unknown Work that may or may not be required on site during remedial activities. None of the quantities and items listed are guaranteed; however, if additional work is required, the rates listed shall be used by the Contractor. Potential Additional Work may include but is not limited to:

- .1 Collection, processing, and disposal of unknown debris scattered over the site area. Unknown debris is any debris not identified within the specifications and/or Drawings.
- .2 Collection, processing, and disposal of unknown buried debris. Unknown buried debris is debris requiring excavation and disposal not identified within the specifications and/or Drawings.
- .3 Processing, containerization, transportation and disposal off-site of unknown hazardous materials. Unknown hazardous materials is any hazardous materials not identified within the specifications and/or Drawings.
- .4 Excavation, containerization or treatment, transport and disposal of unknown hazardous or contaminated soil beyond the quantities listed within the specifications and/or Drawings.
- .5 Collection and treatment or incineration of unknown barrel contents.
- .6 Supply of additional materials as directed by the Departmental Representative.
- .7 Regrading or reshaping of additional site areas.
- .8 Supply of emergency aircraft flights.
- .9 Pre-Mobilization and Post-Demobilization site visits with Departmental Representatives.
- .2 As part of the Potential Additional Work, Unknown Hazardous Materials does not include:
 - .1 Asbestos containing materials from facilities to be demolished.
 - .2 Fuel and fuel residual product from tanks and barrels to be disposed.
 - .3 Any hazardous material identified in the Inventory included in Appendix A, shown on the Drawings or elsewhere in these Specifications.

1.7 SUBMITTALS

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

1.8 ON-SITE DOCUMENTS

- .1 Maintain at job site, one (1) copy each of the following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Request for clarification and responses.
 - .4 Addenda.
 - .5 Task Authorizations.
 - .6 Change Orders.
 - .7 Reviewed Shop Drawings.
 - .8 Other Modifications to Contract.
 - .9 Field Test Reports.
 - .10 Copy of Approved Work Schedule.
 - .11 Copies of any test results.
 - .12 Manufacturers' installation and application instructions.
 - .13 Material and Safety Data Sheets.
 - .14 Site Specific Health and Safety Plan (SSHSP) including:
 - .1 Spill Contingency Plan.
 - .2 Fire Safety Plan.

- .3 Emergency Response Plan.
- .4 Wildlife Management Plan.
- .15 Waste Disposal Work Plan.
- .16 Copies of permits/approvals and/or authorizations including:
 - .1 Water Licence.
 - .2 Land Use Permit.
 - .3 Quarry Permit.
 - .4 Access to Commissioner's or Inuit-Owned Land (IOL) Permit if required (contingent upon selection of the winter access trail route).
- .17 Labour conditions and wage schedules.
- .18 Site Medic credentials.
- .19 Up to date record drawings.
- .20 Licence for radio communication.
- .21 All applicable Territorial permits and licenses.
- .22 All applicable Federal permits and licenses.
- .23 Copies of manifests and bills of lading.
- .24 Workers' Safety & Compensation Commission (WSCC) Notification of Project.
- .25 Letter of Good Standing with WSCC.

1.9 WORK SCHEDULE

- .1 Provide and maintain Work Schedule in accordance with instructions of Section 01 32 18 Construction Progress Schedules - Bar (GANTT) Chart.
- .2 Keep the Departmental Representative advised of planned Work activities in accordance with the instructions of Section 01 33 00 - Submittal Procedures.

1.10 CONTRACTOR USE OF PREMISES

- .1 Contractor's use of site is restricted to the terms and conditions of the issued permits, and all applicable guidelines and regulations.
- .2 Coordinate use of premises under the direction of the Departmental Representative.
- .3 Do not disturb archaeological features as indicated in the contract drawings or as identified during site work.
- .4 Use of site shall comply with the environmental requirements of Section 01 35 43 - Environmental Procedures.

1.11 EXAMINATION OF SITE

- .1 Prior to mobilization, the Contractor must complete a Pre-Mobilization Site Visit to check field conditions and obtain actual conditions. The Pre-Mobilization Site Visit will include attendance by the Departmental Representative and AANDC. Following a site visit, the Contractor must notify the Departmental Representative, in writing, of all matters which could prejudice proper execution of the Work.
- .2 Commencement of mobilization constitutes acceptance of existing conditions, and verification of dimensions.

1.12 PERMITS AND LICENSES

- .1 Departmental Representative will apply for a Land Use Permit, Water License, and Quarry Permit. All restrictions and requirements of these apply to Contractor.

- .2 Contractor shall obtain and pay for applicable Access to Inuit Owned Lands (IOL) or Access to Commissioner's Lands permitting as required (contingent upon selection of the winter access trail route).
- .3 Be responsible for obtaining and paying for all permits, licenses and approvals associated with the development and operation of a construction camp.
- .4 Register, obtain and pay for all required licenses and permits for individual tradesmen employed for Work as referenced in the various Sections of the Contract Specifications.
- .5 Obtain and pay for any other licenses or permits required to complete the activities required on site, i.e. burn permit, etc.
- .6 Provide supplemental information to the regulators for any necessary license amendments or reporting requirements.
- .7 Pay all costs associated with complying with the requirements for the permits and licenses noted in the above clauses.

1.13 SITE SUPERVISION

- .1 Designate Contractor's Site Superintendent to be on-site at all times during construction, to have full authority to make decisions on behalf of the Contractor, to be knowledgeable of the requirements of the contract, and to act upon Departmental Representative's instructions.
- .2 Notify Departmental Representative two (2) weeks in advance of changing the Site Superintendent and provide an updated chain-of-command.

1.14 ADDITIONAL DRAWINGS

- .1 Departmental Representative may furnish additional drawings to assist with proper execution of the work. These drawings will be issued for clarification only. Such drawings are to have the same meaning and intent as if they were included with plans referred to in Contract documents.

1.15 WORKER ORIENTATION SEMINAR

- .1 Develop, prior to the start of Work, course material for a Worker Orientation Seminar. The outline of this seminar is to be reviewed and accepted by Departmental Representative and is intended to describe the remediation activities at the site, and provide instruction for the applicable health, safety, and environmental policies and regulations as related to the site Work activities. Course material will be prepared and presented in English and the local language and dialect.
- .2 Submit two (2) hard copies and one (1) electronic copy of the Worker Orientation Seminar course material to Departmental Representative for review at least 30 days prior to the seminar. Include information describing the facility to be used for conducting the seminars.
- .3 The Orientation Course is to address, but is not necessarily limited to, the following topics:
 - .1 General and Site Specific Health and Safety
 - .1 Responsibility for safety.
 - .2 Team Work.
 - .3 Work attitudes/productivity.
 - .4 Anti-Harassment Policy.
 - .5 First aid procedures.
 - .6 Personal protective equipment and clothing.

SUMMARY OF WORK

- .7 Safe operation of equipment and tools.
- .8 WHMIS requirements.
- .9 Wildlife awareness and safety.
- .10 Marine safety.
- .11 Helicopter safety.
- .12 Weather safety.
- .13 Unexploded Ordnance Awareness.

- .2 Project Communication
 - .1 Roles of Departmental Representative and Departmental Representative's authorized representatives.
 - .2 Roles of Contractor and Contractor's authorized representatives.
 - .3 Lines of Project communication.

- .3 Regional Overview of the CAM-E site area
 - .1 Geology and hydrology of the area.
 - .2 Flora and fauna.
 - .3 Land use of area for hunting, fishing etc.
 - .4 Location of site relative to communities.
 - .5 Areas of archaeological significance.
 - .6 Climate.

- .4 Project Organization/Schedule/Administration
 - .1 Personnel policies.
 - .2 Supervisory reporting relationships.
 - .3 Communication.
 - .4 Payroll and banking procedures.
 - .5 Work Schedules and hours.
 - .6 Camp Rules.

- .5 Environmental Issues and Protection Procedures
 - .1 Climate.
 - .2 Land use.
 - .3 Water resources/fisheries.
 - .4 Terrestrial resources.
 - .5 Heritage resources.
 - .6 Spill contingency plans/procedures.
 - .7 Training activities.

- .6 Waste Management Procedures

- .7 Work Specific Task Requirements
 - .1 Mobilization/Demobilization.
 - .2 Site access road/airstrip improvements.
 - .3 Landfill and Soil Treatment Cell Construction
 - .4 Demolition and waste material segregation and disposal.
 - .5 Barrel collection and disposal/containerization.
 - .6 Waste incineration.
 - .7 Abatement of material with PCB/lead amended paint.
 - .8 Asbestos abatement.
 - .9 Venting of compressed gas cylinders.
 - .10 Excavation of contaminated soils and buried debris.
 - .11 Permafrost protection.
 - .12 Hydrocarbon contaminated soil treatment.
 - .13 Transportation of Dangerous Goods (TDG).

- .14 Development and reclamation of borrow sources.
 - .15 Environmental mitigation procedures.
 - .16 Emergency spill response training.
- .4 Prior to the start of Work, conduct Worker Orientation Seminars for all supervisors, foremen, Contractor's general workforce, Departmental Representative and Departmental Representative's Authorized Personnel staff based on the course material accepted by Departmental Representative.
- .5 All workers must attend the Worker Orientation Seminar prior to commencing Work on the Site. Require each attendee to sign a record of attendance upon completion of the seminar. Retain, for Departmental Representative's review at any time, this record of attendance.

1.16 MEASUREMENT FOR PAYMENT

- .1 Work under this Contract will be paid for as follows:
- .1 Lump sum pay items will be paid at the lump sum price tendered for each lump sum item listed in the Basis of Payment Schedule.
 - .2 Unit price items will be paid at the unit price tendered for each unit price item listed in the Basis of Payment Schedule.
 - .3 Indirect project costs will be paid at the lump sum price tendered for "Balance of Project Costs" (BOPC-1) on the Basis of Payment Schedule.
 - .4 Provisional Cost Sum Items will be paid according to the actual costs expended, as certified by the Departmental Representative for each provisional cost item listed in the Basis of Payment Schedule. Retain receipts for all Provisional Cost Sum Items.
 - .5 Level of effort for authorized Potential Additional Work will be negotiated and paid for at firm all-inclusive prices tendered for additional Work on the Basis of Payment Schedule.
- .2 Unit price items, lump sum items and provisional cost sum items will be paid under the Basis of Payment of the proposed contract. All other items, whether specifically defined in the specific sections of the Specifications or not, will be paid under Item BOPC-1, Balance of Project Costs, in the Basis of Payment Schedule.
- .3 Direct costs include all costs directly attributable to a particular pay item including equipment, operators, materials, etc. All direct costs for lump sum and unit price items are to be included in the appropriate price item in the Basis of Payment Schedule.
- .4 Indirect costs include all costs not directly attributable to the pay items including profit, supervision, overhead, administration, CGL Insurance, Workers' Safety and Compensation Commission WSCC, Contractor's allowance for equipment repairs and depreciation, and any other relevant costs. All indirect costs associated with specific unit price or lump sum items will be included in Item BOPC-1, Balance of Project Costs, in the Basis of Payment Schedule.
- .5 Include costs for work, goods or services required in this section that are not covered by appropriate payment clauses in other sections in Item BOPC-1, Balance of Project Costs, in the Basis of Payment Schedule.
- .6 Notify Departmental Representative of planned Work activities in accordance with requirements of Section 01 33 00 - Submittal Procedures, and at least two (2) days in advance of operations to permit required measurements for payment.

- .7 All costs for the preparation of the Worker Orientation Seminar Material and for conducting the seminars, including the preparation of meeting room facilities as required, are to be included in the lump sum for Worker Orientation Seminar, Item 01 11 00-1, as indicated in the Basis of Payment Schedule. Payment for the Worker Orientation Seminar will be paid upon demonstration by the Contractor to the Departmental Representative that the Contractor's entire project workforce has attended the seminar prior to the start of Work.
- .8 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Particular requirements for inspection and testing, to be carried out by a testing laboratory approved by the Departmental Representative, are specified under various sections.
- .2 Provide and pay for all transportation and analysis required for all Contractor's samples to an accredited laboratory to meet the requirements specified.
- .3 Provide and pay for all transportation required for all Departmental Representative's samples to the Departmental Representative's designated commercial analytical laboratory depot in Edmonton, AB or Yellowknife, NWT.

1.2 SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Submit to the Departmental Representative 60 days prior to the initiation of on-site remediation activities, details of Contractors proposed methodology to complete sampling and testing requirements including, but not limited to:
 - .1 The Contractors proposed analytical laboratory.
 - .2 Details of proposed sampling personnel and protocols.
 - .3 Details of the proposed sample packaging and transportation methods.
 - .4 A copy of the proposed laboratory's current ISO 17025 certification valid for all analytical tests to be performed.
- .3 Proposed methodologies are to meet or exceed requirements of specifications, certified laboratory requirements and industry best practice. Departmental Representative will review Contractors submittal.
- .4 The analytical testing laboratory designated by the Contractor to carry out off-site tests must be acceptable to the Departmental Representative. The analytical laboratory must maintain ISO 17025 certification for all tests to be performed and in advance of analytical testing. The proposed analytical laboratory must be independent from the Contractor.

1.3 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of a testing laboratory required for the following:
 - .1 Confirmatory testing as described in this Section.
 - .2 Testing associated with the characterization of barrel contents as required in the 2009 INAC Abandoned Military Sites Remediation Protocol.
 - .3 Material compaction and gradation testing.
 - .4 Testing associated with the identification and characterization of hazardous waste materials.
 - .5 Testing required for quality assurance.

- .2 Contractor will appoint and pay for testing and quality control of Contractor's own work including the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing completed exclusively for Contractor's convenience.
 - .3 Periodic testing of potable water as described in these Specifications and the Canadian Drinking Water Guideline (CDWG).
 - .4 Testing of hazardous waste materials in accordance with all appropriate regulations for packaging, transport and off-site disposal.
 - .5 Testing of solvent rinsate used during cleaning of barrels.
 - .6 Testing to determine the disposal requirements of oil-absorbent material used as a filter for liquid wastes resulting from equipment decontamination, fuel tank/pipeline cleaning and barrel processing operations.
 - .7 Testing of Wastewater as defined in Section 01 35 15 - Special Project Procedures for Contaminated Sites.
 - .8 Testing of sewage effluent as indicated in Section 01 54 00 - Camp Facilities or as directed by Departmental Representative.
 - .9 Testing of Hydrocarbon Contaminated Soil as described in section 02 55 13 – Contaminated Soil.
 - .10 Testing of wash water resulting from all cleaning activities, including barrel washing and equipment decontamination.
 - .11 Testing of explosive vapour concentrations associated with degassing of tanks.
 - .12 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .13 All tests required by Contractor to monitor conformance and quality control of Contractor's work.
 - .14 Inspection and testing required by the conditions of permits issued for the Work.
- .3 Where tests or inspections by the designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as requested by Departmental Representative to verify acceptability of corrected Work.

1.4 CONTRACTOR RESPONSIBILITIES

- .1 Provide labour and facilities to:
 - .1 Provide assistance and access to Work to be inspected and tested by Departmental Representative.
 - .2 Enable Contractors testing requirements.
 - .3 Make good Work disturbed by inspection and testing.
- .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of personnel and scheduling of test.

- .3 Instruct testing laboratory to include Departmental Representative on result distribution list via facsimile or e-mail.
- .4 Costs for uncovering and making good Work that is covered before required inspection or testing is completed and reviewed by Departmental Representative shall be borne by the Contractor.
- .5 Maintain interior temperature of coolers at approximately 4°C during transport, using ice or ice packs.
- .6 Assume all responsibility for samples compromised during transport including all costs for re-sampling, shipping, analysis and any resulting delays.

1.5 CONFIRMATORY TESTING

- .1 Confirmatory sampling will be carried out on contaminated soil areas by the Departmental Representative as follows:
 - .1 The actual location, frequency and method of testing will be determined by Departmental Representative.
 - .2 Soil sampling will be carried out by Departmental Representative within the perimeter of each contaminated soil excavation and at depth within the completed excavation area, immediately upon completion of excavation.
- .2 If required, classification testing will be carried out at waste material processing areas to classify and delineate contaminated soil and other materials.
- .3 It is anticipated that test results will be available within approximately ten (10) calendar days from the date that samples are transported from the site for laboratory analysis. Deliver Departmental Representative's samples to Departmental Representative's designated testing laboratory depot in Edmonton or Yellowknife within two (2) days from site departure.
- .4 Be responsible for all costs associated with the packaging, handling and transport of Departmental Representative's samples from the site to Departmental Representative's designated testing laboratory depot in Edmonton or Yellowknife. It is critically important that Contractor expeditiously delivers samples from the site and transfers them to a commercial air service. Where cargo transfers are required from charter to commercial air service, provide personnel at transfer locations to facilitate timely transfers.
- .5 Assume all responsibility for samples damaged during transport including all costs for re-sampling, shipping, analysis and any resulting delays.

1.6 MEASUREMENT FOR PAYMENT

- .1 Packaging, handling and off-site transport of Departmental Representative's samples to the Analytical Laboratory Depot in Edmonton or Yellowknife will be measured for payment by kilogram shipped. Packaging, Handling and Transport of Departmental Representative's Samples to an Analytical Laboratory depot in Edmonton or Yellowknife will be paid under Item 01 29 83-1 in the Basis of Payment Schedule.
- .2 Include all direct costs in the lump sum price for Contractor's Testing Requirements, including sampling, packaging, handling, off-site transport and testing of Contractor's samples at an accredited laboratory of choice. Contractor's Testing Requirements including Sampling, Transportation and Analysis at an Accredited Laboratory will be paid under Item 01 29 83-2 in the Basis of Payment Schedule.

- .3 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Project Start-Up Teleconference: conference call to be held within ten (10) days following Contract Award and to include the Contractor, Departmental Representative and Aboriginal Affairs and Northern Development Canada (AANDC).
- .2 Pre-Construction Meeting: meeting to be held prior to Contractor Mobilization at location of Contractor's choice and to include the Contractor, Departmental Representative and AANDC.
- .3 Pre-Mobilization Site Visit: Contractor's visit to the site with Departmental Representative and AANDC to check field conditions and obtain actual site information required to correctly execute the Work prior to site mobilization.
- .4 Post-Construction Meeting: meeting to be held after completion of construction at location provided by Departmental Representative and to include the Contractor, Departmental Representative and AANDC.
- .5 Construction Meetings: meeting to be held on-site at weekly intervals during the course of the work and to include the Contractor, major Sub-Contractors and Departmental Representative.
- .6 Daily Safety Meeting: meeting to be held on-site daily during the construction season and to include Contractor, all staff, on-site Departmental Representative and Departmental Representative's authorized personnel.
- .7 Weekly Safety Meeting: meeting to be held on site on a weekly basis during the construction season and to include Contractor, all staff, on-site Departmental Representative and Departmental Representative's authorized personnel.
- .8 Joint Occupational Health and Safety Committee Meeting: meeting as required by Authorities Having Jurisdiction (AHJs).
- .9 Monthly Meeting: meeting to be held on-site at approximately monthly intervals during the construction season and to include the Contractor, Departmental Representatives and AANDC.
- .10 Inter-Season Meeting: meeting to be held between construction seasons at location of Contractor's choice and to include the Contractor, Departmental Representative and AANDC.
- .11 Community Meetings: meetings to be held prior to each construction season and upon completion of the project. The meetings are to be held in English with simultaneous translation into local Inuit dialect. Community meetings will be led by the Contractor with Departmental Representative and AANDC typically in attendance. Additional attendees include members of the general public, local leaders, officials and authorities. This meeting shall be open to the public and advertised by appropriate means in advance.

1.2 ADMINISTRATIVE

- .1 Responsibilities of Departmental Representative:
 - .1 Schedule and administer project meetings throughout the progress of the Work.
 - .2 Prepare agenda for meetings unless otherwise specified.
 - .3 Distribute written notice of each meeting five (5) days in advance of meeting date.

- .4 Preside at meetings unless otherwise specified.
- .5 Record the meeting minutes unless otherwise specified. Include significant proceedings and decisions. Identify actions by parties.
- .6 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and affected parties not in attendance.
- .2 Responsibilities of the Contractor:
 - .1 Provide physical space and make arrangements for meetings.
 - .2 Representative of Contractor, Sub-Contractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PROJECT START-UP TELECONFERENCE MEETING

- .1 Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. The meeting will be a teleconference between all parties in attendance.
- .2 Departmental Representative, Contractor, AANDC, major Sub-Contractors, field representatives and supervisors will be in attendance.
- .3 Establish time and contact information for the meeting and notify parties concerned a minimum of five (5) days before meeting.
- .4 Departmental Representative will chair the meeting and take minutes. Meeting will be informal and agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Preliminary Schedule of Work.
 - .3 Preliminary Schedule of submission of Work Plan and Cost Breakdown and other submissions.
 - .4 Preliminary requirements for temporary facilities, site security, camp facilities, equipment and proposed method of mobilization and demobilization to minimize disturbances to the environment.
 - .5 Set-up of Pre-Construction meeting.

1.4 PRE-CONSTRUCTION MEETING

- .1 As per Start-up Teleconference Meeting, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, AANDC, major Sub-Contractors, field representatives and supervisors in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum ten (10) days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

- .3 Schedule of submissions in accordance with Section 01 33 00 - Submittal Procedures including but not limited to:
 - .1 Site Specific Health and Safety Plan (SSHSP).
 - .2 Insurance and transcripts.
 - .3 Equipment to be used by Contractor.
 - .4 Proposed camp facilities in accordance with Section 01 54 00 - Camp Facilities.
 - .5 Location of equipment and proposed methods for mobilization and demobilization, including proposed CAT Train route/winter access trail alignment (if applicable).
 - .6 Shop Drawings
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Delivery schedule of specified equipment.
- .6 Site security in accordance with 01 54 00 – Camp Facilities.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, administrative requirements.
- .8 Departmental Representative provided products, if any.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Regulatory Issues.
- .15 Aboriginal involvement and reporting.
- .16 Project Photograph requirements.
- .17 Requirements for Waste Management.
- .18 Regulatory Review of all permits required to complete Work.

1.5 PRE-MOBILIZATION SITE VISIT

- .1 Prior to mobilization, a Pre-Mobilization Site Visit may be completed to check field conditions and obtain actual conditions required for correct execution of the Work.
- .2 Provide a minimum of fourteen (14) days notice to Departmental Representative prior to examining the site.
- .3 Departmental Representative, Contractor, and AANDC will be in attendance.
- .4 Notify Departmental Representative in writing of all matters which could prejudice proper execution of the Work, by submitting a Pre-Mobilization Site Visit Report within seven (7) days of completing the visit.

1.6 POST-CONSTRUCTION MEETING

- .1 Within ninety (90) days after completion of construction, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. The meeting will be a meeting between all parties in Edmonton, Alberta. The Departmental Representative will provide a venue for the meeting.
- .2 Departmental Representative, Contractor, AANDC, major Sub-Contractors, field representatives and supervisors will be in attendance.
- .3 Establish time and contact information for the meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Departmental Representative will chair the meeting and take minutes. Meeting will be informal and agenda to include, but is not limited to:
 - .1 Outstanding contractual issues.
 - .2 Holdback release.
 - .3 AOC Content.
 - .4 Lessons learned.
 - .5 Outstanding submittals.
 - .6 Outstanding reporting requirements.

1.7 CONSTRUCTION MEETINGS

- .1 During course of Work and weeks prior to Project completion, Departmental Representative will schedule weekly progress meetings.
- .2 Contractor, major Sub-contractors involved in Work, and Departmental Representative are to be in attendance.
- .3 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.
- .4 Agenda to include:
 - .1 Review and approval of minutes of previous meeting.
 - .2 Regulatory Review.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, or conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Project schedule review, identifying activities that are behind schedule and providing measures to regain slippage.
 - .8 Corrective measures and procedures to regain projected schedule.
 - .9 Revisions to construction Schedule.
 - .10 Progress schedule during succeeding Work period.
 - .11 Review submittal schedules: expedite as required.
 - .12 Maintenance of quality standards.

- .13 Review proposed changes for effect on construction schedule and on completion date.
- .14 Health, Safety and Security issues.
- .15 Correspondence from AHJs or expected visits from AHJs.
- .16 Camp requirements.
- .17 Other business.
- .5 Provide written explanations on activities which are overrunning estimated time. If any such activities are on the critical path, indicate what corrective action will be taken to bring them back on Schedule.

1.8 SAFETY MEETINGS

- .1 Daily Safety Meeting: meeting to be held on-site daily during the construction season and to include Contractor, all on-site staff, on-site Departmental Representative and Departmental Representative's authorized personnel. The Daily Safety Meeting may be split into task or crew specific meetings as required. Record attendance and discussion topic(s) for daily safety meeting(s) and make available to Departmental Representative as required.
- .2 Weekly Safety Meeting: Contractor to preside over weekly meeting for all site personnel during the construction season. Minutes are to be recorded and attendance taken. Post minutes and attendance list on-site and provide copy to Departmental Representative within three (3) days of the meeting.
- .3 Joint Occupational Health and Safety Committee Meeting: hold meeting according to attendance and frequency requirements of AHJs.

1.9 MONTHLY PROGRESS MEETINGS

- .1 Departmental Representative will schedule Monthly Progress Meetings to be held on-site.
- .2 Departmental Representative, Contractor, AANDC, major Sub-Contractors, field inspectors and supervisors will be in attendance.
- .3 Departmental Representative will notify parties five (5) days prior to meetings.
- .4 Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.
- .5 Agenda may include:
 - .1 Summary of the previous month's site activities.
 - .2 Comparison of progress achieved with the Project Schedule.
 - .3 Schedules and action Contractor plans to take to get back on schedule, if required.
 - .4 Confirmation of quantities.
 - .5 Health, safety and security issues.
 - .6 Summary of interactions with AHJ.
 - .7 Work plan for the following month.
 - .8 Camp requirements.
 - .9 Other business.

1.10 INTER-SEASON MEETING

- .1 Request a meeting of parties in contract to discuss the previous and upcoming construction season and resolve issues arising from same.
- .2 Departmental Representative, Contractor, AANDC, major Sub-Contractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum ten (10) days before meeting.
- .4 Departmental Representative will preside.
- .5 Agenda may include:
 - .1 Summary of the previous season's site activities.
 - .2 Comparison of progress achieved with the Project Schedule.
 - .3 Schedules and action Contractor plans to take to get back on Schedule, if required.
 - .4 Confirmation of quantities.
 - .5 Health, safety and security issues.
 - .6 Summary of interactions with AHJ.
 - .7 Work plan for the following season, if any.
 - .8 Camp requirements.
- .6 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.

1.11 COMMUNITY MEETINGS

- .1 Prior to the commencement of each work season and following the completion of remediation, arrange meetings with Departmental Representative, local leaders, officials, authorities and public in Kugaaruk, Nunavut. Be prepared to discuss local hiring practices and any other items of operations which may impact upon the local communities. Minutes will be taken by Departmental Representative. Provide a sign in sheet for attendees.
- .2 Conduct presentations via computer and projector using "Power Point" software or using a similar suitable presentation. Provide wording in English and simultaneous translation to the local Inuit dialect during the presentation. Submit presentations to Departmental Representative for review a minimum of 14 days prior to each community meeting.
- .3 Provide and pay for the following associated with these meetings:
 - .1 Meeting facility rental.
 - .2 Coffee, tea, pastries, cookies, etc.
 - .3 Costs associated with translation.
 - .4 All associated advertising costs.
- .4 Each Community Meeting should be well advertised including but not limited to:
 - .1 Advertisement through posters hung in the Town/Hamlet Office, Community Hall, the Co-op Store, and other places frequented by people in the Hamlet, at least one week in advance of the meeting.
 - .2 Advertisement through radio announcements which will air starting at least one week prior to the meeting.

- .3 Any other forms of advertisements capable of providing adequate publicity for the community meeting.
- .5 Meeting minutes are to be distributed by the Departmental Representative to key stakeholders and shall include questions asked and answers provided and a list of attendees. The list of attendees will be recorded by the Departmental Representative. Meeting minutes shall be distributed within ten (10) days of the meeting date.

1.12 SUBMITTALS

- .1 Provide submittals to the Departmental Representative for review. Include submittals as noted in Table 01 33 00-1 in Section 01 33 00 - Submittal Procedures.

1.13 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the Pre-Construction Meeting in the lump sum price for Pre-Construction Meeting at location of Contractor's choice, Item 01 31 19-1, as indicated in the Basis of Payment Schedule. Item 01 31 19-1 includes, but is not limited to, arranging for meeting facilities and travel and accommodation costs for Contractor's personnel only. The Departmental Representative will provide and pay for all costs related to the facilitator for the Partnering Session.
- .2 Include all direct costs for the Pre-Mobilization Site Visit in the lump sum price for the Pre- Mobilization Site Visit, Item 01 31 19-2, as indicated in the Basis of Payment Schedule. Item 01 31 19-2 includes, but is not limited to, transportation to site for all participants and accommodation costs for Contractor's personnel only.
- .3 Include all direct costs for the Post Construction Meeting in the lump sum price for Post Construction Meeting in Edmonton, Alberta, Item 01 31 19-3, as indicated in the Basis of Payment Schedule. Item 01 31 19-3 includes, but is not limited to, travel and accommodation costs for Contractor's personnel only.
- .4 All costs associated with return transportation for Monthly Meetings of Departmental Representative's personnel from Kugaaruk, Nunavut to CAM-E will not be considered for payment under this section, but will be included for payment as specified in Section 01 54 00 - Camp Facilities.
- .5 Include all direct costs for the Inter-Season Meeting in the lump sum price for Inter-Season Meeting at Location of Contractor's Choice, Item 01 31 19-4, as indicated in the Basis of Payment Schedule. Item 01 31 19-4 includes, but is not limited to, arranging for meeting facilities and travel and accommodation costs for Contractor's personnel only.
- .6 Community Meetings in Kugaaruk, Nunavut, will be measured for payment by the number of meetings held and paid under Item 01 31 19-5, Community Meetings – Kugaaruk, Nunavut in the Basis of Payment Schedule. The scope of work for payment Item 01 31 19-5 is to include, but is not limited to, transportation of three (3) Departmental Representative(s) and/or Authorized Personnel from the Contractor's Charter Base to the Community Meeting Location.
- .7 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Activity: element of Work completed during course of Project. Activity normally has expected duration, expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar (GANTT) Chart: graphic display of Schedule-related information. In a typical bar chart, activities or other Project elements are listed down the left side of the chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars. Generally Bar Charts should be derived from commercially available computerized Project management systems.
- .3 Baseline: original accepted/approved plan (for Project, Work package, or activity), plus or minus approved scope or accepted schedule changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven (7) day Work week and define Schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other Project element. Usually expressed as work days or work weeks.
- .6 Milestone: significant event in Project, usually completion of major deliverable.
- .7 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout Project life cycle.

1.2 REQUIREMENTS

- .1 Ensure detailed Schedule is practical and remains within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Provide and maintain a work schedule showing anticipated progress stages and final completion of work within time period required by Contract.
- .4 Prepare schedule using critical path analysis techniques, showing resource loading. Identify tasks that lie on the critical path. Show float where possible.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the Bar (GANTT) Chart for the Preliminary Project Schedule to Departmental Representative within seven (7) working days of the contract award date.

1.4 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule.

- .2 Ensure detailed Project Schedule includes the following as minimum milestone and activity types:
 - .1 Award.
 - .2 Planning document submittals, Shop Drawings, samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Construction of project facilities including camp, landfills, soil treatment cell, staging areas, and abatement facility.
 - .6 Access improvements.
 - .7 Structure demolition.
 - .8 Buried debris excavation and regrading.
 - .9 Collection and disposal of non-hazardous materials.
 - .10 Collection, abatement, and disposal of hazardous materials.
 - .11 Excavation and treatment of hydrocarbon contaminated soils.
 - .12 Excavation and disposal of Tier II impacted soil.
 - .13 Regrading.
 - .14 Restoration of borrow sources and disturbed areas.
 - .15 Final off-site disposal of hazardous waste requiring off-site disposal.
 - .16 Submission of waste manifests and disposal certificates.
 - .17 Camp Shutdown.
 - .18 Interim Certificate of Completion.
 - .19 Demobilization.
 - .20 Closeout Submittals.
 - .21 Final Completion of all site Works.
 - .22 Final Certificate of Completion.
- .3 Submit preliminary construction progress Schedule in accordance with Section 01 33 00 - Submittal Procedures to Departmental Representative coordinated with Departmental Representative's Project Schedule.
- .4 After review, revise and resubmit Schedule to comply with revised Project Schedule.
- .5 During progress of Work, update and resubmit the Project Schedule as directed by Departmental Representative. Provide the updated Project Schedule a minimum of three (3) days prior to monthly meetings, or as directed by Departmental Representative.

1.5 PROJECT PROGRESS REPORTING

- .1 Update and submit the Project Schedule on a monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule submittal, a 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.

1.6 PROJECT MEETINGS

- .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 Project Schedule.
- .2 Weather-related delays with their mitigative measures will be discussed and negotiated.

1.7 COST AND QUALITY CONTROL

- .1 Provide a Contract Work Breakdown Structure (CWBS) based on Contractor's Cost Breakdown and any modifications requested by Departmental Representative as follows:
 - .1 The CWBS is to be an organization of the Work to be performed, services to be provided and data to be submitted by Contractor, as well as payments to be made to the Contractor under the terms of the Contract.
 - .2 The CWBS is to clearly define the Work elements of each item of the CWBS.
 - .3 The CWBS is to include a breakdown of pay items included under Item BOPC -1, Balance of Project Costs in the Basis of Payment Schedule. All unit price, lump sum, and provisional cost sum allowance pay items included in the Basis of Payment Schedule to also be included in the CWBS.
 - .4 Prepare the CWBS in computerized spreadsheet format compatible with the most recent release of Microsoft Excel software. Provide CWBS in hard copy format.
 - .5 Submit the CWBS within thirty (30) days following contract award date.
 - .6 Update the CWBS monthly reflecting changes and items completed to date and submit the updated CWBS with the monthly Project Schedule updates.
- .2 Equipment and Material Control:
 - .1 Record data on status of construction material and equipment and report upon Departmental Representative's request.
- .3 Manpower Performance Measures:
 - .1 Record and report manpower listing for each company employed under this Contract, including Sub-Contractors, detailing daily man-hours (aboriginal and non-aboriginal) during the current month and cumulative total to date. Submit to the Departmental Representative on a monthly basis.
 - .2 Provide statistical reporting.
 - .3 Provide statistics related to lost time accidents hours upon Departmental Representative's request.
 - .4 Monthly Performance Measures Templates are included in this specification in Appendix D.

1.8 MEASUREMENT FOR PAYMENT

- .1 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in this Section.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 DEFINITION

- .1 Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Contractor to provide submittals including, but not limited to, those listed in Submittal Table 01 33 00 – 1 at the end of this Section. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal is not to proceed until review is complete.
- .3 Present shop drawings and product data, in SI Metric units.
- .4 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .5 Submit requests for payment for review and for transmittal to Departmental Representative.
- .6 Submit requests for interpretation of Contract Documents and obtain instructions through the Departmental Representative.
- .7 Submit and process substitutions through Departmental Representative.
- .8 Submit and process task authorizations and change orders through Departmental Representative.
- .9 Deliver closeout submittals for review to Departmental Representative.
- .10 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to a specific Project will be returned without being examined and will be considered rejected.
- .11 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .12 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .13 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .14 Keep one reviewed copy of each submission on-site.

1.3 SHOP DRAWINGS SUBMISSION

- .1 Submit, ninety (90) days prior to mobilization, preliminary shop drawings, product data and samples for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Departmental Representative. Submit Final Shop Drawings forty-five (45) days prior to mobilization.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in Nunavut/NWT, Canada.
- .4 Allow fourteen (14) days for Departmental Representative's review of each submission.
- .5 Adjustments made on Shop Drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative and receive written approval from the Departmental Representative prior to proceeding with Work.
- .6 Make changes in Shop Drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.
- .7 Verify in shop drawings:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
- .8 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .9 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Sub-Contractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .10 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

- .11 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Single line and schematic diagrams.
 - .9 Relationship to adjacent Work.
- .12 After Departmental Representative's review, distribute copies.
- .13 Submit three (3) prints and an electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .14 Delete information not applicable to Project.
- .15 Supplement standard information to provide details applicable to Project.
- .16 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, two (2) copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be completed before fabrication and installation of Work may proceed.
- .17 The review of Shop Drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review does not mean that Departmental Representative approves detail design inherent in Shop Drawings, responsibility for which remains with Contractor submitting same, and such review does not relieve Contractor of responsibility for errors or omissions in Shop Drawings or of responsibility for meeting all requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address site office.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 PHOTOGRAPHS

- .1 Provide digital photos in "Joint Photographic Experts Group" (.jpg) format for Progress Photographs and Final Photographs.
- .2 Digital photographs to have a minimum of 2,592 x 1,944 pixel (5 Megapixel) resolution.
- .3 Progress and Final Photographs to be submitted on a compact disc (CD). Provide one (1) copy of the Progress Photographs, and two (2) copies of the Final Photographs.
- .4 Printed (colour) copies of digital photographs to be provided for Final Photographs only:
 - .1 Size: 100 mm x 125 mm.
 - .2 Two digital photographs per 215 x 280 mm page.
 - .3 Pages to be white, of photographic quality paper and to be three-hole punched, ready for insertion into a three-ring binder. Binder(s) to be vinyl, hard-covered, 3 inch D ring, sized for 215 x 280 mm paper, with spine pocket.
- .5 Identification: Typewritten or generated by computer, the name and number of the Project on cover and spine of binder and CD case. Each photograph to be labelled with the digital photo file name positioned so as to not interfere with the view of the main activity or feature presented on the photograph. Also provide a description of each photograph in photographic log format. Photographic log to be included with each computer disk, CD, and binder. Description to include:
 - .1 Digital photograph file name
 - .2 Name and description of feature
 - .3 Position (GPS) and view direction.
 - .4 Date of exposure.
 - .5 Before and after photograph of location
- .6 Quantity: Provide sufficient number of photographs to adequately describe the Work activities carried out during the reporting period. A minimum of two (2) photographs taken from two (2) viewpoints are to be provided for each clean up/construction activity. Viewpoint locations for final digital photographs to be determined by Departmental Representative.
- .7 Provide "Before" and "After" photos of site showing key areas before remediation and after remediation. Provide "After" photos from the same Photographic Viewpoint as the "Before" photos, Record the location of the Photographic Viewpoints with a handheld GPS and plot these locations on the record drawing mark-up. Consult with Departmental Representative to verify Photographic Viewpoints.
- .8 Submit progress photographs monthly with Progress Report or as directed by Departmental Representative.
- .9 Provide two sets in two binders of final digital photographs.
- .10 Submit final photographs prior to final progress payment request.

1.6 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the Project Photographs in the lump sum price for Project Photographs, Item 01 33 00 - 1, as indicated in the Basis of Payment Schedule.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

| TABLE 01 33 00-1 CONTRACTOR SUBMITTAL SCHEDULE | | |
|---|--|--|
| Specification Section | Description | Date |
| 01 11 00 | Worker Orientation Seminar Course Material | Thirty (30) days prior to the first planned Worker Orientation Seminar |
| 01 11 00 | Notice of planned work activities to permit required measurements for payment | 2 days in advance of operations |
| 01 29 83 | Contractor's methodology to complete sampling and testing requirements | Sixty (60) days prior to start of on-site remediation activities |
| 01 29 83 | Valid ISO 17025 Laboratory Certifications | Sixty (60) days prior to start of on-site remediation activities |
| 01 31 19 | Pre-Mobilization Site Visit Report | Within seven (7) days after pre-mobilization site visit |
| 01 31 19 | Weekly Safety Meeting Minutes | Within three (3) days of the meeting. |
| 01 31 19 | Community Meeting Presentations | Fourteen (14) days prior to community meeting |
| 01 32 18 | Bar (GANTT) Chart for the Preliminary Project Schedule | Seven (7) days after contract award |
| 01 32 18 | Project Schedule Updates (Progress Report) | Monthly or as directed |
| 01 32 18 | Contract Work Breakdown Structure (CWBS) | Thirty (30) days following contract award date |
| 01 32 18 | CWBS Updates | Monthly with Progress Report or as directed |
| 01 32 18 | Cumulative and Daily Manpower Reports | Monthly with Progress Report |
| 01 33 00 | Document Submittals | Monthly with Progress Report |
| 01 33 00 | Preliminary Shop Drawings, Product Data, Samples | 90 days prior to mobilization |
| 01 33 00 | Final Shop Drawings | 45 days prior to mobilization |
| 01 33 00 | Progress Photographs | Monthly with Progress Report or as directed |
| 01 33 00 | Final Photographs | Prior to final progress payment request |
| 01 35 15 | Wastewater Treatment Facility Design, Operation and Maintenance Details | Sixty (60) after contract award |
| 01 35 15 | Wastewater compliance testing results | As received |
| 01 35 32 | Draft Site Specific Health and Safety Plan (including submittals listed in Section 01 35 32 to be submitted as part of Site Specific Health and Safety Plan) | Thirty (30) days after contract award |
| 01 35 32 | Final Site Specific Health and Safety Plan | Forty-five (45) days prior to crew mobilization. |
| 01 35 32 | Updated Site Specific Health and Safety Plan | Thirty (30) days prior to the start of each construction season. |
| 01 35 32 | Site inventory of health, safety, medical and first aid equipment and supplies | Within ten (10) days of crew mobilization to site each season |
| 01 35 32 | Accident/Incident Reports | Immediate verbal report, written report within 24 hrs |
| 01 35 32 | Proof of fit testing for site personnel | Prior to task |
| 01 35 32 | Proof of first aid credentials | Prior to the start of each construction season |
| 01 35 43 | Copies of Environmental Agency Submittals/Approvals | As required |
| 01 35 43 | Historical, Archaeological and, Cultural and Biological Resources Plan | Sixty (60) days prior to on-site remediation activities |
| 01 35 43 | Wildlife Protection Plan | Sixty (60) days prior to on-site remediation activities |
| 01 35 43 | Erosion Sediment and Drainage Control Plan | Forty-five (45) days prior to on-site Work |
| 01 35 43 | Work Methodology Plan for In Stream or Near Water Works | Forty-five (45) days prior to commencing the activity |
| 01 35 43 | Inventory of Environmental Protection Supplies | Forty-five (45) days prior to mobilization |
| 01 41 00 | MSDS Data Sheets | Upon delivery of materials to site |

SUBMITTAL
PROCEDURES

| TABLE 01 33 00-1 CONTRACTOR SUBMITTAL SCHEDULE | | |
|---|---|---|
| Specification Section | Description | Date |
| 01 45 00 | Inspection and Test Reports | As received |
| 01 52 00 | Field Drawings to Indicate Position of Facilities, Services, Equipment. | When required by Departmental Representative |
| 01 53 00 | Mobilization/Demobilization Plan Including Proposed Temp. Winter Access Trail Alignment | Forty-five (45) days after contract award |
| 01 53 00 | Final Mobilization/Demobilization Plan (if changes are required based on review) | Thirty (30) days prior to mobilization |
| 01 53 00 | Construction Equipment List | Thirty (30) days prior to mobilization |
| 01 54 00 | Plan of Construction Camp Layout and Siting | Forty-five (45) days prior to mobilization |
| 01 54 00 | Camp Facilities Third Party Inspection Report | Thirty (30) days prior to mobilization |
| 01 54 00 | Proof of Camp Licenses, Permits, Authorizations | Within thirty (30) days of camp start-up |
| 01 54 00 | Information on bottled water, or water source and quality tests | Prior to commencing camp operation, weekly for coliforms during camp operation, and a minimum frequency of every four (4) weeks for other parameters during camp operation. |
| 01 54 00 | Sketch of Proposed Sample Processing Facility / Laboratory | With Plan of Construction Camp Layout and Siting |
| 01 54 00 | Set of Camp Rules | Ten (10) days prior to mobilization |
| 01 71 01 | Documentation Certifying Survey Equipment Calibration | Thirty (30) days prior to each construction season |
| 01 71 01 | Name and address of Surveyor | Prior to project commencement |
| 01 71 01 | Survey documentation to verify accuracy of field engineering Work. | Upon request of Departmental Representative |
| 01 71 01 | Submit survey data backup for quantities claimed on Progress Claims | As required by Departmental Representative for Progress Claims |
| 01 71 01 | Certificate of Completed Survey Work (noting those elevations and locations of completed Work that conform and do not conform with Contract Documents | Seven (7) days prior to requested final inspection |
| 01 71 01 | Drawings | Upon request of Departmental Representative |
| 01 77 00 | Completion Certificate | Seven (7) days prior to requested final inspection |
| 01 78 00 | Record Drawings | At completion of project and prior to final inspection. Forward information on completed areas at the end of each construction season. |
| 01 78 00 | Records Submittal as indicated in Section 01 78 00 (Including copies of permits and permit reporting, information required by AHJs, records of testing, shipping documents, manifests, and TDG documentation) | Thirty (30) days after the completion of each construction season |
| 01 78 00 | Close Out Reporting | March 31 following project completion |
| 02 41 16 | Waste Transport Manifests, Chain of Custody Documentation, Transport Documentation for materials to be removed from the Site | Prior to Payment |
| 02 41 16 | Hazardous Waste Container Inventories and Weigh Scale Records | Prior to shipment off-site |
| 02 41 16 | LEL results of VOC testing | Upon request of Departmental Representative |
| 02 41 16 | Photographic record of contents of all completed hazardous containers for off-site transport | Prior to closure |
| 02 55 13 | Survey of existing conditions | Prior to excavation work |
| 02 55 13 | Written notice prior to excavation work | Seven (7) days prior to excavation work |
| 02 55 13 | Written notice when limits of excavation are reached | When limits of excavation are reached. |

SUBMITTAL
PROCEDURES

| TABLE 01 33 00-1 CONTRACTOR SUBMITTAL SCHEDULE | | |
|---|---|---|
| Specification Section | Description | Date |
| 02 55 13 | Details of Hazardous Contaminated Soil Containers including written confirmation from Transport Canada that the containers satisfy TDGA requirements for marine transport | Forty-five (45) days prior to mobilization |
| 02 55 13 | List of the numbered Hazardous Contaminated Soil Containers containers, their contents, and the area from where the soil was excavated | Prior to shipment off-site |
| 02 61 00 | Type B PHC Contaminated Soil Treatment Plan | Ninety (90) days prior to the construction |
| 02 61 00 | Type B PHC Contaminated Soil Treatment Operation Report | Monthly |
| 02 61 00 | Interim Soil Remediation Report | Thirty (30) days after completion of each construction season |
| 02 61 33 | Hazardous Material Qualifications and Training Records | Prior to commencement of work |
| 02 61 33 | Hazardous waste disposal tracking information including final inventories of hazardous waste containers and disposal details | Prior to transportation off-site |
| 02 61 33 | Details of Hazardous Waste Containers including written confirmation from Transport Canada that the containers satisfy TDGA requirements for marine transport | Forty-five (45) days prior to mobilization |
| 02 61 33 | Details of Hazardous Material Abatement, Processing, and Storage Areas | Prior to commencement of remediation activities |
| 02 61 33 | Photographic Record of interior of all Hazardous Waste Containers | Upon completion of work |
| 02 61 33 | Inventory of Hazardous Materials Containers and Contents | At the end of each construction season |
| 02 61 33 | Temporary Storage Area Inventory | Each month during the construction season |
| 02 61 33 | Waste Transport Manifests, Chain of Custody Documentation and Transport Documentation and Destruction Certificates for Hazardous Wastes | Prior to Payment |
| 02 61 33 | Details of Proposed Barrel Processing Methodology | Forty-five (45) days prior to mobilization |
| 02 61 33 | Hazardous Waste Disposal Tracking Form | Prior to shipment off-site |
| 02 82 00 | Provincial/Territorial and/or local requirements for Notice of Project Form | Thirty (30) days after contract award |
| 02 82 00 | Proof of Contractor's Asbestos Liability Insurance | Thirty (30) days after contract award |
| 02 82 00 | Proof that asbestos-containing waste has been properly bagged and disposed of | Upon project completion |
| 02 82 00 | Proof of Asbestos Training for Employees | Prior to commencing asbestos abatement work |
| 02 82 00 | Proof of Employee Medical Assessment to determine capability of wearing a respirator, and respirator fitting and testing. | Prior to commencing asbestos abatement work |
| 02 82 00 | Proof of Approved Two Day Asbestos Training for Supervisors | Prior to commencing asbestos abatement work |
| 02 82 00 | WSCC and Transcription of Insurance | Prior to commencing asbestos abatement work |
| 02 82 00 | Documentation of Asbestos Test Results, Flammability Data, and MSDS Sheet | Prior to commencing asbestos abatement work |
| 02 82 00 | Layout of Decontamination Facilities | Prior to commencing asbestos abatement work |
| 02 83 10 | Proof that suitable arrangements have been made to dispose of lead and/or PCB containing paint waste in accordance with requirements of AHJs including Certificate of Approval for Transportation of PCB Waste and Location of Destruction Facility | Forty-five (45) days prior to mobilization |
| 02 83 10 | Provincial/Territorial and/or local requirements for Notice of Project Form | Thirty (30) days after contract award |

| TABLE 01 33 00-1 CONTRACTOR SUBMITTAL SCHEDULE | | |
|---|--|--|
| Specification Section | Description | Date |
| 02 83 10 | Proof of Contractors General and Environmental Liability Insurance | Thirty (30) days after contract award |
| 02 83 10 | Proof of Permits for transportation and disposal of lead and PCB amended paint | Prior to commencing PCB/lead abatement work |
| 02 83 10 | Proof of PCB/lead waste disposal/destruction | Prior to Payment |
| 02 83 10 | Proof of Approved Two Day Lead Abatement Training for Supervisors | Prior to commencing PCB/lead abatement work |
| 02 83 10 | WSCC and Transcription of Insurance | Prior to commencing PCB/lead abatement work |
| 31 22 15 | Site Access Upgrade Plan | Prior to mobilization |
| 31 22 15 | Culvert Installation and Removal Plan | Prior to mobilization |
| 31 22 15 | Location of Asbestos in NHW Landfill on Project Record Drawings | Upon landfill closure |
| 31 23 11 | Details of Buried Debris Material Processing Area | Prior to commencement of remediation activities |
| 31 32 19.01 | Signed Manufacturer's Certification and Warranty for Geotextile | 4 weeks prior to commencement of work |
| 31 32 19.02 | Shop drawings for Oil Resistant RPE Geomembrane installation | Prior to geomembrane liner installation |
| 31 32 19.02 | Oil Resistant RPE Geomembrane samples, manufacturer's mill test data | 4 weeks minimum before beginning Work |
| 31 32 19.02 | Oil Resistant RPE Geomembrane Certificates, including test results | 2 weeks before delivery to job site |
| 31 32 19.03 | Signed Manufacturer's Certification and Warranty for Textured HDPE Geomembrane | Prior to shipment of liner materials to the site |
| 31 32 19.03 | Information regarding the Textured HDPE Geomembrane Manufacturer | Prior to shipment of liner materials to the site |
| 31 32 19.03 | Proof of Qualifications of Textured HDPE Geomembrane Installation Supervisor | Prior to shipment of liner materials to the site |
| 31 32 19.03 | Information regarding the Textured HDPE Geomembrane Installer (background, insurance, procedures, equipment and personnel) | Part of Bid Document |
| 31 32 19.03 | Drawings showing proposed installation panel layout identifying seams and details | Prior to geomembrane liner installation |
| 31 32 19.03 | Proposed variance or deviation from the specified guidelines (if required) | Minimum of seven (7) days prior to scheduled start of geomembrane installation |
| 31 32 19.03 | Documentation of all weld testing | Daily during geomembrane liner installation |

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Contact Water: Water that has been in physical contact with known Contaminated Soil, either in defined soil excavations or excavated soil in treatment areas or stockpiles.
- .2 Camp Wastewater: wash water, rinse water, water from operation of camp facilities, and/or any other liquid effluent stream created or encountered during camp activities.
- .3 Process Wastewater: water from decontamination activities, water from dewatering work areas, potentially contaminated groundwater, contact water and/or any other liquid effluent stream created or encountered during Work activities.
- .4 Processed Wastewater: Wastewater processed through the Wastewater Treatment Facility.
- .5 Treated Wastewater: Processed wastewater which has been tested and shown to be in compliance with applicable discharge criteria and requirements of this Section and Section 01 35 43 - Environmental Procedures.

1.2 REGULATORY REQUIREMENTS

- .1 Comply with federal, provincial, territorial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.

1.3 SUBMITTALS

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

1.4 EQUIPMENT DECONTAMINATION

- .1 Prior to commencing Work involving equipment contact with potentially contaminated materials, remove soil lumps and particles from excavating and processing equipment.
- .2 Decontaminate equipment, including tracks and buckets, after working in potential and known contaminated work areas and prior to subsequent work or travel on clean areas.
- .3 At minimum, complete the following steps during equipment decontamination:
 - .1 Mechanically remove loose waste solids, grit, dirt, and debris by manual methods without using steam or high-pressure water to minimize water usage and potential for generation of contaminated rinsate.
 - .2 Should decontamination not be achieved using the above, use high-pressure, low- volume, hot water or steam supplemented by detergents or solvents as appropriate and approved by Departmental Representative. Perform an assessment as directed by Departmental Representative, to determine effectiveness of decontamination.
 - .3 Collect and dispose of the removed solid material and contaminated soil in appropriate on-site disposal area.
 - .4 Contain any rinsate if generated during the removal process as contact water/wastewater.

- .4 Complete final decontamination of equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .5 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields, if deemed necessary.
- .6 Each piece of equipment may be inspected by Departmental Representative or designate after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed, if deemed necessary.
- .7 Take appropriate measures necessary to minimize drift of mist and spray during decontamination, including provision of wind splash screens, as required.

1.5 SOIL STOCKPILING FACILITIES

- .1 Provide, maintain, and operate storage/stockpiling facilities as specified in Section 02 55 13 Contaminated Soil.
- .2 The Contractor shall prevent potential contamination of underlying and surrounding soil and /or groundwater from contaminated soil stockpiles. Confirmatory soil sampling shall be completed to confirm that underlying and surrounding soil and/or groundwater has not become impacted by contaminated soil stockpiles. Cover all stockpiles with tarps capable of completely covering stockpiled material at all times, unless materials are being added or taken away from the stockpiles.
- .3 Segregate all contaminated soil from non-contaminated soil in separate stockpiles.
- .4 The Contractor shall prevent the release of any liquids from contaminated or impacted stockpiles. Liquids shall be contained and transferred to the wastewater treatment facility.

1.6 WASTEWATER TREATMENT FACILITIES DESIGN REQUIREMENTS

- .1 Submit design, operation and maintenance details of wastewater treatment facilities conforming to requirements of Authorities Having Jurisdiction (AHJ) 60 days after contract award date. Wastewater treatment facility designs will be stamped by a professional engineer registered or licensed to practice in Nunavut.
- .2 Contain wastewater from the following sources separately:
 - .1 Camp Operations; including, but not limited to, greywater, kitchen sumps and traps and blackwater.
 - .2 Work Activities; including, but not limited to, wastewater streams from dewatering work areas, draining impacted soil, decontamination, process wastewater, contact water, and wash/rinse water.
- .3 Wastewater Treatment Facilities:
 - .1 Design wastewater treatment facilities capable of treating contact water, process water, and work areas to meet the discharge criteria of the Water License, which are approximately as follows:

| Parameter | Maximum Allowable Concentration |
|---|---------------------------------|
| Volatile Hydrocarbons | 15 mg/L |
| Extractable Hydrocarbons | 5 mg/L |
| Oil and Grease | 5 mg/L, non visible |
| Non-Aqueous Phase Liquid / Free Product | Not Present |
| pH | 6 to 9 |

| Parameter | Maximum Allowable Concentration |
|---------------------|---------------------------------|
| Arsenic (total) | 100 µg/L |
| Cadmium (dissolved) | 10 µg/L |
| Chromium (total) | 100 µg/L |
| Cobalt (dissolved) | 50 µg/L |
| Copper (dissolved) | 200 µg/L |
| Lead (dissolved) | 50 µg/L |
| Mercury (total) | 0.6 µg/L |
| Nickel (dissolved) | 200 µg/L |
| Zinc (total) | 500 µg/L |
| PCBs | 1,000 µg/L |
| Phenols | 20 µg/L |

- .2 Design Wastewater Treatment Facilities capable of treating water generated from camp operations to meet the criteria of the Water License, which are approximately as follows:

| Parameter | Maximum Allowable Concentration |
|------------------------|---------------------------------|
| pH | 6 to 9 |
| Mineral Oil and Grease | 5 mg/L and none visible |
| Total Suspended Solids | 100 mg/L |
| BOD | 80 mg/L |
| Fecal Coliforms | 10,000 CFU/dL |
| Residual Chlorine | 0.1 mg/L |

- .3 Provide means (piping/mobile storage) to transfer liquid/solid mixtures generated by work activities which require treatment to the wastewater treatment facility.
- .4 Ensure wastewater treatment facilities are capable of receiving liquid/solid mixtures to not cause delay to dewatering operations.
- .5 Ensure wastewater treatment facilities are capable of oil/water separation.
- .6 In the event of a discrepancy between the above listed wastewater requirements and those provided in the Water License or under the Land Use Permit, the requirements in the Water License/Land Use Permit will govern.
- .7 The Contractor is responsible for transporting and disposing of wastewater to an approved off-site disposal facility in the event that the on-site facility is not functioning. The contractor is responsible for additional testing required by the off-site disposal facilities.
- .4 Installation:
- .1 Provide labour, materials, and equipment and complete Work required for setup and construction of Wastewater Treatment Facilities.
- .2 Install component systems in accordance with installation procedures and as indicated.
- .3 Following installation of system, implement initial operation test in accordance with procedures developed by Contractor and submitted to Departmental Representative for review.
- .4 Install piping in accordance with manufacturer's instructions and test for leakage using potable water prior to commencing treatment operations.
- .5 Operation:

- .1 Obtain and analyze influent and effluent samples required to operate the system.
- .2 Make system modifications required for effluent to satisfy effluent criteria based on analytical results.
- .3 Operate Wastewater Treatment Facilities by experienced, qualified personnel in accordance with manufacturer's instructions and procedures submitted by Contractor and approved by Departmental Representative.
- .4 Operate the Wastewater Treatment Facilities such that storage tanks and storage ponds are either empty at the end of the construction season or have allowances for expansion of water due to freezing.
- .6 Decommissioning/Dismantling:
 - .1 Decontaminate and remove salvageable components of Wastewater Treatment Facilities including water filtering system, pumps, piping, and electrical equipment.
 - .2 Dispose of non-salvageable equipment and materials at appropriate on or off-site disposal facilities. Decontaminate salvageable equipment within facility area as required prior to removal from site.

1.7 WASTEWATER STORAGE TANKS

- .1 Provide, operate, and maintain wastewater storage tanks to store wastewater.
- .2 Provide separate storage for wastewater generated by camp operations and wastewater generated from remediation activities.
- .3 Provide adequate storage for treated wastewater such that samples of treated wastewater can be obtained and analyzed prior to discharge.
- .4 Provide pumps and piping to convey collected wastewater to designated wastewater storage tanks.
- .5 Provide storage tanks with minimum total live capacity such that effluent quality can be analyzed and approved prior to discharge.
- .6 Install wastewater storage tanks in locations as directed by Departmental Representative.
- .7 Support tank(s) on (temporary) above ground foundation(s).
- .8 Connect pumps, piping, valves, miscellaneous items, and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping, and miscellaneous items from freezing.
- .9 Do not operate wastewater storage tanks until inspected and approved by Departmental Representative.
- .10 Notify Departmental Representative three (3) days minimum in advance of when wastewater storage tank is anticipated to be full.
 - .1 Do not discharge additional liquids to filled tank following sampling by Departmental Representative.
 - .2 Departmental Representative will determine appropriate disposition of wastewater based on sample analysis.

1.8 WASTEWATER TREATMENT FACILITIES DISCHARGE REQUIREMENTS

- .1 Provide adequate containment facilities for processed wastewater, prior to discharge, to complete testing and analytical requirements. Salvage of tanks designated for removal on-site is permitted, provided that the tanks are empty and clean prior to use. Wastewater storage ponds meeting all requirements of AHJ are permitted.

- .2 Water discharge on-site must be in compliance with applicable permits, authorizations and approvals. Make adjustments to Water Treatment Facilities or provide alternative equipment, at no additional cost, such that processed wastewater meets applicable permit requirements and limitations for discharge.
- .3 Wastewater discharges from site must be in compliance with applicable permit requirements:
 - .1 Camp Wastewater is to be released onto the ground at a location, reviewed and accepted by the Departmental Representative, a minimum of 30 m from natural drainage courses and 100 m from fish bearing waters and conform to the discharge requirements set out by the AHJ.
 - .2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.
 - .3 No direct discharge is allowed to wetland or surface waters.
 - .4 Contractor must obtain approval from the AHJ prior to discharging treated wastewater.
- .4 Dispose of any processed wastewater not meeting the applicable permit requirements and limitations for discharge in accordance with Section 02 61 33 - Hazardous Waste Material, at the Contractor's expense including, but not limited to, transporting and disposing of processed wastewater to approved disposal facilities.

1.9 DUST AND PARTICULATE CONTROL

- .1 Execute Work using methods to minimize raising dust from Work operations.
- .2 Implement and maintain dust and particulate control measures as determined necessary by applicable regulations and standards during Work and in accordance with Section 01 35 43 - Environmental Procedures.

1.10 WATER CONTROL

- .1 Maintain excavations free of water.
- .2 Protect site from ponding or running water. Grade site to drain. Provide water barriers as necessary to protect site from soil erosion and runoff and potentially impacted water and soil.
- .3 Prevent surface water runoff from leaving Work areas.
- .4 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material without confirmation it meets applicable guidelines for discharge and approval for discharge has been provided by AHJ.
- .5 Treat water to meet disposal criteria prior to discharging.
- .6 Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with an impermeable liner during periods of Work stoppage and periods of heavy precipitation and as directed by the Departmental Representative. Contain water in contact with stockpiled waste materials.
- .7 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.
- .8 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
- .9 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other Work areas free from water.

- .10 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for emergencies, including power outage, and competent workers for operation of pumping equipment.

1.11 DEWATERING

- .1 Dewater various parts of Work including, without limitation, excavations, structures, foundations, and Work areas, as required to complete work.
- .2 Contractor must employ construction methods, plant procedures, and precautions such that Work, including excavations, are stable, free from disturbance, and dry.
- .3 Contractor must provide sufficient and appropriate labour, plant, and equipment necessary to keep Work free of water including standby equipment necessary to provide continuous operation of dewatering system.
- .4 Take necessary precautions to prevent uplift of any structure or pipeline and to protect excavations from flooding and damage due to surface runoff.
- .5 Test and analyze water generated from dewatering activities and treat to meet required discharge or disposal criteria.
- .6 Treat water as required to meet disposal criteria prior to discharging.

1.12 PROGRESS CLEANING

- .1 Maintain cleanliness of Work and surrounding site to comply with federal, provincial, territorial, and local fire and safety laws, ordinances, codes, and regulations.
- .2 Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.13 FINAL DECONTAMINATION

- .1 Complete final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .2 Complete decontamination as specified to the satisfaction of Departmental Representative. Departmental Representative will direct Contractor to complete additional decontamination if required.

1.14 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from site.
- .2 Dispose of contractor generated waste materials, litter, debris, and rubbish off site.
- .3 Do not burn rubbish and waste materials on site unless a burn exemption is provided in accordance with the land use permit and approved by the AHJ.
- .4 Do not discharge wastes into streams or waterways.
- .5 Dispose of the following materials at appropriate off-site facilities identified by Contractor and approved by Departmental Representative: solid and liquid hazardous waste, disposable PPE worn during hazardous material handling and packaging, other hazardous materials as directed by Departmental Representative, materials generated from the decommissioning of the soil treatment area, and wastewater generated from final decontamination operations including wastewater storage tank cleaning.

1.15 TESTING

- .1 Carry out and pay for all testing required to confirm that Wastewater comply with Wastewater Treatment and Discharge Criteria outlined in this Section. Submit records of this testing to Department Representative.
- .2 Carry out and pay for all testing required for the classification of waste and licensed disposal facilities acceptance requirements outlined in this Section and Section 01 29 83– Payment Procedures for Testing Laboratory Services.

1.16 MEASURE OF PAYMENT

- .1 Include all direct costs for the treatment of camp waste water in the lump sum price for Supply, Operation and Maintenance of Camp Facilities, Item 01 54 00-1, as indicated in the Basis of Payment Schedule.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 PIPING

- .1 Suitable material type, of sufficient diameter and structural thickness for purpose intended; satisfactorily tested for leaks with potable water in presence of Departmental Representative before handling wastewater.

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Separated Work Group: a work crew of any number of personnel working at a location where immediate medical attention from site medical personnel may not be possible due to environmental, mechanical or other factors.

1.2 SITE SPECIFIC HEALTH AND SAFETY REQUIREMENTS

- .1 Maintain and complete all health and safety, fire safety, and environmental compliance activities in accordance with applicable sections and Authorities Having Jurisdiction (AHJ).
- .2 Schedule a compliance meeting on an as required basis, as directed by Departmental Representative. Compliance meetings may be held in conjunction with regular meetings.
- .3 The intent of the compliance meeting is to review reporting and inspection requirements to meet the intent of the Nunavut Safety Act, the Water License, the Land Use Permit, regulatory, and other requirements as may be required.
- .4 Compliance meetings to be held at the Work site.
- .5 Departmental Representative will record minutes, chair the compliance meeting and distribute minutes to parties of record prior to the next scheduled meeting.
- .6 Compliance meeting attendees:
 - .1 Contractor: Manager and/or Supervisor(s), representatives of major Sub-Contractors, and others as necessary.
 - .2 Departmental Representative and representatives of Independent Inspection Agencies.
 - .3 AANDC representative(s).
- .7 Compliance meeting agenda to include:
 - .1 Review and approval of minutes of previous meeting.
 - .2 Review of items of significance that could affect Work.
 - .3 Identify and record field observations, problems, and conflicts that must be noted in reports required by the AHJ.
 - .4 Identify corrective measures and procedures to regain approval from AHJ.
 - .5 Identification of requirements for maintenance of quality standards needed for compliance with applicable Codes and Legislation.
 - .6 Review of site safety and security issues.
 - .7 Review of environmental and regulatory compliance.
 - .8 Review of site inspections and identified hazards: Inspect the site on a monthly basis, or more or less often, as determined by the Departmental Representative or as dictated by the AHJ.
 - .9 Other topics for discussion as appropriate to current status of the Work.

1.3 SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the Draft Site Specific Health and Safety Plan (SSHSP) no later than thirty (30) days after contract award to the Departmental Representative for review. Any items, which are identified as missing, will be added and the plan revised, so as to incorporate the additional items. Submit three (3) hard copies and one (1) electronic copy of the final SSHSP forty-five (45) days prior to crew mobilization. The revised SSHSP will be submitted to the AHJ for review and recommendations to ensure all elements required by the Nunavut Safety Act, OSHA Regulations, other AHJs, and Contract Specifications have been addressed.
- .3 Update the SSHSP at the beginning of each construction season, and submit to the departmental representative no later than thirty (30) days before the start of each construction season.
- .4 The SSHSP will include but is not limited to the following sections:
 - .1 A Statement of Contractor's Safety Policy.
 - .2 Safety Responsibilities of all on-site personnel.
 - .3 Requirements for safety meetings and documentation.
 - .4 Camp Rules and their enforcement.
 - .5 Site traffic rules and speed limits including those applicable during aircraft landing/takeoff.
 - .6 Anti-Harassment Policy.
 - .7 Fit For Duty Policy.
 - .8 Environmental, Health and Safety Management Plan.
 - .9 Safety Inspection Plan.
 - .10 On-site Contingency and Emergency Response Plan (ERP)
 - .11 List of emergency contacts including but not limited to Contractor's corporate Safety Officer and on-site Safety Representative, medivac, and helicopter/aircraft companies.
 - .12 Spill Contingency Plan.
 - .13 Fuel Management Plan.
 - .14 Fire Safety Plan.
 - .15 Wildlife Management Plan.
 - .16 Winter Road Safety Plan.
 - .17 Safe Work Practices and/or Job Procedures appropriate to the tasks workers will be performing and the environment workers will be exposed to (including but not limited to cold weather survival, heat stress, remote work, helicopter safety, marine safety, hazardous materials awareness and handling, lockout/tagout, buddy system, procedures for working alone, personnel hygiene and decontamination).

- .18 Personal Protective Equipment (PPE) Program, including Contaminated Sites Working and Decontamination Procedures and Respiratory Protection Program.
- .19 First Aid Locations.
- .20 Results of safety and health risk or hazard analysis for camp and construction activities and appropriate training for the identified hazards.
- .21 Workplace Hazardous Materials Information System (WHMIS) and Material Safety Data Sheet (MSDS) records.
- .5 Complete an inventory of Contractor's health, safety, medical and first aid equipment and supplies on-site to assess compliance with AHJ requirements. Submit the inventory to Departmental Representative within ten (10) days of mobilization each season. Include a schedule for upgrading deficiencies to meet requirements of AHJ.
- .6 The Fuel Management Plan is to include information related to storage, on-site transport, containment, handling and decommissioning.
- .7 The On-site Contingency and ERP are to address standard operating procedures to be implemented during emergency situations. Plans including procedures are to meet Safety Requirements below.
 - .1 Prepare and coordinate a Contingency and ERP with contributions from appropriate authorities including the Government of Nunavut Safety Act, Hospitals, RCMP, Ministry of Transportation, and Ministry of Health. Plan will identify off-site Emergency Response Coordinator through whom all information and coordination will flow in the event of an incident.
 - .2 Departmental Representative will have Contractor's On-site Contingency and ERP reviewed by AHJ and may request modifications or additions as necessary for the work.
- .8 The PPE Program will include but is not limited to the following:
 - .1 PPE Selection based upon site hazards.
 - .2 PPE use and limitations of equipment.
 - .3 Donning and doffing procedures.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Medical surveillance requirements for personnel assigned to work at site.
 - .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.

- .10 Contaminated site working and decontamination procedures for both personnel and equipment.
- .11 Written respiratory protection program for project activities and proof of respirator fit testing.

1.4 CONSTRUCTION SAFETY MEASURES

- .1 Observe and enforce construction safety measures required by the latest revisions of: Canada Labour Code, National Building Code of Canada, National Fire Code of Canada, Workers' Safety and Compensation Commission (WSCC), the applicable Occupational Health and Safety Regulations, and Territorial and local statutes and authorities including Nunavut Safety Act and Nunavut Labour Standards Act.
- .2 In the event of discrepancies between any requirements of the above listed authorities, the more stringent requirements will govern.
- .3 Designate a resident Health and Safety Officer to oversee Contractor's SSHSP with the authority to enforce policies and procedures set out in the SSHSP. Health and Safety Officer to have a minimum of five (5) years' acceptable experience in administering construction health and safety programs.
- .4 Hold safety meetings as per Section 01 31 19 - Project Meetings.
- .5 Maintain at the site, five (5) safety hard hats with liners, five (5) safety hi-visibility vests, a supply of ear plugs, gloves, and safety glasses for use by Departmental Representative and visitors.
- .6 Maintain a supply of disposable PPE (Tyvek or equivalent) suits of various sizes as required for Contractor's staff, Departmental Representative and up to three (3) visitors for the duration of the Work.
- .7 Comply with all applicable health and safety policies and procedures from AHJ.
- .8 Departmental Representative or Departmental Representative's Authorized Personnel has the authority to stop Work on the contract if, in his/her opinion, the Work is being completed in an unsafe manner as required by the applicable safety legislation. Assign responsibility and obligation to the Contractor's Health and Safety Officer where required to stop or start work.
- .9 Verify that emergency procedures, including appropriate First aid facilities and First Aid personnel, are in place at the Work Site. First aid facilities and First Aid personnel must be in compliance with the Nunavut Safety Act.
- .10 Verify that procedures meet the WSCC and Human Resources and Skills Development Canada (HRSDC) requirements.
- .11 PPE Program and Contaminated Sites Working and Decontamination procedures to be consistent with requirements OSHA's 29 CFR 1910.120 HAZWOPER and territorial environmental regulations for:
 - .1 Activities, where employees are likely to be exposed to 50% of Threshold Limit Values (TLV) listed by American Conference of Governmental Hygienists (ACGIH), TLVs and BEIs based on documentation of Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEI) 2004 and amendments thereto.

.12 Hazardous Material Discovery

- .1 Immediately stop Work and notify Departmental Representative for further instructions with respect to abatement procedures required for asbestos or other hazardous conditions encountered when Work occurs in areas having materials resembling asbestos or other hazardous materials that have not been previously identified.

1.5 FILING OF NOTICE

- .1 File Notice of Work with Federal and Territorial AHJ prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

- .1 Comply with specified standards, regulations and orders of AHJ to operate safely at sites containing hazardous or toxic materials and other hazards (such as wildlife encounters, falls, etc.).
- .2 All equipment brought to the site must meet Nunavut Health and Safety Regulations.

1.7 RESPONSIBILITY

- .1 Be responsible for safety of persons and property on-site and for protection of public off-site and environment to extent that they may be affected by the site and conduct of Work. The health and safety of personnel and the public takes precedence.
- .2 Control access to the site. Persons with business at the site and who are not Contractor's employees must be briefed on site specific health and safety issues and be provided with a copy of the SSHSP.
- .3 Contractor may refuse access to the site to any person not complying with site specific health and safety standards.
- .4 Comply with and enforce compliance by employees with safety requirements of contract documents, applicable federal, territorial and local statutes, regulations and ordinances, Worker Orientation Seminar, and with SSHSP:
 - .1 Conduct appropriate safety training for all personnel working on the site.
 - .2 Conduct workplace safety inspections for all Work activities regularly and in accordance with all applicable acts and regulations.
 - .3 Maintain a log of first aid and safety supplies, and notify appropriate personnel for restocking after each incident, and periodical restocking to replace out dated or consumable (headache medicines, bandages) products.

1.8 HAZARDOUS MATERIAL REQUIREMENTS

- .1 Comply with Work Site Hazardous Materials Information System Regulations of the AHJ.
- .2 Provide Departmental Representative with MSDS and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site; bound in one place and stored in accordance with the SSHSP.

1.9 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident, stop Work, assess, take steps to mitigate if necessary at that time and immediately advise Departmental Representative verbally and in writing.
- .2 Monitor potential low oxygen and Lower Explosive Limits areas with oxygen/LEL monitor if workers are working in and around area. These areas include but are not limited to trenches, excavations, confined spaces and areas near machinery exhaust.

1.10 SAFETY AND HYGIENE

- .1 Provide training for all persons entering the site in accordance with specified personnel training requirements, maintain log of who was trained by having the trainee sign the training log, what training was provided and by whom the training was conducted.
- .2 Personal Protective Equipment (PPE):
 - .1 Furnish site personnel with appropriate PPE as required by legislation.
 - .2 Verify that safety equipment and protective clothing is kept clean and well maintained.
 - .3 Ensure all clothing and PPE used on site remains on site, to be either decontaminated or disposed of. No Work clothing is to leave Work site without having been properly decontaminated. This includes but is not limited to working coveralls.
 - .4 Outline and designate PPE for each site and Work activity in accordance with AHJ.
- .3 Develop written PPE care and use procedures to be included in the PPE Program under the SSHSP and verify that procedures are strictly followed by site personnel including, but not limited to, the following:
 - .1 Provisions for prescription eyeglasses with side shields worn as safety glasses and do not permit contact lenses on site within Work zones.
 - .2 Provisions for footwear are steel toed safety shoes or boots and are covered by rubber overshoes when entering or working in potentially contaminated Work areas.
 - .3 Dispose of or decontaminate PPE worn on-site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Provisions for decontamination arising from entry or exit into contaminated areas.
- .4 Develop a written Respiratory Protection program to be included in the SSHSP and strictly enforce compliance with the program by site personnel; include the following procedures as minimum:
 - .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.
 - .2 Monitor, evaluate, and provide respiratory protection for site personnel.

- .3 Verify that levels of protection as listed have been chosen to be consistent with site specific potential airborne hazards associated with major contaminants identified on site.
- .4 Immediately notify Departmental Representative when level of respiratory protection required increases.
- .5 Verify that appropriate respiratory protection during Work activities is available and readily accessible; all personnel entering potentially contaminated Work areas will be supplied with and use appropriate respiratory protection.
- .6 Assess ability for site personnel to wear respiratory protection.
- .7 Verify that site personnel have passed respirator fit test prior to entering potentially contaminated Work areas.
- .8 Verify that facial hair does not interfere with proper respirator fit.
- .9 Submit proof of fit testing for site personnel to Departmental Representative. Update submission when new personnel are added to Work or when new Work activities occur.
- .5 Heat Stress/Cold Stress: Implement heat stress and cold stress monitoring program as applicable and include in SSHSP.
- .6 Personnel Hygiene and Personnel Decontamination Procedures: provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
 - .3 Access to hot water shower facilities.
 - .4 Provisions for proper disposal of contaminated PPE.

1.11 TASK SPECIFIC SAFETY MEETINGS

- .1 Conduct on-site task specific safety meetings (toolbox meetings) as per Project requirements and as directed by Departmental Representative.
- .2 Conduct safety meetings with workers engaged in constructing, maintaining, or travelling on winter roads or trails, airstrips, and near steep, unstable slopes. Workers must be instructed on the dangers inherent with winter work, and hazard avoidance procedures.
- .3 Conduct safety meetings with workers engaged in outdoor work under summer or winter conditions. Topics must include hot and cold stress, exhaustion, snowmobile/ATV safety, buddy systems, and any other items inherent in working outdoors in winter in isolated safety meetings on an as needed basis or as specified by the AHJs. Keep records of meetings on file.

1.12 SITE COMMUNICATION

- .1 Post emergency numbers near site telephones. Update emergency numbers as required.

- .2 Staff will be equipped with radios, and emergency radio-in procedures will be established prior to commencing work. If radios do not provide sufficient range for continuous communication, Contractor must provide satellite phones or repeater stations and/or booster stations as required such that all workers are in live contact or have the ability to immediately contact base operations/wildlife monitors at all times.
- .3 All equipment must have operational two-way radio communication while in operation.
- .4 Train personnel in the use of "buddy" system.
- .5 Provide alarm system to notify employees of site emergency situations or to stop Work activities if necessary. Identify emergency stations and Muster Points. Test alarm system regularly and train personnel to use alarm system as required.

1.13 FUEL MANAGEMENT

- .1 All vehicle and equipment refuelling must be performed by appropriately trained personnel using the appropriate personal protective equipment in a manner which meets or exceeds regulatory requirements and in accordance to the accepted Fuel Management Plan including using drip pans.
- .2 Records of fuel usage by activity must be maintained.
- .3 All fuel transports including mobile refuelling trucks and fuel transport to stationary equipment such as generators or pumps or distributed storage areas, must occur in approved (CSA) containers with the notification and consent of site safety personnel.

1.14 VEHICLE AND EQUIPMENT USAGE

- .1 Seatbelts must be worn at all times when vehicle or equipment is in operation.
- .2 Speed limits must be set and obeyed.
- .3 If road conditions are unsafe or marginally unsafe, maintain roads to acceptable standards. Do not risk property damage or injury.
- .4 Vehicles are not to be idled for longer than ten (10) minutes (warm up) unless explicitly used as a place of refuge during animal encounters or for personnel working outdoors during winter operations. Exceptions are to be made in consultation with Departmental Representative.
- .5 Complete vehicle maintenance and lubrication of equipment in a manner that avoids spillage of fuels, oils, grease and coolants. When refuelling equipment, use leak free containers and reinforced rip and puncture proof hoses and nozzles. Remain in attendance for duration of refuelling operation, and properly seal all storage container outlets after use.
- .6 Collect and dispose of used oil, grease and coolants from Contractor's vehicle maintenance activities as hazardous waste as detailed in Section 02 61 33 - Hazardous Waste Material.
- .7 Place drip pans under stationary equipment with potential leaks.
- .8 All equipment brought to the site must have rotating beacons and vehicles should have beacons and buggy whips.

1.15 FLAMMIBLE LIQUIDS

- .1 The handling, storage and use of flammable liquids will be governed by the current National Fire Code of Canada.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for Work purposes, requires permission of the permitting authority.
- .3 Do not transfer flammable liquids in the vicinity of open flames or any type of heat-producing devices.
- .4 Do not use flammable liquids having a flash point below 38°C such as naphtha or gasoline as solvents or cleaning agents.
- .5 Store flammable waste liquids, for disposal, in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Departmental Representative is to be notified when disposal is required.
- .6 Dispose of all flammable liquids in accordance with all applicable environmental regulations and with the requirements of Section 02 61 33 - Hazardous Waste Material.

1.16 STORAGE AND HANDLING OF FUEL

- .1 Locate fuel storage areas as approved by AHJ and as specified in the Fuel Management Plan as part of the SSHSP. Location to be reviewed by Departmental Representative. Provide secondary containment as required by AHJ.
- .2 Inspect fuel storage and dispensing facilities daily. Make available firefighting and spill response equipment for immediate access at each fuel storage location.
- .3 Store all barrels containing fuel and /or hazardous materials in an elevated position, either on their side with bungs facing 9 and 3 o'clock position, or on pallets, upright, and banded.
- .4 All barrels to be individually identified. Label will be to industry standards and will provide all information necessary for health and safety and environmental purposes. Make available, to all personnel, MSDS for all materials maintained at site or along right-of-ways.
- .5 All barrels/fuel containers to be stored in accordance with the Land Use Permit and labelled with AANDC's name and Contractor's name, as required by the Land Use Permit. All tanks require registration, including of assignment of a registration number, with Environment Canada (EC) Federal Identification Registry for Storage Tank Systems (FIRSTS).
- .6 Treat all waste petroleum products, including used oil filters, as hazardous materials.
- .7 Conduct regular inspections of all machinery hydraulic, fuel and cooling systems. Repair leaks immediately.
- .8 Pre-assemble and maintain emergency spill equipment, including at least two fuel pumps, empty 200 litre barrels and absorbent material sufficient to clean up a 1000 litre spill at all fuel storage sites. Maintain spill mats or pan under mobile fuelling containers and a spill kit at the refuelling area.
- .9 Remove all full and empty barrels, fuel storage facilities and associated materials and equipment from site at conclusion of Work.

- .10 All fuel drums delivered to site, regardless of ownership, will be returned to supplier by Contractor for reuse or cleaned, crushed and disposed in accordance to Section 02 61 33 - Hazardous Waste Material. Fuel drums, if transported, will comply with Section 02 61 33 - Hazardous Waste Material and applicable regulations.

1.17 SPILL CONTINGENCY PLAN

- .1 Develop a Spill Contingency Plan, as part of the SSHSP. Update Spill Contingency Plan prior to each construction season as part of the SSHSP seasonal update. Identify response capabilities by detailing response times, and types and volumes of spills to which Contractor can respond. Following information is required as a minimum:
 - .1 A description of pre-emergency planning.
 - .2 Personnel roles, lines of authority and communication, emergency phone numbers.
 - .3 Emergency alerting and response procedures.
 - .4 Evacuation routes and procedures, safe distances and places of refuge.
 - .5 Directions/methods of getting to nearest medical facility.
 - .6 Emergency decontamination procedures.
 - .7 Emergency medical treatment and First-Aid.
 - .8 Emergency equipment and materials: Include and provide, at minimum, booms (sorberent and containment), sorbents for cleanup, fire extinguishers for A-B-C fires, overpacks for contaminated soils, pumps, hand shovels, picks and containment barriers, such as plastic sheeting.
 - .9 Emergency protective equipment: Including, at minimum, clothing, protective suits, respirators, etc. in accordance with National Institute for Occupational Safety and Health (NIOSH) guidelines.
 - .10 Procedures for reporting incidents.
 - .11 Spill response and containment plans for all materials that could potentially be spilled.
 - .12 Site specific spill contingency plans for all locations where refined petroleum products will be stored and used for refuelling including, but not limited to:
 - .1 An inventory of response and clean-up equipment.
 - .2 A site map with the location of storage facilities and the location of emergency equipment with spill response and clean-up equipment.
 - .3 A cover page that clearly identifies the NT-NU 24-hour Spill Report Line and the name, job title and 24-hour telephone number for person(s) responsible for activating the Spill Contingency Plan.

1.18 MEDICAL

- .1 Provide and maintain first aid and medical care and facilities for all workers as required by the Statutes of the Nunavut Safety Act.

- .2 Maintain first aid supplies and sick quarters separate from general living quarters.
- .3 Provide the appropriate first aid kits, based on the number of workers, in accordance with the Nunavut Safety Act.
- .4 Establish an ERP, acceptable to Departmental Representative, for the removal of any injured person to medical facilities or a doctor's care in accordance with applicable legislative and regulatory requirements. In the event that the Emergency Medical Technician (EMT) departs site with the patient, replace the EMT as soon as possible.
- .5 Provide proof of First Aid credentials to Departmental Representative prior to the start of each construction season. Provide the appropriate number of First Aid attendants on-site in accordance with the Nunavut Safety Act and a minimum of one (1) person trained in Wilderness First Aid for each separated work group.
- .6 Emergency and First Aid Equipment:
 - .1 Locate and maintain emergency and first aid equipment in appropriate location on site including first aid kit to accommodate number of site personnel; portable emergency eye wash; fire protection equipment as required by legislation.
 - .2 Locate sufficient self-contained breathing apparatus units; blankets and towels; stretcher; and one (1) hand held emergency siren in all confined access locations.
 - .3 Locate and maintain an Automated External Defibrillator (AED) in an appropriate location at project area. Submit details and procedures related to the operation and maintenance of the Automated External Defibrillator unit following the "Best Practice Model for implementation of an External Automated Defibrillator Program" with the SSHSP.
 - .4 Provide a full time EMT - Emergency Medical Technician, c/w 1000 hours of classroom and practical training, six (6) weeks of practical experience with required number of emergency response calls. The EMT will be territorially certified by a required exam and refresher exams every two (2) years. An EMT is a highly trained medical professional who responds to medical and trauma emergencies in the pre-hospital setting ("in-field") for the purpose of stabilizing a patient's condition before and during transportation to an appropriate medical facility.

1.19 INCIDENTS AND ACCIDENT REPORTS

- .1 Immediately report, verbally, followed by a written report within 24 hours, to Departmental Representative, all incidents and accidents of any sort arising out of or in connection with the performance of the Work, giving full details and statements of witnesses. If death or serious injuries or damages are caused, report the accident promptly to Departmental Representative by telephone in addition to any report required under federal and territorial laws and regulations.
- .2 If a claim is made by anyone against the Contractor or Sub-Contractor on account of any accident, promptly report the facts in writing to Departmental Representative, giving full details of the claim.

1.20 SECURITY

- .1 Enforce the Camp Rules as provided under Section 01 54 00 - Camp Facilities.

- .2 Limit site access only to persons employed on the Project. Unauthorized persons will be permitted on site only with the approval of Departmental Representative or Contractor.

1.21 WILDLIFE MANAGEMENT

- .1 Develop a Wildlife Management Plan, as part of the SSHSP, that includes bear and large mammal safety and as a minimum meets the following requirements:
 - .1 Firearms must be stored and used in accordance with all AHJ. Terms of Use for firearms must be submitted to Departmental Representative for review as part of the SSHSP.
 - .2 All wildlife encounters and sightings must be reported to Departmental Representative as part of weekly reporting.
 - .3 All persons on site must be made aware of wildlife attractants and proper procedures to be followed in the event of wildlife encounter.
 - .4 A minimum of one (1) person must be designated as a Wildlife Monitor for each Separated Work Group and trained in firearms and wildlife deterrent use. Qualifications and training plans for Wildlife Monitors must be submitted to Departmental Representative as part of the SSHSP.
 - .5 Alarmed trip wires installed around camp must be tested regularly and the results reported to the Departmental Representative as part of the weekly report.

1.22 WILDLIFE MONITORS

- .1 Provide for the duration of the construction seasons, full-time wildlife monitors acceptable to the Departmental Representative. Provide sufficient number of wildlife monitors with firearms and ammunition to protect the safety of all workers in all areas, day and night, including Departmental Representative and Departmental Representative's support staff during site operations.
- .2 Assign a wildlife monitor to accompany Departmental Representative and Departmental Representative's support staff during all inspections and soil/material sampling activities that take place away from the construction camp area.
- .3 All Wildlife Monitors are required to have a valid Firearm Certificate as per AHJ. Copies of the firearms certificates to be included with the SSHSP.
- .4 Assume full responsibility for reporting incidents associated with wildlife encounters.
- .5 Supply one All Terrain Vehicle (ATV) per wildlife monitor to facilitate his/her duties. Wildlife monitors must be fully trained in the safe use of the ATV equipment.
- .6 Provide the wildlife monitors with continuous mobile communication via radios with charging units or satellite phones for on-site communication between the wildlife monitors, Contractor base radio, and Departmental Representative and Departmental Representative's Authorized Personnel.
- .7 Qualifications and training plans for wildlife monitors must be submitted to Departmental Representative as part of the SSHSP.
- .8 Where possible, use non-lethal ammunition to deter wildlife prior to the use of lethal ammunition.

1.23 FIRE SAFETY

- .1 Provide all fire prevention, fire protection and firefighting services at the Project site.
- .2 Implement a fire safety program that includes fire prevention, fire protection and firefighting requirements. Submit details of the fire safety program in writing to Departmental Representative for review with the SSHSP. Such review does not relieve Contractor from any obligations or responsibilities required by the Contract.
- .3 Ensure that all personnel on-site including Sub-Contractors and other temporary personnel are briefed on fire safety requirements and are familiar with the fire prevention, fire protection and firefighting program.
- .4 The fire safety program will meet or exceed the most recent editions of the following codes and standards:
 - .1 Nunavut Safety Act.
 - .2 National Fire Code of Canada.
 - .3 Canada Labour Code.
- .4 Personnel designated for firefighting services must be provided with training for any special hazards that may be present. These personnel must also be provided with protective equipment as required by the AHJ.

1.24 REPORTING FIRES

- .1 A person discovering a fire and all fire related incidents is to report immediately, by fastest available means, to Departmental Representative and site superintendent.
- .2 A person discovering a fire will if possible, remain in the vicinity to direct firefighting personnel.

1.25 FIRE EXTINGUISHERS

- .1 Provide and maintain fire extinguishers in sufficient quantity to protect, in an emergency, the Work in progress and the camp on-site.

1.26 SMOKING PRECAUTIONS

- .1 Do not permit smoking in hazardous areas. Exercise care in the use of smoking materials in non-restricted areas.
- .2 Abide by applicable AHJ smoking regulations or the requirements of this Section, whichever are more stringent.
- .3 Provide and place signs prohibiting smoking in areas where smoking is not permitted.
- .4 Signs prohibiting smoking are to be in English and the local dialect and are to have black lettering not less than 50 mm high, with a 12 mm wide stroke on a yellow background. In lieu of lettering, symbols of not less than 150 mm by 150 mm may be used.
- .5 Smoking is prohibited within the camp buildings.
- .6 Smoking is prohibited within 7.5 metres of fuel storage and dispensing facilities.

- .7 Provide and place signs indicating that smoking within 7.5 metres of fuel storage and dispensing facilities is not permitted, and that the vehicle ignition must be turned off while the vehicle is being refuelled. Provide at least one weather-resistant sign at each fuel dispensing location. The signs are to have a minimum dimension of 200 mm and letters not less than 25 mm high. In lieu of lettering, signs may have international "No Smoking - Ignition Off" symbols not less than 100 mm in diameter. Install signs in a location visible to all drivers approaching the dispensing location, and at the dispensing unit.

1.27 RUBBISH AND WASTE MATERIALS

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 Storage:
 - .1 Extreme care is required where it is necessary to store oily waste in Work areas to complete work with maximum possible cleanliness and safety.
 - .2 Greasy or oily rags or materials subject to spontaneous combustion are to be disposed of as hazardous material in accordance with Section 02 61 33 - Hazardous Waste Material.

1.28 HAZARDOUS SUBSTANCES

- .1 If the work entails the use of any toxic or hazardous materials or chemicals, or otherwise creates a hazard to life, safety or health, work is to be in accordance with the National Fire Code of Canada, Occupational Health and Safety Legislation, WSCC and WHMIS.
- .2 Departmental Representative is to be advised, and a "Hot Work" permit issued by Contractor's designated representative in all cases involving welding, burning or the use of blow torches and salamanders, in buildings or facilities. Special precautions are necessary to safeguard life and property from damage by fire or explosives.
- .3 Wherever work is being carried out in dangerous or hazardous areas involving the use of heat, fire watchers equipped with sufficient fire extinguishers, are to be provided. The determination of dangerous or hazardous areas along with the level of precaution necessary for Fire Watch is to be at the discretion of Contractor. Notify Departmental Representative prior to that determination.
- .4 Provide proper ventilation and eliminate all sources of ignition where flammable liquids, such as lacquers or urethanes are used.
- .5 Do not store flammable substances within 30 m of the Temporary PCB Materials Storage Area.

1.29 QUESTIONS AND/OR CLARIFICATIONS

- .1 Direct any questions or clarification to the Departmental Representative.

1.30 UNIQUE HAZARDS

- .1 Workers must receive training specific to the PPE requirements for working with site-specific unique hazards including, but not limited to, safe handling, disposal and emergency procedures for such hazards as:
 - .1 Petroleum hydrocarbon vapours from the excavation of petroleum hydrocarbon contaminated soil or treatment of barrel contents.
 - .2 Chemical reagents used on site in Wastewater Treatment Plant(s).

- .3 Asbestos or PCB/lead amended paint encountered during demolition or debris removal activities.
- .4 Other hazardous materials encountered during demolition or debris removal activities.

1.31 MEASUREMENT OF PAYMENT

- .1 Include all direct costs for the preparation and completion of the SSHSP in the lump sum price for Item 01 35 32-1, as indicated in Basis of Payment Schedule. The lump sum price for the SSHSP will be paid after a satisfactory SSHSP has been submitted to the Departmental Representative.
- .2 Wildlife Monitors, including ATVs, will be measured for payment by the number of days that the services are provided and will be paid under Item 01 35 32-2 in the Basis of Payment Schedule.
- .3 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 REGULATORY OVERVIEW

- .1 Comply with all applicable environmental laws, regulations and requirements of Federal, Territorial and other regional authorities, and acquire and comply with such permits, approvals and authorizations as may be required.
- .2 Comply with and be subject to those permits and approvals obtained from Departmental Representative to conduct the Work.
- .3 Pay specific attention to the Land Use Permits, Water License, Quarry Permit, and Access to Commissioner's or Inuit-Owned Land (IOL) Permits (if required).
- .4 Pay specific attention to the Migratory Birds Convention Act, as amended in 1994.
- .5 Pay specific attention to the Fisheries Act.

1.3 SUBMITTALS

- .1 Submit all required Contractor submittals to satisfy environmental requirements to the responsible agency and Authorities Having Jurisdiction (AHJ).
- .2 Submit one (1) complete copy of all submittals and agency approvals to Departmental Representative.
- .3 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 HISTORICAL OR ARCHAEOLOGICAL SITES

- .1 Historical or archaeological sites and items of historical or scientific interest such as cairns, tent rings, commemorative plaques, inscribed tablets, and similar objects found on-site or in structures to be demolished will remain the property of the appropriate AHJ.
- .2 Prior to commencing remediation activities at the site, review the following with Departmental Representative:
 - .1 Extent of the archaeological sensitive areas including gravesites.
 - .2 Methods to be used by Contractor to mark and protect the areas from construction/remediation activities.
- .3 Site Archaeologist will review/mark the identified/potential archaeological sensitive areas including the heritage sites identified in the Archaeological Impact Assessment,

Golder Associates, 2013. General locations for the heritage sites are indicated on Drawing C01.

- .4 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction/remediation activities, and await Departmental Representative's written instructions before proceeding with Work in this area.
- .5 Protect archaeological finds and similar objects found during course of Work.

1.5 HISTORICAL ARCHAEOLOGICAL CONTROL

- .1 Provide Historical, Archaeological and Cultural Resources Plan that defines procedures for identifying and protecting historical, archaeological, cultural and biological resources known to be on Project site, and/or identifies procedures to be followed if resources not previously identified are discovered during construction.
- .2 Submit the Historical, Archaeological and Cultural Resources Plan to the Departmental Representative sixty (60) days prior to initiation of on-site remediation activities.
- .3 Plan to include methods to provide protection for known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.
- .4 Plan to include equipment and methods to be implemented for completion of Work as required in archaeological sensitive areas.

1.6 WILDLIFE PROTECTION PLAN

- .1 Submit a Wildlife Protection Plan that defines procedures for the protection of wildlife known to frequent the Project and surrounding areas (including the winter access trail, if required, following final route selection as part of the Mobilization and Demobilization Plan, detailed in Section 01 53 00). Wildlife Protection Plan will include but is not limited to the following:
 - .1 Avoidance of active animal dens.
 - .2 Avoidance of active nests.
 - .3 Potential access restrictions and/or disturbance minimizing of migration activities.
 - .4 Minimizing disturbances caused by aircrafts.
- .2 Submit the site Wildlife Protection Plan to the Departmental Representative sixty (60) days prior to initiation of on-site remediation activities.

1.7 SITE MAINTENANCE

- .1 Keep the site free from the accumulation of waste materials and debris.
- .2 Upon completion of the work, clean away and dispose of all surplus material, supplies, rubbish and temporary works leaving the site neat and tidy to the requirements of Departmental Representative and the Land Use Permit.

1.8 FIRES

- .1 Obtain all required permits from AHJ.

- .2 Fires and burning of rubbish on site permitted only when approved by the Departmental Representative and a burning exemption is obtained for the Land Use Permit.
- .3 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials and vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged Work.
- .4 Provide supervision, attendance and fire protection measures as required by AHJ and these Specifications.

1.9 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on-site unless approved by Departmental Representative.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.

1.10 WASTE WATER DISCHARGE

- .1 Treat all process waste water and camp waste water in accordance with the treatment requirements of Section 01 35 15 – Special Procedures for Contaminated Sites. Treated waste water will be released onto the ground at a location that is a minimum of 30 meters from natural drainage courses and 100 meters from fish bearing waters and will conform to the discharge requirements set out in the Land Use Permit and Water Licence. Approval from Departmental Representative and AHJ must be obtained prior to discharging treated waste water.

1.11 FUEL STORAGE

- .1 Comply with Canadian Environmental Protection Act (CEPA) Storage Tank Systems for Petroleum Products Regulations, CCME Codes of Practice and any regulations obtained from Territorial and other regional authorities, for setting up and operating temporary fuel tanks. Provide Departmental Representative with copies of permits prior to the start of construction in accordance with Section 01 33 00 – Submittal Procedures.

1.12 SITE CLEARING AND PLANT PROTECTION

- .1 Protect native vegetation, including plants on site and adjacent properties, where indicated.
- .2 Minimize stripping of topsoil and vegetation.

1.13 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other Work areas. Prevent erosion and sedimentation.
- .2 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical. Strip vegetation, re-grade, or otherwise develop in such a way as to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Departmental Representative.

- .3 Provide and maintain temporary measures which may include but are not limited to silt fences, hay or straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and any other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction. Place silt fences in ditches to prevent sediments from escaping from ditch terminations.
- .4 Prior to or during construction, Departmental Representative may require the installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes, guardrails, temporary roads, and other measures appropriate to specific site conditions. Temporary improvements must remain in place and in operation as necessary or until otherwise directed by Departmental Representative.
- .5 Plan construction procedures to avoid damage to Work or equipment encroachment onto water bodies or drainage ditch banks. In the event of damage, promptly take action to mitigate effects. Restore affected bank or water body to pre-existing condition.
- .6 Do not disturb existing embankments or embankment protection.
- .7 Do not construct silt fence in flowing streams or in swales.
- .8 Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- .9 If soil and debris from site accumulate in low areas, ditches, or other areas where, in Departmental Representative's determination, it is undesirable, remove accumulation and restore area to original condition.
- .1 Do not pump water containing suspended materials into waterways or drainage systems.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.14

EROSION, SEDIMENT AND DRAINAGE CONTROL PLAN

- .1 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative for review forty-five (45) days prior to initiation of on-site Work and specifically addressing the protection of water bodies, water courses, fisheries and the following:
 - .1 Details of grading Work to prevent surface drainage into or out of Work areas.
 - .2 Details of erosion control works and materials to be used for specific Work activities, including the deployment of silt fencing, floating silt curtains and containment booms during construction and excavation activities.
 - .3 Work Schedule including the sequence and duration of all related Work activities, with consideration of timing windows specified by Department of Fisheries and Oceans (DFO) for in-water works.
 - .4 The treatment of site runoff to prevent siltation of watercourses.
 - .5 Dewatering procedures for excavated materials including silt removal procedures prior to discharge.
 - .6 Stabilizing procedures during excavation.
 - .7 Fish salvage efforts where applicable.
 - .8 Maintenance and monitoring of erosion control works.

- .9 Reporting as required by AHJ's.
- .2 All approved discharge from dewatering activities to be released onto the ground at a location that is a minimum of 30 m from natural drainage courses and 100 m from fish bearing waters.
- .3 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

1.15 WORK IN OR ADJACENT TO WATERWAYS

- .1 Submit a Work Methodology Plan for work to be undertaken in or near water bodies to Departmental Representative for review forty-five (45) days prior to commencing the activity. The work plan is to include the following:
 - .1 Sketch of working area, including placement of erosion and sediment control measures, culvert, and temporary roadway as required.
 - .2 Reference to DFO Operational Statements and/or Best Management Practices as applicable.
 - .3 Timing of work.
 - .4 Specific details of erosion and sediment control works, materials to be used, and deployment and removal methods.
 - .5 Work schedules including the sequence and duration of all related Work activities.
 - .6 Maintenance, monitoring, and final removal of erosion and sediment control, culvert, and roadway works.
 - .7 Reporting as required by AHJ's.
- .2 Do not operate construction equipment in waterways during DFO restricted periods.
- .3 Do not use waterway beds for borrow material.
- .4 Do not dump excavated fill, waste material or debris in waterways.
- .5 Do not use shoreline grounds (at least 30 m from edge) as staging or storage area, equipment/vehicle maintenance or overnight parking, storage of fuel or for stockpiling of granular fill and other deleterious material storage.
- .6 Design and construct temporary crossings to minimize erosion to waterways.
- .7 Do not skid logs or construction materials across waterways.
- .8 Do not refuel equipment (except for boats) within 30 m of water bodies or on ice.
- .9 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .10 If stream or drainage course crossing is required, use methodologies in accordance with DFO requirements, and with consideration of DFO timing windows.
- .11 Install fish exclusion nets or flow diversion to prevent fish from migrating to the work site.
- .12 Fish to be captured and relocated from the work site prior to the start of construction. Nets or electro-shock methods can be used.
- .13 Effective sediment and erosion control measures to be installed prior to starting work to prevent entry of sediment into watercourses. Such measures to be inspected regularly and repaired if damaged by construction, precipitation or snowmelt.

1.16 TEMPORARY WINTER ACCESS TRAIL ALIGNMENT (IF REQUIRED)

- .1 Contractor is responsible for selection of the winter access trail alignment, if required as part of the Mobilization and Demobilization Plan. The proposed trail alignment will be included as part of the Mobilization and Demobilization Plan, detailed in Section 01 53 00, to be submitted to the Departmental Representative in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Assessment of potential environmental impact of the proposed winter access trail alignment, once determined, is to be completed in accordance with the requirements of the AHJs prior to final approval of the route by Departmental Representative and AHJ.
- .3 Temporary Winter Access Trail route shall be selected following consultation with the chosen departure community to avoid heavily used traditional areas, where practical.
- .4 Contractor will comply with the requirements of this Environmental Procedures Section (01 35 43), the requirements of the AHJs, and the mitigation measures identified within the February 2014 Environmental Screening Report for construction and operation of the winter access trail, including but not limited to the following:
 - .1 Construction and operation will only occur when the ground is frozen (e.g., December to April).
 - .2 Appropriate wildlife protection procedures and measures will be taken during construction and operation.
 - .3 Build-up and pre-packing of snow on winter access trail will be completed to a minimum of 0.10 m thickness to protect the underlying ground and vegetation.
 - .4 Water withdrawal along access trail route will comply with appropriate protocols including DFOs Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut.
 - .5 Construction and decommissioning of ice bridges and snow fills will comply with the former DFO Operational Statement for Ice Bridges and Snow Fills.

1.17 DUST AND PARTICULATE CONTROL

- .1 Execute Work using methods to minimize raising dust from decontamination operations. Implement and maintain dust and particulate control measures as determined necessary by applicable regulations and standards during Work and in accordance with AHJ.
- .2 Provide positive means to prevent airborne dust from dispersing into atmosphere. The use of oil for dust control is prohibited.
- .3 Prevent dust from spreading to beyond the immediate work area.
- .4 Departmental Representative or designate may stop work at any time when Contractor's control of dusts and particulates is inadequate for worker exposure relative to indoor conditions during demolition activities, or when air quality monitoring indicates that release of fugitive dusts and particulates into the work area equals or exceeds specified levels.
- .5 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures that Contractor proposes to resolve problem. Make all necessary changes to operations prior to resuming work that may cause release of dusts or particulates.
 - .1 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

- .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .3 Provide dust control for temporary roads.

1.18 EMISSION CONTROL

- .1 Control emissions from equipment and plant to local authorities emission requirements.

1.19 ENVIRONMENTAL PROTECTION SUPPLIES

- .1 Comply with federal and territorial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.
- .2 Provide erosion, sediment and drainage control supplies necessary to complete all requirements of the Work in compliance with federal and territorial fisheries and environmental protection legislation.
- .3 Erosion, sediment and drainage control supplies are to include, but are not limited to the following:
 - .1 Minimum of 300 m of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. These materials are to be used as necessary to prevent sediment transport into water bodies. Product acceptance will be based on compliance with the minimum/maximum average values found in Part 2 of this Section.
 - .2 Minimum of 300 lineal metres, and as required, of 200 mm diameter hydrophobic, sorbent booms. These materials are to be used as necessary to prevent the migration of hydrocarbons.
 - .3 Minimum of 150 lineal metres of reusable floating silt curtain, of appropriate depth to prevent sediment transport throughout water bodies. Product acceptance is based on compliance with the minimum/maximum values found in Part 2 of this Section.
- .4 Supply, transport, install and maintain erosion, sediment and drainage controls necessary to complete all work in accordance with the requirements of Departmental Representative.
- .5 Unused Erosion, Sediment and Drainage Control supplies are to remain the property of Departmental Representative upon completion of the Contract.
- .6 At the completion of construction, dispose of used silt fence as non-Hazardous Waste. Dispose of used absorbent boom in accordance with Section 02 61 33 - Hazardous Waste Material.
- .7 Submit a detailed inventory of environmental protection supplies forty-five (45) days prior to mobilization.

1.20 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.
- .2 Contractor, after receipt of such notice, will inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

- .3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.
- .4 No time extensions granted, or equitable adjustments allowed, to Contractor for such suspensions.

1.21 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the supply of Environmental Protection Supplies in the lump sum price for Environmental Protection Supplies, Item 01 35 43-1, as indicated in the Basis of Payment Schedule.
- .2 Except as indicated above, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 POLYPROPYLENE SILT FENCE

- .1 Silt Fence: An assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile to be 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.
 - .1 Minimum Grab Tensile Strength (ASTM D4632): 520 N.
 - .2 Maximum Elongation (ASTM D4632): 15%.
 - .3 Minimum Puncture Strength (ASTM D4833): 250 N.
 - .4 Maximum Apparent Opening Size (ASTM D4751): 500 µm
- .2 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.
- .3 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.

2.2 HYDROPHOBIC SORBENT BOOM

- .1 200 mm dia. Polypropylene Material.
- .2 Minimum gallons absorbed per 3 m length: 50 L.

2.3 FLOATING SILT CURTAIN

- .1 Provide floating silt curtains meeting the United States Army Corps of Engineers Type II designation and meeting the following values:
 - .1 Minimum Flotation Buoyancy: 250 N/m.
 - .2 Minimum Fabric Curtain Grab Tensile (ASTM D-5043) 1700 x 1650 N.
 - .3 Connectors: brass grommets nominally 300 mm o/c for lacing.
 - .4 Ballast Chain: minimum 8 mm galvanized chain, 1.4 kg/m.

- .5 Load Cable: minimum 8 mm galvanized, vinyl coated 7 x 19 wire rope, minimum loading 40 kN.
- .6 Constructed in Panels.
- .2 Provide mooring lines and anchors as necessary to secure the floating silt curtain in position.

Part 3 Execution

3.1 EROSION AND SEDIMENT CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff to adjacent properties, according to requirements of AHJ.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during Work.
- .3 Implement silt curtains and other erosion control methods as directed by Departmental Representative.

3.2 INSTALLATION OF EROSION AND SEDIMENT CONTROL

- .1 Construct temporary erosion control items as required. Review actual alignment and/or location of various items with Departmental Representative prior to installation.
- .2 Check erosion and sediment control measures daily.
- .3 Whenever sedimentation is caused by stripping vegetation, re-grading, or other development, remove it from adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.
- .4 Maintain and/or repair damaged erosion control measures promptly.
- .5 Unless indicated or directed by Departmental Representative, remove temporary erosion and sediment control devices (including installed culverts) upon completion of Work. Spread accumulated sediments to form a suitable surface for seeding or dispose of, and shape area to permit natural drainage to satisfaction of Departmental Representative. Materials once removed become property of Contractor.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including all amendments and other codes of territorial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
- .3 Perform Work in accordance with the Specifications and meet or exceed all codes, standards, and regulations applicable to the Work and issued under the authority of the Government of Canada and the Government of Nunavut. Advise Departmental Representative of any discrepancies in the codes, standards and regulations applicable to the Work.

1.2 REFERENCES AND CODES - FEDERAL

- .1 Meet or exceed the most current issue of governing codes, standards and guidelines, and regulations applicable to Work and issued under the authority of the Government of Canada including, but not limited to the following:
 - .1 Canada Labour Code Part II-Occupational Health and Safety (R.S. 1985, c.L-2).
 - .2 National Fire Code of Canada, 1995 a. 2002.
 - .3 Canada Occupational Health and Safety Regulations (SOR/86-304), including:
 - Part X – Hazardous Substances.
 - .4 Canadian Environmental Protection Act, 1999, including:
 - Ozone Depleting Substances Regulations, 1998 (SOR/99-7).
 - PCB Regulations (SOR/2008-273).
 - PCB Waste Export Regulations, 1996 (SOR/97-109).
 - Federal Mobile PCB Treatment and Destruction Regulations (SOR/90-5).
 - Storage Tank System for Petroleum Products & Allied Petroleum Products Regulations (SOR / 2008-197).
 - Export and Import of Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149)
 - Inter-Provincial Movement of Hazardous Waste Regulations (SOR/2002-301).
 - .5 Fisheries Act (R.S.C., 1985, c. F-14), including:
 - Wastewater Systems Effluent Regulations (SOR/2012-139).
 - .6 Species at Risk Act (S.C. 2002, c.29).
 - .7 Migratory Birds Convention Act, 1994 (S.C. 1994, c.22).
 - .8 Arctic Waters Pollution Prevention Act (R.S.C., 1985, c. A-12), including:
 - Arctic Waters Pollution Prevention Regulations (C.R.C., c. 354)
 - .9 Hazardous Products Act (R.S.C., 1985, c. H-3), including:
 - Controlled Products Regulations (SOR/88-66), and amendment SOR/2001-254.
 - .10 Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c.34) a.1999,

- c.31. including:
 - Transportation of Dangerous Goods Regulations (SOR/2001-286) a.SOR/2011-60
- .11 Territorial Lands Act (R.S.C., 1985, c T-7), including:
 - Territorial Land Use Regulations (C.R.C., c.1524) a.98-430.
- .12 Nunavut Land Claim Agreement Act (S.C. 1993, c. 29) [Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada].
- .13 Canadian Council of Ministers of the Environment (CCME) Guidelines, Objectives, Codes of Practice:
 - Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME, 2003).
 - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 1999).
 - Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 1999).
 - Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (CCME, 2008).
- .14 Health Canada, Guidelines for Canadian Drinking Water Quality, August 2012.
- .15 Department of Fisheries and Oceans:
 - Nunavut Operational Statement: Snow Fills and Ice Bridges (2007).
 - Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut (2010).
 - Fish Screen Design Criteria for Flood and Water Truck Pumps (2011).
- .16 Aboriginal Affairs and Northern Development Canada References:
 - Abandoned Military Site Remediation Protocol (INAC, 2009).
 - Contaminated Sites Management Policy (INAC, 2002).
 - Risk Management Guidance Document (INAC, 2006).
 - Contaminated Sites Cost Estimating Guide (INAC, 2013).
 - Risk Management Tool & Reporting Tool User Guide (INAC, 2007).
 - Environment, Health & Safety Management System Manual (INAC, 2008).
 - Environment, Health & Safety Standard Operating Procedures Manual (INAC, 2008).
 - Environment, Health & Safety Control Framework, Northern Contaminated Sites Program (INAC, 2008).
 - Environment, Health & Safety Audit Program Guide (INAC, 2008).
- .17 Department of Indian Affairs and Northern Development Northern Land Use Guidelines:
 - Volume 5: Access - Roads and Trails (2010).
 - Volume 6: Camp and Support Facilities (2011).
 - Volume 7: Pits and Quarries (2009).
- .18 Treasury Board Policy on Management of Real Property (TB, 2006).
- .19 A Federal Approach to Contaminated Sites, Contaminated Sites Management Working Group (CSMWG), 2002.
- .20 Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments, April 1976.
- .21 Environment Canada Technical Document for Batch Waste Incineration, EC, 2010.
- .22 Construction Project Safety Management Guide, 5th Edition (PWGSC, 2008).

1.3 REFERENCES AND CODES - NUNAVUT

- .1 Meet or exceed the governing codes, standards and guidelines, and regulations applicable to Work and issued under the authority of the Government of Nunavut and the Northwest Territories as follows:
 - .1 Nunavut Environmental Protection Act (R.S.N.W.T. 1988, c. E-7) a. 1998, c.21, c.24, and related Department of Environment, Government of Nunavut Environmental Guidelines for:
 - Ambient Air Quality (2011).
 - Burning and Incineration of Solid Waste (2012).
 - Contaminated Site Remediation (2010).
 - Dust Suppression on Unpaved Roads (2014).
 - General Management of Hazardous Waste (2010).
 - Industrial Waste Discharges Into Municipal Waste and Sewage Treatment Facilities (2011).
 - Mercury Containing Products and Waste Mercury (2010).
 - Ozone Depleting Substances (2011).
 - Used Oil and Waste Fuel (2012).
 - Waste Antifreeze (2011).
 - Waste Asbestos (2011).
 - Waste Batteries (2011).
 - Waste Lead and Lead Paint (2014).
 - Waste Paint (2010).
 - Waste Solvent (2011).
 - .2 Nunavut Archaeological and Palaeontological Sites Regulations (SOR/2001-220).
 - .3 Commissioner's Lands Act (R.S.N.W.T. 1988, c.C-11).
 - .4 Used Oil and Waste Fuel Management Regulations, 2003.
 - .5 Labour Standards Act (Nunavut) (R.S.N.W.T. 1988, c.L-1) amended S.N.W.T 2003, c.15, in force January 2004.
 - .6 Public Health Act, R.S.N.W.T. 1988, c.P-12.
 - .7 Safety Act (R.S.N.W.T. 1988, c.S-1), including:
 - General Safety Regulations (R.R.N.W.T. 1990, c.S-1).
 - Work Site Hazardous Materials Information System Regulations.
 - .8 Transportation of Dangerous Goods (R.S.N.W.T. 1988, c.81 [Supp]).
 - .9 Spill Contingency Planning and Reporting Regulations R-068-93.
 - .10 Fire Prevention Act, R.S.N.W.T. 1988, c.F-6.
 - .11 Transportation of Dangerous Goods Act (1990 S.N.W.T. 1990, c.36).
 - .12 Nunavut Waters and Surface Rights Tribunal Act (2002).

1.4 PERMITS AND LICENSES

- .1 The following permits and licenses will be provided to the Contractor when received by AANDC:
 - .1 Water License, granted by the Nunavut Water Board in accordance with the Nunavut Waters Act.
 - .2 Land Use Permit, granted by AANDC - Land Administration Division.
 - .3 Quarry Permit, granted by AANDC.
- .2 The Contractor is responsible for acquiring permits, authorizations, and/or licenses required for mobilization and demobilization. This includes but is not limited to Access

to Inuit Owned Lands (IOL) or Access to Commissioner's Lands permitting as required (contingent upon selection of the winter access trail route).

- .3 Any deviations from the current remediation plan may require land use permit amendments or field authorizations. Notify the Departmental Representative of any proposed deviations so AANDC can contact the appropriate agency to obtain approval for the deviation. Approval may take 45 to 90 days from the time of submission.

1.5 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: Demolition of spray or trowel-applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition Work, immediately stop Work and notify Departmental Representative. Refer to Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions, and Section 02 82 00.02 - Asbestos Abatement - Intermediate Precautions.
- .2 Stop Work immediately and notify Departmental Representative upon discovery of following materials that are not identified on the Drawings or in Appendix A or B during course of Work:
 - .1 Designated substances such as PCBs, asbestos, and mercury.
 - .2 Unknown and/or potentially hazardous substances.
 - .3 Items that may have archaeological, cultural or scientific significance.
- .3 Work at site may involve contact with:
 - .1 Hazardous waste and demolition debris (polychlorinated biphenyls [PCBs], leachable lead paint, batteries, asbestos containing materials [ACMs])
 - .2 Metal/PCB impacted soil.
 - .3 Petroleum Hydrocarbon (PHC) impacted soil.
 - .4 Hazardous liquids and petroleum based sludges.

1.6 WHIMIS

- .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 acceptable to Labour Canada and Health and Welfare Canada.
- .2 Submit copies of Material Safety Data Sheet (MSDS) to Departmental Representative upon delivery of materials to site.

1.7 SUBMITTALS

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

1.8 MEASUREMENT FOR PAYMENT

- .1 Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is preparation at locations other than Place of Work, allow access to such Work whenever in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative, instructions, or law, of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work at no additional cost.

1.2 SUBMITTALS

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

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services is to be borne by Departmental Representative.
- .2 Provide equipment required for inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off-site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on-site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's Work damaged by such removals or replacements promptly.
- .3 If in the opinion of the Departmental Representative it is not expedient to correct defective Work or Work not completed in accordance with Contract Documents, Departmental Representative may deduct from Contract Price the difference in value between Work completed and that called for by Contract Documents, amount of which will be determined by the Departmental Representative.

1.7 REPORTS

- .1 Submit three (3) copies of inspection and test reports to Departmental Representative as received.
- .2 Provide copies to Sub-contractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MEASUREMENT FOR PAYMENT

- .1 Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities to facilitate all construction and camp activities.
- .2 Remove from site all such Work after use.
- .3 Provide all temporary utilities consisting of the design, supply, construction, maintenance, operation and removal of the utilities and services required to support the remediation of the site. Temporary utilities to meet requirements of the Land Use Permit issued for the Work, satisfy requirements of Federal, Territorial and local Authorities Having Jurisdiction (AHJ), and comply with the requirements of Section 01 35 43 - Environmental Procedures.

1.2 SUBMITTALS

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

1.3 EXISTING SERVICES

- .1 The location of remaining utility services from former site operations specified or indicated on the Drawings is to be considered as approximate. The site has no known operational utility services.
- .2 Before commencing Work, establish location and extent of services in area of Work, and notify Departmental Representative of findings.
- .3 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

1.4 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
- .2 Provide means to conserve water on-site, as suitable water sources may be seasonal. Consider using tanks to store water during high flow events.
- .3 Abide by terms of Water Licence regarding water usage.

1.5 TEMPORARY POWER AND LIGHT

- .1 Provide, operate, and maintain an electrical power supply system, in accordance with governing regulations, to service Contractor's site power requirements.
- .2 Install temporary facilities as necessary for power distribution, such as power cable and pole lines, subject to Departmental Representative's approval.
- .3 Provide lighting and power at site for use during Work by Contractor, Sub-Contractors, and Departmental Representative's support personnel including outdoor lighting for night shift as applicable.

1.6 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders (multi-fuel cast iron stoves) are not permitted.

- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage and installation of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Provide ventilation for temporary facilities as follows:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful elements.
- .5 Provide Carbon Monoxide and smoke detectors for occupied areas.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, and data hook up equipment necessary for Contractor use and use of Departmental Representative.

1.8 FIRE PROTECTION

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

1.9 DRAINAGE

- .1 Refer to Section 01 35 43 – Environmental Procedures.

1.10 SIGNS AND NOTICES

- .1 Safety and Instruction Signs and Notices:

- .1 Signs and notices for safety and instruction to be in English, and the local Inuit dialect.
- .2 Maintenance and Disposal of Site Signs:
 - .1 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.

1.11 MOBILIZATION AND DEMOBILIZATION

- .1 Provide temporary utilities to facilitate mobilization and demobilization activities including but not limited to water supply, power and light, heating and ventilation, communication, and fire protection.
- .2 Provide all temporary utilities consisting of the design, supply, construction, maintenance, operation and removal of the utilities and services required to support the mobilization to and demobilization from the site of all labour, equipment, materials, and supplies. Temporary utilities to meet requirements of the Land Use Permit issued for the mobilization/demobilization, including Access to Commissioner's Lands and/or Inuit Owned Lands permits (if required) for the temporary winter access trail, satisfy requirements of Federal, Territorial and local Authorities Having Jurisdiction (AHJ), and comply with the requirements of Section 01 35 43 - Environmental Procedures including those specific to the Winter Access Trail Alignment.

1.12 MEASUREMENT FOR PAYMENT

- .1 Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute Work expeditiously.
- .2 Provide all temporary facilities consisting of the design, supply, construction, maintenance, operation and removal of the facilities and services required to support the remediation of the site. Provide temporary facilities as specified at the Work site, and any other location where temporary facilities are essential to the Work. Temporary facilities are to meet requirements of the Land Use Permit issued for the Work, satisfy requirements of Federal, Territorial and local authorities having jurisdiction (AHJs), and comply with the requirements of Section 01 35 43 - Environmental Procedures.
- .3 Remove from site all such Work after use.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Inform Departmental Representative of impending installation and obtain his/her approval for location.
- .2 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.3 ACCESS AND DUST CONTROL

- .1 Provide and maintain adequate access, including snow removal, to all working areas of the site, camp, utilities and offices during all periods of work by Contractor, subcontractors and other contractors completing work for Departmental Representative.
- .2 Maintain access to property including overhead clearances for use by emergency response vehicles/aircraft.
- .3 Access includes the removal of snow, as may be required, to gain access to site, as required, to meet the project schedule.
- .4 Minimize dust creating activities and maintain dust control, as specified in Section 01 35 43 – Environmental Procedures.

1.4 VEHICLES

- .1 Supply one crew cab 4-wheel drive pickup truck for use by the Departmental Representative and the Departmental Representative's Authorized Personnel for the duration of the Project.
- .2 Vehicle to be in new condition, having been driven for not more than 30,000 km.
- .3 Equip vehicle with heater, defroster, right and left hand mirrors, windshield washers, permanent type anti-freeze, spare wheel, jack, wheel wrench, snow tires on drive wheels and spare, directional signals with two-way flasher, full width front seat and license in accordance with Territorial regulations.
- .4 Provide one (1), two-passenger side-by-side seating four-wheel drive all-terrain vehicle (ATV) for use by Departmental Representative for the duration of the work activity. The ATV must meet the following criteria, at minimum:

- .1 675 cc gasoline or equivalent diesel engine;
- .2 Roll-over protection system;
- .3 Hard enclosure with glass windshield and windshield wipers;
- .4 Pick-up style rear box suitable for carrying samples and equipment;
- .5 Buggy whips and rotating beacon;
- .6 Tire repair kit and air pump.
- .5 The use of these vehicles will not be shared with Contractor.
- .6 Provide sufficient vehicles (number and type) for use during the Contract to perform the Work expeditiously and meet site safety requirements including one (1) ATV per wildlife monitor as specified in Section 01 35 32 - Site Specific Health and Safety for Contaminated Sites.
- .7 Provide and maintain all site vehicles with appropriate Health & Safety supplies including first aid kits and fire extinguishers.
- .8 Vehicles provided for purposes of this contract are accepted at risk of supplier whether in possession of supplier or Departmental Representative.
- .9 Deliver vehicles to location designated by Departmental Representative at the site.
- .10 Store vehicles in accordance with manufacturer's recommendations.
- .11 Maintain all vehicles in good running order for duration of Project. If vehicles are out of commission for any period of time, provide other replacement vehicles.
- .12 Repair and maintain vehicles expeditiously.
- .13 Provide and pay for all fuel and lubricants required to operate the vehicles for the duration of the Project.
- .14 Provide applicable insurance for damage to vehicles and ATVs under use by Departmental Representative or Departmental Representative's Authorized Personnel, or absorb costs for damage to same.

1.5 EQUIPMENT, TOOL AND MATERIAL STORAGE

- .1 Provide and maintain, in a clean and orderly condition lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with Work activities.

1.6 SANITARY FACILITIES

- .1 Provide sanitary facilities for Work force in accordance with governing regulations and ordinances.
- .2 Washroom facilities are to be provided at, or in close proximity to, the respective camp facilities and Work areas.
- .3 Washroom facilities provided to have running hot and cold water for workers not able to return to the camp facilities for lunch.
- .4 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.7 CONSTRUCTION SIGNAGE

- .1 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.

1.8 DRAINAGE

- .1 Refer to Section 01 35 43 - Environmental Procedures and to specific sections in Division 2 of these Specifications for site drainage and pumping requirements.

1.9 SCAFFOLDING

- .1 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary for the completion of the work.
- .2 Construct and maintain scaffolding in a rigid, secure and safe manner.
- .3 Erect scaffolding independent of walls. Remove promptly when no longer required.
- .4 Design and construct scaffolding in accordance with CSA S269.2-M87. Provide details and procedures for ensuring all scaffolding equipment, materials, and construction practices meet all applicable regulations and site specific requirements.
- .5 Conform to safety requirements of Section 01 35 32, Site Specific Health and Safety Plan.

1.10 HOISTING

- .1 Provide, operate and maintain hoists required for moving of materials and equipment. Make financial arrangements with Sub-Contractors for use thereof.
- .2 Hoists to be operated by qualified operator.

1.11 SITE STORAGE/LOADING

- .1 Confine Work and operations of employees to Work listed in the Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger the Work.

1.12 BARRICADES

- .1 Provide secure barricades around deep excavations and while working on roofs.
- .2 Provide as required by AHJ.

1.13 REMOVAL OR SHUTDOWN OF FACILITIES, CONTROLS, VEHICLES AND EQUIPMENT

- .1 Commission temporary facilities, controls, vehicles and equipment at the beginning of each construction season.
- .2 Winterize and secure temporary facilities, controls, vehicles, and equipment at the end of each construction season.
- .3 When project is closed down at end of each construction season, keep facilities operational until close down is approved by Departmental Representative.
- .4 Schedule and obtain approval from Departmental Representative to remove temporary facilities, controls, vehicles, and equipment from site.

1.14 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property, including archaeological/heritage sites from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.15 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the Start-up and Winterizing of Facilities are to be included in the unit price for Supply, Operation and Maintenance of Camp Facilities 01 54 00-1, as indicated in Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Cost Breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 MOBILIZATION AND DEMOBILIZATION

- .1 Provide all labour, equipment and materials, and performance of all Work necessary for mobilization to, and demobilization from the CAM-E site. This will include all Departmental Representative provided supplies, equipment and materials.
- .2 Mobilization to include transportation to site of Contractor's labour, equipment, materials, and assembling, erecting, and preparing site in readiness to start Work, all in accordance with Contractor's Schedule.
- .3 Demobilization to include dismantling and removal from site of all Contractor's equipment, camp facilities and materials, waste resulting from cleanup of site, and transportation of labour from site.
- .4 Decontaminate and clean all equipment used on the Project prior to demobilization according to Section 01 35 15 – Special Procedures for Contaminated Sites.
- .5 Do not mobilize to the site without written authorization from the Departmental Representative.
- .6 A Post-Demobilization site visit may be required as part of the Post-Demobilization Inspection as per Section 01 77 00 - Closeout Procedures.
- .7 Summarize the proposed mode, route, equipment, labour and all other requirements for the mobilization and demobilization of all required equipment, materials, waste and personnel to complete the remediation of the site, as indicated in these specifications, in a Mobilization and Demobilization Plan (1.3).
- .8 All mobilization and demobilization activities to comply with the requirements of all applicable codes, standards, guidelines and AANDC permits, approvals and/or authorizations. Comply with relevant Sections of this Specification including but not limited to Section 01 35 43 – Environmental Procedures, Section 01 41 00 – Regulatory Requirements, and Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.

1.2 TEMPORARY WINTER ACCESS TRAIL ALIGNMENT (IF REQUIRED)

- .1 Contractor is responsible for selection of the winter access trail alignment if the proposed Mobilization and Demobilization Plan includes overland travel (via CAT Train). The proposed trail alignment shall be included as part of the Mobilization and Demobilization Plan in accordance with Section 01 35 43 – Environmental Procedures to meet the requirements of the AHJs, and the mitigation measures identified within the February 2014 Environmental Screening Report for construction and operation of the winter access trail including those listed in Section 01 35 43.
- .2 Assessment of potential environmental impact of the proposed winter access trail alignment, once determined, is to be completed in accordance with the requirements of the AHJs prior to final approval of the route by Departmental Representative and AHJs.
- .3 Temporary Winter Access Trail route shall be selected following consultation with the chosen departure community to avoid heavily used traditional areas, where practical.

1.3 MOBILIZATION AND DEMOBILIZATION PLAN AND EQUIPMENT LIST

- .1 Provide a Mobilization and Demobilization Plan which shall include, but not be limited to, the following items:
 - .1 Proposed mode(s), route, and timing.
 - .2 Mobilization strategy, health and safety and environmental protection, wildlife protection, camp facilities description, fuel management plan, communications plan, and other specific requirements to Mobilization and Demobilization.
 - .3 In-transit storage or staging areas.
 - .4 Equipment, labour and other requirements
 - .5 Equipment and materials to be brought to site to complete the remediation of the project, as indicated in these specifications.
 - .6 Final Mobilization and Demobilization Plan will include any requirements specific to the review of the proposed winter access trail alignment.
- .2 Compile a complete Construction Equipment List comprised of manufacturer name, model number, year, and hours for construction equipment that is being mobilized to site and submit to Departmental Representative.

1.4 SUBMITTALS

- .1 Submit Mobilization and Demobilization Plan and Construction Equipment List in accordance with Section 01 33 00 - Submittal Procedure for review by Departmental Representative.
- .2 Submit to Departmental Representative three (3) hard copies and one (1) electronic copy of the Mobilization and Demobilization Plan, forty-five (45) days after contract award.
- .3 Submit to Departmental Representative three (3) hard copies and one (1) electronic copy of the Construction Equipment List thirty (30) days prior to mobilization.

1.5 MEASUREMENT FOR PAYMENT

- .1 Include all costs for Mobilization of all equipment and materials, including the submission of the Mobilization and Demobilization Plan and costs associated with the selection and environmental impact assessment of the temporary winter access trail alignment, in the lump sum price for Item 01 53 00-1 – Mobilization, as indicated in the Basis of Payment Schedule. The lump sum price for Mobilization is to include all labour, equipment, materials, meals, accommodation, flights and any other costs necessary to undertake work required.
- .2 Include all costs for Demobilization of all equipment, waste and materials in the lump sum prices for Item 01 53 00-2 – Demobilization, as indicated in the Basis of Payment Schedule. The lump sum price for Demobilization is to include all labour equipment, materials, meals, accommodation, flights and any other costs necessary to undertake the work required. Payment for Demobilization will be made after satisfactory cleanup of the site, shutdown, takedown, packaging, and cleanup of camp facilities, removal from the site of all equipment, materials, site demolition debris materials and contaminated soils as indicated.

- .3 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED


- .1 Not used.

END OF SECTION

Part 1 General

1.1 CAMP FACILITIES

- .1 Provide and operate complete camp facilities services, including but not limited to provision, preparation and serving of food, for construction personnel, Departmental Representative and his/her authorized personnel, and other specified site visitors.
- .2 Camp facilities to be established and operated in accordance with local regulations and requirements of the Authorities Having Jurisdiction (AHJs).
- .3 The location of the camp facilities must be approved by Departmental Representative. Submit location and layout of camp forty-five (45) days prior to mobilization. Submission is to include full details demonstrating compliance with all codes and standards.
- .4 Provision of camp facilities services consisting of, but not limited to:
 - .1 Design, supply, installation, and operation and maintenance of camp facilities including:
 - .1 All associated facilities.
 - .2 Utilities and services required for camp facilities such as heating, lighting, fuel, potable and domestic water systems.
 - .3 Sewage and greywater collection, treatment, and disposal systems.
 - .4 Waste, refuse, and garbage collection, storage and disposal system, including provision of dedicated camp garbage incinerator.
 - .5 Fire prevention.
 - .6 Alarm and firefighting system.
 - .7 Safety and security service.
 - .8 Wildlife Management.
 - .9 Water treatment system.
 - .10 Supply of potable drinking water.
 - .11 Meals and catering service.
 - .12 Shower/wash facilities.
 - .13 Sleeping and washroom facilities.
 - .14 Bedding and bedding laundry services.
 - .15 Janitorial services.
 - .16 Personnel laundry facilities.
 - .17 Recreational facilities.
 - .18 First Aid facilities and service.
 - .19 Office facilities including satellite communications (phone, fax and internet).
 - .20 Snow removal services.
 - .21 Camp re-supply and staff rotation transportation (charter flights).
 - .2 Obtain and pay for, as part of provision of camp facilities services, any and all licences, permits, and authorizations required to comply fully with all laws, ordinances and regulations of the Federal, Territorial and local authorities in connection with the performance of work of this Section.
 - .3 Provide camp facilities services for own workforce, Sub-Contractor's workforce, Departmental Representative, Departmental Representative's authorized personnel, and visitors as follows:
 - .1 Contractor and Sub-contractor personnel including but not limited to Resident Contractor Representative, labour force, site medic, wildlife

- .2 monitors, surveyors, and laboratory testing personnel as required.
- .2 Resident Departmental Representative: one (1) for duration of the Project.
- .3 Specialist (Environmental, Geotechnical) Inspectors: one (1) for duration of the Project.
- .4 Allow for an additional three (3) personnel at any one time to accommodate the Departmental Representative, Departmental Representative's Authorized Personnel, AANDC personnel, PWGSC personnel, visitors, and shift change overlap.
- .5 Separate sleeping quarters are to be provided for cook(s), cook's helpers and for female staff.
- .4 Demobilize camp facilities from site at completion of contract.
- .5 Camp Facilities shall not be older than 20 years 
- .1 Contractor to arrange to have the proposed camp facilities inspected by a third-party building inspector prior to mobilization.
- .2 Submit inspection report to the Departmental Representative thirty (30) days prior to mobilization. The inspection report is to include planned corrective action for identified deficiencies.
- .3 Contractor will address any recommendations arising from building inspector's report before camp facilities are paid.
- .4 Contractor will maintain camp in good operating condition and provide adequate and suitable furnishings.
- .6 Provide and maintain a digital communication system for the site consisting of full duplex and secure voice, real time fax and high speed internet. Provide three (3) separate phone lines for the Departmental Representative. Communication system must accommodate virtual private network (VPN) connections. The communication system is to be based on monthly charges with unlimited internet access. Provide wireless 802.11 B/G/N network access points such that the entire camp area has wireless network access.
- .7 Maintain one (1) handheld satellite telephone on-site for emergency purposes or when the main communication system is non-functional. Use of the handheld satellite telephone for primary site communications for extended periods is not acceptable.
- .8 Shared use areas, kitchen dining areas and sleeping quarters shall be maintained as smoke-free areas. Provide a smoking area at Contractor's discretion, in accordance with Federal, Territorial and local regulations and guidelines.
- .9 Be responsible for security and surveillance of the camp and site facilities at all times including during winter months and when camp is not occupied. Provide security, site surveillance or other means to protect the camp and site facilities from vandalism and tampering.

1.2

REGULATORY AND ENVIRONMENTAL REQUIREMENTS

- .1 Camp facilities, including utilities, services, location and operation is subject to the approval of Departmental Representative and is to be designed, established and operated in accordance with applicable Federal, Territorial and local codes, regulations and requirements governing camp facilities. Comply with requirements of Environmental Regulatory Agencies, Water License, Land Use Permit, and the provisions of Section 01 35 43 - Environmental Procedures.
- .2 Obtain applicable licences, permits and authorizations associated with establishing camp. Submit proof of same to Departmental Representative within thirty (30) days of camp start-up. Pay for all costs for the inspection of camp and

- electrical facilities by AHJ officials. Display all applicable regulatory permits at the camp site.
- .3 Install and maintain fire protection equipment as specified in Section 01 35 32 – Site Specific Health and Safety Plan.
 - .4 Provide water supply that meets Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ). Submit information on water, including the source and water quality test results to Departmental Representative prior to opening of the camp facilities. Provision of potable drinking water includes the following:
 - .1 All potable water withdrawn from on-site water sources (including Freshwater Lake) will be treated to disinfect and meet Health Canada's GCDWQ. Contractor will provide and pay for equipment, supplies and materials required to treat the water.
 - .2 Maximum water withdrawal rate shall meet regulation requirements.
 - .3 Contractor is responsible for payment for sampling and analyses of any camp facilities water supply, as indicated in Section 01 29 83 - Payment Procedures for Testing Laboratory Services. The sampling and analysis is to be provided at the water supply source and at the distribution source prior to consumption. Results of all water quality testing are to be submitted to Departmental Representative as received.
 - .4 Regular quality control testing (including weekly sampling/testing for coliforms) will be completed throughout the duration of the Project to meet the requirements of the Departmental Representative and AHJs. If results from the analysis exceed the GCDWQ and/or there is insufficient water supply, commercially sealed bottled water will be used.
 - .5 Contractor is responsible for provision of commercially sealed bottled water that meets Health Canada's GCDWQ until it is adequately demonstrated that the local source meets the Health Canada GCDWQ. In the absence of analytical test results, local sources must not be used, and the supply of bottled water must be maintained. Submit information on bottled water, including the source and water quality test results to the Departmental Representative prior to opening the camp.
 - .5 Consider the possibility of wildlife encounters when determining the layout of the camp. Refer to bear or wildlife safety literature when selecting the camp layout, facility spacing, and location of the kitchen, food storage, washroom and sleeping facilities.
 - .6 Provide an alarmed trip wire around the camp to provide warning of wildlife intrusions whenever wildlife monitors are not patrolling. A working wildlife deterrent is to be provided and a replacement will be made available within 24 hours should the primary system fail. Test the alarm system as specified in Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
 - .7 Incinerate all kitchen food waste in order to avoid attracting wildlife.
 - .8 Comply with all requirements of the Water License, Land Use Permit and all other licenses, permits and authorizations.
 - .9 Operate the camp in accordance with Camp Rules, as specified in this Section, and the provisions of Section 01 35 32 – Site Specific Health and Safety Plan.
 - .10 Comply with wastewater and sewage treatment, disposal and closure requirements as outlined in Section 01 35 15 - Special Project Procedures for Contaminated Sites.

1.3

CAMP FACILITIES INSTALLATION AND REMOVAL

- .1 Mobilize equipment, camp facilities, personnel, and materials.
- .2 Establish approved temporary buildings, shops, offices and facilities as required.

- .3 Place all camp facilities so as not to interfere with any construction or other site activities.
- .4 Carry out all Work necessary to protect environment, such as constructed pads (if required), prior to actual installation of camp facilities.
- .5 Locate camp generators a minimum distance of 30 metres away from any sleeping facility, camp kitchen or an area with constant human presence.
- .6 Winterize and secure camp, equipment, and vehicles at the end of the construction season.
- .7 Upon completion of Work, remove camp facilities, clean up, and leave site in condition satisfactory to Departmental Representative. Upon removal of camp facilities, grade as necessary (if required) to match surrounding terrain and to provide positive drainage as directed by Departmental Representative.

1.4 DECOMMISSIONING OF SEWAGE TANKS AND LINES

- .1 Prior to decommissioning of wastewater lines, rinse lines with wash water. Sample, analyse, treat, and dispose, as required, wastewater in accordance with Section 01 35 15 – Special Project Procedures for Contaminated Sites and Section 01 35 43 – Environmental Procedures.
- .2 Treat sludge as hazardous materials as specified under Section 02 61 33 – Hazardous Waste Material and treat accordingly.

1.5 SITE LOCATION

- .1 Locate camp facilities at a site that provides for the safety and welfare of its residents for the duration of the Work.
- .2 Locate camp facilities within Project Area, as indicated.
- .3 Camp facilities will be located at a minimum of 100 meters from the high water mark of any water body.
- .4 Locate the medic's centre in the camp facilities. Co-locate the medic's centre with an office, or other facility where other workers are present.
- .5 Locate the communications centre in the camp facilities.
- .6 Locate incinerator or burn areas downwind of camp facilities.
- .7 Locate camp facilities in an area that has been previously disturbed, but outside of any remedial work areas, if possible. If camp is located on rock, provide sufficient material to maintain a trafficable surface.
- .8 Locate any temporary shelter to be used as a workshop near the Work.
- .9 Construct an access road to the selected location, as needed or as directed by Departmental Representative.

1.6 MAINTENANCE

- .1 Maintain camp, power generators, fuel storage facilities, water and sewage systems, garbage disposal containers, heating and cooling units, appliances and furniture in neat, clean and good operating condition, and make repairs as necessary.
- .2 Heat camp facilities to maintain environmental controlled conditions between 20 and 22°C continuously.
- .3 Clean camp facilities daily. Clean and sanitize toilets, urinals, wash basins, showers, washing machine, and washing tubs daily.

- .4 Keep all buildings and camp facilities free of insects, pests and wildlife through garbage control, proper screens, pesticides and other non-smoke producing methods of bug, pest and wildlife control.
- .5 In the event of temporarily vacating camp, clean up and leave camp facilities in a safe, tidy and secure condition.

1.7

DEPARTMENTAL REPRESENTATIVE'S AND DEPARTMENTAL REPRESENTATIVE'S AUTHORIZED PERSONNEL SLEEPING QUARTERS

- .1 Sleeping quarters for Departmental Representative and Departmental Representative's Authorized Personnel are to be within the camp complex, but segregated from those for Contractor's staff.
- .2 It is anticipated that Departmental Representative workforce will include both male and female personnel. Design and operate the camp facilities with due consideration of the separate and private requirements for this work force.
- .3 Provide, for use by Resident Departmental Representative, single sleeping quarters with a minimum floor area of 6 m².
- .4 For Departmental Representative's Authorized Personnel, provide a, minimum of 4.6 m² of floor space for each occupant, with one dimension not to be less than 2 m.
- .5 Sleeping quarters for other Departmental Representative's Authorized Personnel, as indicated in this Section, to provide for maximum double occupancy with a minimum floor area of 9.2 square metres. Design camp facilities such that specialist inspectors generally are accommodated in single occupancy rooms. Double occupancy of specialist inspectors' accommodations will be considered by Departmental Representative for short periods of time only, and at Departmental Representative's discretion.
- .6 Provide a minimum of 11 m³ of air space for each occupant.
- .7 Provide storage lockers and/or shelving to store personal items. Provide at least one (1) power outlet per occupant. Provide one (1) reading light above each bed.
- .8 Provide key locks and keys for Departmental Representative and Departmental Representative's Authorized Personnel sleeping quarters upon their use of these facilities.

1.8

DEPARTMENTAL REPRESENTATIVE'S AND DEPARTMENTAL REPRESENTATIVE'S AUTHORIZED PERSONNEL SITE OFFICE

- .1 Provide office accommodation and furniture on-site for Departmental Representative and specialist inspectors. The use of this facility will not be shared with Contractor. Shared office and sleeping quarters for the Departmental Representative is not acceptable. Office space must be large enough to accommodate surveyors and additional specialist inspectors on a periodic basis.
- .2 Provide electrical lighting system, giving a minimum of 200 lux, using surface mounted, shielded commercial fixtures with 10% upward lighting component.
- .3 Departmental Representative's and Departmental Representative's Authorized Personnel site office must be large enough to accommodate surveyors and additional specialist inspectors on a periodic basis and will furnished with the following:
 - .1 Two desks with a top surface not less than 150 cm by 75 cm.
 - .2 Two desk chairs.
 - .3 Four stacking type chairs.
 - .4 One four-drawer file cabinets with locking mechanisms.
 - .5 One bookcase, not less than 90 cm wide by 30 cm deep by 120 cm high,

- complete with adjustable shelves.
- .6 Two waste paper baskets.
- .7 Four duplex receptacles, 120 V, 60 Hz equipped with surge protection.
- .8 Two UPS (Uninterruptible Power Supply) bars.
- .9 One plan table.
- .4 Provide and maintain one remote communications device (including internet) compatible with all site communications, one outlet for computer connections. Equip with surge protectors and an UPS bar. Provide access to reliable communications systems for Departmental Representative and support staff.
- .5 Provide and maintain at Departmental Representative's office one Multiple Function Centre (MFC) with capabilities for printing, copying, faxing and scanning. This unit is to be for Departmental Representative's exclusive use and is to be Windows compatible with Parallel, USB and Ethernet interfaces. Provide the MFC with all required consumable supplies such that it provides continuous operation. The MFC is required to also meet the following specifications:
 - .1 Print Function: Black and White and Colour with a minimum of 32 MB of memory.
 - .2 Copy Function: Black and White and Colour with capabilities for Automatic Document Feed (ADF) and Reduction / Enlargement.
 - .3 Scan Function: Black and White and Colour scan capabilities with a minimum optical scan resolution of 600 x 2400 dots per inch (dpi) and capabilities to scan to e-mail, image, OCR and file.
- .6 Provide and maintain at Departmental Representative's office two (2) satellite phone lines or equivalent communication approved by Departmental Representative.
- .7 Provide, for the use by Departmental Representative and Departmental Representative's Authorized Personnel, four (4) mobile communication radios, complete with charging units. The radios are to allow for on-site communication between Departmental Representative, Departmental Representative's Authorized Personnel and Contractor. The radios are to have a minimum range of 10 km.
- .8 It is critically important that the communication equipment provided by Contractor for Departmental Representative's use is reliable and of the highest quality. Immediately repair or replace faulty equipment. The equipment is to be operational from the day the work commences.

1.9

FIELD LABORATORIES

- .1 Supply and pay for a field laboratory, complete with furniture, for the use by the Departmental Representative's Authorized Personnel. The lab will accommodate an environmental analytical and geotechnical testing.
- .2 Locate the field laboratory in the camp complex and make ready for use three (3) days prior to the first day Work commences for which testing is required, and remain available for the duration for which testing is required.
- .3 The lab will be complete with heating system, lighting system, a minimum of four (4) 110 volt and one (1) 220 volt, 60 cycle electric outlets, water and sewer system, sink, work benches, garbage cans, stove/oven, hood and fan, refrigerator and freezer (as specified below), shelving and clothes rack, two (2) desks, two (2) 0.75 metre x 1.50 metre tables, three (3) chairs, one (1) four-drawer filing cabinet and adequate windows.
- .4 The lab will have a minimum floor area of 20 m², unless less space is accepted in writing by Departmental Representative.
- .5 Provide and maintain phone and internet service for the field laboratory.

- .6 Equip the lab with a standard refrigerator with a total minimum capacity of 0.48 cubic metres (17 cubic feet) and a chest freezer with a total minimum capacity of 0.28 cubic metres (10 cubic feet). The refrigerators and freezer will remain the property of the Contractor upon completion of the project.
- .7 Equip the lab with the following granular material testing equipment:
 - .1 One (1) forced convection bench top laboratory oven with digital controls, stainless steel interior and suitable for effective drying of soil samples and large enough to fit the pan sizes outlined below
 - .2 One (1) 1.5" sample splitter
 - .3 One (1) polyethylene tarp for sample splitting: 1.8 m x 1.8 m minimum size
 - .4 One (1) 6" Proctor Mould for the Standard Proctor Test: ASTM 698
 - .5 One (1) Standard Proctor Hammer
 - .6 One (1) Motorized Sieve Shaker compatible with 200mm sieves
 - .7 One (1) Set of 200mm Sieves to include the following opening sizes in millimetres: 112, 80, 56, 40, 28, 20, 14, 10, 5, 2.5, 1.25, 0.630, 0.315, 0.160, 0.08, pan
 - .8 One (1) wash sieve (0.08 mm opening) with reinforced screen (300mm diameter), one 5mm wash screen (300mm diameter)
 - .9 One (1) brass sieve brush and one soft sieve brush
 - .10 Pans and Tares:
 - .1 each 8" x 4" x 2.5" metal
 - .2 each 11.5" x 9" x 2.5" metal
 - .3 each 18" x 10.5" x 6" metal
 - .4 each 19" x 11" x 4" metal
 - .5 loaf pans – 80mm x 180mm (for use in oven)
 - .11 One (1) precision grade electronic scale with accuracy and readability to 0.1 grams and a minimum capacity of 20 kilograms.
 - .12 One (1) pair of oven mitts.
 - .13 One (1) metal scoop
 - .14 One (1) leveling rod
 - .15 One (1) rubber mallet
 - .16 One (1) scrub bucket
- .8 Clean lab at least two times per week, and maintain all electric lights, heating, water and sewer systems in good working condition during the period the laboratory is required. Maintain facility in acceptable condition.
- .9 Provide power to each of the laboratories on a 24 hour/day basis while the remediation activities, requiring laboratory services, are in operation. Equip all power supplies with adequate surge protection. Damage to equipment resulting from power surges will be repaired or replaced at no cost to the Departmental Representative or his/her Authorized Personnel.
- .10 Submit to the Departmental Representative for review a sketch of the proposed laboratories with the construction camp layout and siting plan as specified in this section.
- .11 Provide Departmental Representative with key-locks for the field laboratories prior to commencement of activities requiring laboratory services being in operation.

1.10

KITCHEN/DINING COMPLEX

- .1 The functional design of the kitchen is to include all equipment necessary for food storage, preparation, cooking and the serving of three meals daily to meet camp population requirements.

- .2 Provide dishwashing and garbage handling equipment consistent with the required function of the kitchen.
- .3 Provide seating capacity of the dining area to meet maximum camp population requirements.
- .4 Store all non-perishable food supplies in adequate, vermin proof, containers kept in an orderly manner and under sanitary conditions, in a vermin-proof enclosure.
- .5 Store all perishable food supplies in properly refrigerated indoor areas within the camp facilities to preclude the attraction of wildlife.

1.11 ABLUTION AND LATRINE FACILITIES

- .1 Provide ablution and latrine facilities as per AHJ and codes requirements and as per camp occupancy requirements as follows:
 - .1 Toilets as required.
 - .2 Urinals as required.
 - .3 Wash basin of stainless steel, porcelain, with one mirror over each basin as required.
 - .4 Individual shower units with non-slip flooring together with adjacent dressing cubicles as required.
- .2 Maintain separate ablution and latrine facilities for female/male populations.
- .3 Maintain separate ablution and latrine facilities for Departmental Representative and Departmental Representative's Authorized Personnel. Maintain separate facilities for Departmental Representative's male and female staff.
- .4 Clean ablution and latrine facilities daily. Supply adequate amounts of paper towels and toilet tissue in washrooms.

1.12 LINEN, BEDDING, AND LAUNDRY

- .1 Supply three (3) blankets, two (2) sheets, one (1) bath towel, one (1) face cloth and two (2) pillows and two (2) pillow cases for each person living in camp facilities.
- .2 Change two (2) sheets and one (1) pillow case once per week or whenever a change of occupant occurs.
- .3 Launder sheets, pillow covers, and towels regularly to provide weekly supply of clean linen and towels.
- .4 Provide clean blankets to all camp occupants.
- .5 Cooking staff is to wear suitable kitchen attire. Launder kitchen attire daily.
- .6 Provide both personnel laundry facilities and facilities dedicated to the camp (ex: bedding, kitchen linens). Provide additional laundry facilities for laundering of PPE (e.g. coveralls and other exterior work clothing) at a separate location within or adjacent to Controlled Access Trailer.

1.13 CONTROLLED ACCESS TRAILER

- .1 Provide a suitably sized trailer to house the decontamination rooms for the entire construction crew, Departmental Representative, inspectors and up to three (3) visitors to the site.
- .2 The trailer is to have two (2) access doorways where workers can enter from the construction side, change out of their PPE and field clothes and wash up prior to entering the camp facilities or clean side of the trailer.

- .3 Provide a designated area for all field/construction equipment, located in such a manner as to minimize the potential for contaminated material (PCBs, asbestos, soil and the like) to enter the camp facilities.

1.14 FIRE PROTECTION EQUIPMENT

- .1 Install and maintain fire protection equipment as specified in Section 01 35 32 - Site Specific Health and Safety for Contaminated Sites.

1.15 FOOD SCHEDULE

- .1 Provide food of the highest quality giving a balanced diet and served under acceptable standards of cleanliness by experienced personnel. Eggs and dairy products are to be Grade "A". Canned fruit and vegetables to be choice or fancy.
- .2 Beef to be Canada Grade "A", pork to be Grade "I", turkey, chicken or other fowl to be "utility" or better.
- .3 Provide choices of traditional food.
- .4 Provide healthy choices in food preparation.
- .5 As a minimum, provide three meals a day. Provide casual meals or fourth meals if irregular shifts are worked or irregular travel by personnel is required. Consult with Departmental Representative to set meal times for casual or fourth meals.
- .6 Main courses to be served at meals are classified as follows:
 - .1 First Line: Beef steak, roast beef, roast pork, veal cutlets, baked ham, ham steak, chicken, turkey, pork chops, roast lamb, roast veal, vegetarian lasagne, pasta with meatless sauce, quiche.
 - .2 Second Line: Fish, short ribs, spare ribs, stews, meat pies, liver, curried dishes, spaghetti and meatballs, sausages, salisbury steak, swiss steak, ground beef, corned beef, vegetarian chili, omelettes, vegetarian baked beans, vegetarian patties.
 - .3 Third Line: Hot dogs, vegetarian hot dogs, omelettes, chili con carne, baked beans, chicken and turkey turnovers, dishes using leftover meats, bagels and cream cheese, soup and sandwiches.
 - .4 Breakfast Line: Eggs, toast, bacon, sausage, ham, toast, hash browns, waffles, porridge, cereal, fruit, yogurt, milk and fruit juice.
- .7 Serve breakfast line daily. At supper, serve a hot main course, one first line and a choice between a second and third line. At lunch, serve a hot main course, one second line and one third line. Do not repeat the same selection more than twice weekly. Beef steak is to be served at least once per week. Provide a vegetarian option upon request.
- .8 Provide box lunches for all camp occupants who will not be in camp for noon meal.
- .9 Contractor will be given twelve hours notice to serve fourth and/or casual meals to work forces of other contractors and Departmental Representative.
- .10 Provide "Mug Up" nightly at 2100 hours consisting of tea, coffee, hot chocolate, fruit juice and any leftover pastries at cook's discretion. Make coffee available at coffee breaks.
- .11 Make available daily apples and oranges; serve other types of fresh fruit at least once per week.
- .12 Provide beverages and snacks at all times. A variety of snacks shall be available, including snacks that are appropriate for diabetics or persons with blood sugar

concerns. Snacks may consist of fresh fruit or vegetables, granola bars, cheese and crackers, bannock, or other suitable items.

- .13 Fresh salads are to be provided daily.
- .14 Provide whole milk each day; powdered milk is not acceptable for drinking but may be used in cooking.
- .15 Provide pure juice each day.
- .16 Schedule food re-supply flights, as necessary, to maintain variety in the menu and that fresh produce, milk and juice is continually available.

1.16 SERVICE FACILITIES

- .1 Install, hook-up, test and make necessary repairs to sewage, water supply, heating, and electrical services.
- .2 Situate power plant in camp area to minimize noise, and prevent exhaust fumes from blowing through camp during prevailing winds.
- .3 Ground all buildings and electrical equipment with an approved grounding system.

1.17 RECREATION

- .1 Provide an area for recreation for all camp occupants.
- .2 Area to be of a size suitable for accommodating at least 50% of camp occupants, and to be suitably furnished with loungers, and stacking chairs.
- .3 Provide a TV and DVD player for use by camp occupants. Alternatively, provide a satellite system.
- .4 Provide a minimum of 20 DVD movies and rotate these movies every two weeks or provide a TV with satellite link.
- .5 Provide an assortment of books (soft cover) and magazines for reading.

1.18 CAMP RULES

- .1 Prepare a set of Camp Rules and submit to the Departmental Representative, ten (10) days prior to mobilization, for review.
- .2 In order to protect all camp occupants, the following activities are strictly prohibited and could result in dismissal and removal from the site:
 - .1 Tampering with smoke or fire detectors/alarms, any other safety equipment or electrical outlets/fixtures.
 - .2 Possession and consumption or use of alcohol or illegal drugs.
 - .3 Possession or use of unauthorized firearms, ammunition or other lethal weapons.
 - .4 Fighting, physical violence, stealing, vandalism or destruction of property.
 - .5 Harassment in any form.
- .3 The employee or visitors departure from the site for any of the above reasons will be on the first available scheduled transportation. Should this person wish to leave immediately, the costs will be the responsibility of the employee.
- .4 Make all camp residents familiar with all emergency procedures, exits, signals and alarms. Keep accesses to fire equipment clear at all times, and immediately report any damaged fire or safety apparatus to your supervisor.
- .5 Keep living areas as clean as possible.
- .6 Provide smoking rules and/or designated area in accordance with Federal, Territorial and local regulations and guidelines

- .7 Have warm emergency clothing available at all times during wet or cold weather.
- .8 Keep clothing or other flammable goods away from baseboard heaters.
- .9 Employees must store/remove all personal effects and belongings when going off rotation or permanently off site.
- .10 No loose clothing, dangling neckwear, bracelets, rings or similar articles are to be worn where there is a risk of coming into contact with moving machinery or electrical energized equipment.
- .11 Keep workplace and equipment neat and orderly. Complete an inspection of tools and equipment prior to starting Work. Correct any hazards immediately.
- .12 Provide a copy of Camp Rules to all camp occupants prior to or upon arrival in camp.
- .13 Enforce the Camp Rules.

1.19 SECURITY

- .1 Restrict access to camp facilities. Only persons employed on project are to be allowed normal access. Unauthorized persons will be permitted on site only with approval of Departmental Representative and/or Contractor.

1.20 ACCESS TO THE WORK

- .1 Be responsible for the transport of personnel and equipment to the various work areas on the site including transport to and from camp each day.

1.21 TRANSPORTATION

- .1 Provide return air transportation services for Departmental Representative and Departmental Representative's Authorized Personnel from Kugarruk, Nunavut to the CAM-E site.
- .2 It is anticipated that air transport of Departmental Representative's Authorized Personnel will be scheduled to coincide with the transport of Contractor's workforce to and from the site. Provide air transportation for Departmental Representative's personnel at a minimum frequency of one return trip per week and two additional trips per month scheduled according to Departmental Representative's request.
- .3 Departmental Representative will advise Contractor of Departmental Representative's and Departmental Representative's personnel air transportation requirements 7 days in advance of trip departure.

1.22 SUBMITTALS

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

1.23 MEASUREMENT FOR PAYMENT

- .1 Include all costs for the supply, erection, connection, inspection of camp and electrical facilities by AHJ officials in the lump sum payment for Camp Supply and Start-Up, Item 01 54 00-1, as indicated in the Basis of Payment Schedule.
- .2 The operation and maintenance of all camp facilities and equipment will be measured for payment by the operating week. Operation and Maintenance of Camp Services will be paid under Item 01 54 00-2 as indicated in the Basis of Payment Schedule. Operation and Maintenance of Camp includes, but is not limited to, water treatment and sewage treatment, on-site mobile communication equipment, charter flights, as well as the provision of catering, rooms, and laundry and janitorial services for the camp.

- .3 Room and board and associated services for Departmental Representative and Authorized Personnel will be measured for payment by the person-day for each day that personnel resides overnight at the camp. Departmental Representative and Authorized Personnel Room and Board will be paid under Item 01 54 00-3 in the Basis of Payment Schedule.
- .4 Casual meals to visiting Departmental Representative's Authorized Personnel will be measured for payment by the number of meals served. Casual meals will be paid under Item 01 54 00-4 in the Basis of Payment Schedule.
- .5 Air transportation from Contractor's Charter Base (Kugaaruk, Nunavut) to CAM-E, Keith Bay for Departmental Representative's Authorized Personnel will be measured for payment by the number of person return trips and will be paid under Item 01 54 00-5 in the Basis of Payment Schedule. This includes transportation for Monthly Meetings as specified in Section 01 31 19 – Project Meetings.
- .6 Include all direct costs for the supply and installation of satellite and/or long distance communication links for the Departmental Representative and Departmental Representative Authorized Personnel in the lump sum price for Departmental Representative's Communication Links, Item 01 54 00-6, as indicated in the Basis of Payment Schedule.
- .7 Supply of Departmental Representative's consumable office supplies will be considered incidental to the work and will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.
- .8 The provision of security or surveillance for the camp and site facilities, including times when camp is not occupied, will be considered incidental to the work and will not be measured for payment. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.
- .9 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 QUALIFICATIONS OF SURVEYOR

- .1 Qualified surveyor, licenced to practice in Nunavut, with a minimum of five (5) years of surveying experience, acceptable to Departmental Representative.
- .2 Surveyor cannot be a direct employee of the Contractor.

1.2 REFERENCES

- .1 Departmental Representative's identification of existing survey control points and property limits.

1.3 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings (existing benchmark location is identified on Drawing C01).
- .2 Locate, confirm and protect control points prior to starting site Work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice and approval from the Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

- .1 Establish stable temporary survey control points for use in laying out work. Re-establish local control points at the start of each construction season.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Prepare a topographic map of work sites prior to demolition, excavation, or capping work to provide a baseline survey for quantity measurements.
- .4 Layout/stake location of landfills and hydrocarbon impacted soil treatment cell in the field, and prepare a record drawing showing final location and contours of the landfills and treatment cell.
- .5 Maintain surveys for quantity calculations.
- .6 Survey locations of all environmental samples and geotechnical work as directed by Departmental Representative. Provide drawings showing all appropriate details to Departmental Representative as required.
- .7 Prepare drawings showing areas where repairs were undertaken.

1.5 SURVEY EQUIPMENT

- .1 Maintain at site, for duration of the construction period, a complete set of survey equipment for occasional use by the Departmental Representative. Shared use of Contractor's survey equipment is acceptable.
- .2 Equipment to include:

- .1 Surveying Total Station with data recording capability, tripod, spare battery, battery charger, downloading hardware and software and all associated ancillary items cables, hardlock, etc.).
- .2 Automatic level with tripod.
- .3 Single prism with 5 m collapsible range pole.
- .4 Triple prism with tripod.
- .5 50 m cloth tape (steel reinforced)
- .6 5 m collapsible level rod.
- .7 Magnetic pin finder (high frequency).
- .8 One 1.2 m carpenter's level.
- .3 The use of either a Total Station unit or a GPS Real Time Kinetic unit is acceptable.
- .4 Calibrate all equipment prior to the construction season. Submit to the Departmental Representative documentation certifying the calibration of the equipment thirty (30) days prior to each construction season.

1.6 SURVEY MARKERS

- .1 Provide all survey markers and other items required to complete Work as specified including but not limited to:
 - .1 Pointed stakes (minimum 1.2 m in length, 12 mm thick, 38 mm wide)
 - .2 Pointed hubs (minimum 0.5 m in length, 20 mm thick, 38 mm wide)
 - .3 Nails (100 mm long), spikes (250 mm long), and pins (1 m long), etc.
 - .4 Fluorescent paint, flagging, etc.
 - .5 Felt markers, chalk, wax pens, etc.
- .2 Maintain supply of survey markers for Departmental Representative's use.

1.7 RECORDS

- .1 Maintain a complete, accurate log of control and survey Work as it progresses.

1.8 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative prior to construction commencement.
- .2 Upon request of Departmental Representative, submit documentation to verify accuracy of field engineering Work. Maintain accuracy to 0.01 m vertically and 0.1 m horizontally. Submit data in UTM NAD83 Datum.
- .3 Submit survey data backup for quantities claimed on Progress Claims.
- .4 Submit raw survey data in electronic form containing (at minimum):
 - .1 Date of survey.
 - .2 Name of survey (e.g. Tier II Landfill Berms – Finished grade, or Quonset Hut 3 – Original Ground, etc.)
 - .3 Point numbers, Northing, Easting, elevation, description.
- .5 Submit the record survey data file as the latest as-constructed information. Submission of more than one data file as record information for each facility is not acceptable.

- .6 At completion of all Work, a minimum of seven (7) days prior to requested final inspection, submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.
- .7 Submit all drawings electronically in accordance with PWGSC protocols for AutoCAD drawings, and by hard copy.
- .8 Submit to the Departmental Representative documentation certifying the calibration of the equipment thirty (30) days prior to construction commencement each season.

1.9 MEASUREMENT OF PAYMENT

- .1 Work identified in this section will be paid for in the lump sum price for Survey, Item 01 71 01-1, as indicated in the Basis of Payment Schedule. Tendered price is to include labour, equipment, materials, meals, accommodation, flights, and any other costs necessary to undertake the survey Work required.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 CLOSEOUT PROCEDURES

- .1 Notify Departmental Representative when Work is considered ready for substantial performance (fulfillment of essential obligations as required under the Contract).
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed Certificate of Substantial Completion.
- .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

1.2 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Sub-Contractors to conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will complete inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .3 Completion: submit written certificate that the following have been completed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for Final Inspection.
- .4 Submit written completion certificate to Departmental Representative seven (7) days prior to the requested final inspection.
- .5 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .6 Post-Demobilization Inspection: once demobilization is completed, Departmental representative may request a Post-Demobilization inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

1.3 MEASUREMENT OF PAYMENT

- .1 All direct costs for the Post-Demobilization Inspection will not be considered for payment under this section, but will be negotiated with the Departmental Representative using the Labour and Materials rates provided in the Potential Additional Work section of the Basis of Payment schedule.
- .2 Except as indicated above, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 FORMAT

- .1 Organize all closeout data in the form of an instructional manual, called Project Record Documents.
- .2 Binders: vinyl, hard covered, 3" D-ring, loose leaf(219 mm x 279 mm), with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of Project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dxf or dwg format on CD.

1.2 CONTENTS – EACH VOLUME

- .1 Table of Contents:
 - .1 Provide title of project
 - .2 Date of submission
 - .3 Names, addresses, and telephone numbers of Contractor with name of responsible parties
 - .4 Schedule of products and systems, indexed to content of volume,
 - .5 Summary of Health and Safety issues, Environmental issues and performance indicators.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of Sub Contractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Include As-Built Drawings as specified in this section.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.

1.3 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Survey Requirements, certifying that elevations and locations of completed Work are in conformance, or non- conformance with Contract Documents.

1.4 AS-BUILTS

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one (1) record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Task Authorizations.
 - .5 Change Orders and other modifications to the Contract.
 - .6 Reviewed shop drawings and product data.
 - .7 Field test records.
 - .8 Inspection certificates.
 - .9 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of drawings provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information, as required.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
- .5 References to related shop drawings and modifications, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by Task Authorization, Change Order or Field Order.
- .6 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Task Authorization, Addenda and change orders.

- .7 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.6 RECORD DRAWINGS

- .1 Departmental Representative will provide to Contractor two (2) sets of white prints and CAD electronic drawing file (.dwg or compatible) for record drawing purposes.
- .2 Maintain Project record drawings and record accurately deviations from Contract documents on one set of prints. Electronic format should be .dwg or compatible.
- .3 Record changes in red on prints, or on separate layer electronically.
- .4 At completion of project and prior to final inspection, neatly transfer record notations to second set of drawings or final CAD electronic drawing (.dwg or compatible) and submit both sets to Departmental Representative. Forward information on completed areas at the end of each construction season.

1.7 OTHER RECORDS

- .1 Thirty (30) days after the completion of each construction season submit the following to the Departmental Representative:
 - .1 Copies of all documents and permits obtained by the Contractor.
 - .2 Results of all testing carried out by the Contractor.
 - .3 Any other pertinent information.
 - .4 Copies of all shipping documents identifying the shipper, the receiver and all carriers involved in the transport of materials.
 - .5 Information as required by the Land Use Permit.
 - .6 Information as required by the Water License.
 - .7 Information as required by the Quarry Permit.
 - .8 Information as required by all other applicable regulatory bodies and Authorities Having Jurisdiction (AHJs).
 - .9 Copies of all Transportation of Dangerous Goods documentation.
 - .10 Documentation as required for PCB material management.
 - .11 Copies of all waste manifests.
 - .12 Copies of all weigh scale tickets.
- .2 Consolidate the above information in one (1) document and submit two (2) hard copies and one (1) digital copy in Portable Document Format (PDF) to the Departmental Representative.

1.8 MEASUREMENT OF PAYMENT

- .1 Include all direct costs for the Project Record Documents in the lump sum price for Project Record Documents, Item 01 78 00-1, as indicated in the Basis of Payment Schedule.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Hazardous Waste Material: Items or debris no longer used for their original purpose; now hazardous and intended for recycling, treatment, or disposal. Also material that is designated as “hazardous” under Nunavut Territorial or Federal Legislation; or as a “dangerous good” under the Transportation of Dangerous Goods Act (TDGA). This may include dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to poisons, flammable substances, corrosive agents, ammunition, radioactive substances, or materials that endanger human health or the environment if handled improperly, including but not limited to batteries, asbestos, lead, PCBs, and mercury.
- .2 Contractor’s Designated Hazardous Waste Disposal Facility: A Licensed Hazardous Waste Disposal Facility designated by the Contractor for the disposal of hazardous materials specified under the provisions of this contract. The facility must be pre-approved by the Department Representative prior to commencing the work. The Contractor must be able to provide documentation from the Designated Hazardous Waste Disposal Facility indicating full responsibility for all hazardous waste accepted from the CAM-E site.
- .3 Leachable-Lead Painted Material: Material that is coated with lead based paint that has been analyzed and determined to contain leachable lead concentrations in excess of 5 mg/L.
- .4 Lead—Containing Paint: Material that is coated with lead based paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
- .5 Untreated Wooden Debris: Wooden debris that is not painted or treated in any way and is suitable for on-site incineration.
- .6 Non-Hazardous Waste: Waste material which does not meet the definition of Hazardous Waste Materials.
- .7 PCB-Amended Paint (PAP) Material: Material that is coated with PCB-amended paint. Paint has been analyzed and PCB levels found to exceed 50 ppm when calculated using paint and substrate characteristics.
- .8 Rigid Intermediate Bulk Container: Rigid Intermediate Bulk Containers, approved by Transport Canada, used for transportation of Hazardous Waste Materials.
- .9 Temporary Storage Area: A designated area used for the consolidation and storage of containerized Hazardous Waste Materials as specified in Section 02 61 33 – Hazardous Waste Material.

1.2 REFERENCE STANDARDS

- .1 Canada Labour Code Part II-Occupational Health and Safety (R.S. 1985, c.L-2, amended 2014).
- .2 National Fire Code of Canada, 2010.
- .3 Canada Occupational Health and Safety Regulations (SOR/86-304), including:
 - .1 Part X – Hazardous Substances.

- .4 Canadian Environmental Protection Act, 1999, including:
 - .1 Ozone Depleting Substances Regulations, 1998 (SOR/99-7).
 - .2 PCB Regulations (SOR/2008-273).
 - .3 PCB Waste Export Regulations, 1996 (SOR/97-109).
 - .4 Federal Mobile PCB Treatment and Destruction Regulations, 1989 (SOR/90-5).
 - .5 Export and Import of Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149)
 - .6 Inter-Provincial Movement of Hazardous Waste Regulations (SOR/2002-301).
- .5 Hazardous Products Act (R.S.C., 1985, c. H-3), including:
 - .1 Controlled Products Regulations (SOR/88-66), and amendment SOR/2001-254.
 - .2 Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c.34) a.1999, c.31.
including:
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286)
a.SOR/2011-60
- .6 Hazardous Waste Worker Training Manual: Canadian LIUNA - Contractors Training Council, 1992.
- .7 Aboriginal Affairs and Northern Development Canada References:
 - .1 Abandoned Military Site Remediation Protocol (INAC, 2009).
- .8 National Institute for Occupational Safety and Health (NIOSH):
 - .1 Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115.
- .9 Health Canada:
 - .1 Hazardous Products Act – Workplace Hazardous Materials Information System (WHMIS) Requirements.
- .10 Environment Canada Technical Document for Batch Waste Incineration, EC, 2010.
- .11 Canadian Standards Association:
 - .1 CSA Standard Z94.4-93 – Selection, Use and Care of Respirators.
- .12 Nunavut Environmental Protection Act (R.S.N.W.T. 1988, c. E-7) a. 1998, c.21, c.24, and related Department of Environment, Government of Nunavut Environmental Guidelines for:
 - .1 Ambient Air Quality (2011).
 - .2 Burning and Incineration of Solid Waste (2012).
 - .3 Contaminated Site Remediation (2010).
 - .4 General Management of Hazardous Waste (2010).
 - .5 Ozone Depleting Substances (2011).
 - .6 Used Oil and Waste Fuel (2012).
 - .7 Waste Asbestos (2011).
 - .8 Waste Batteries (2011).
 - .9 Waste Lead and Lead Paint (2014).
 - .10 Waste Paint (2010).
 - .11 Waste Solvent (2011).

- .13 Safety Act (Nunavut) (R.S.N.W.T. 1988,c.S-1), including:
 - .1 General Safety Regulations (R.R.N.W.T. 1990, c.S-1).
 - .2 Work Site Hazardous Materials Information System Regulations.
- .14 Labour Standards Act (Nunavut) (R.S.N.W.T. 1988, c.L-1) amended S.N.W.T 2003, c.15, in force January 2004.

1.3 WORK DESCRIPTION

- .1 Demolish, remove, and dispose of structures and utilities (and related ancillary facilities) as indicated on the Drawings and/or as indicated in the Demolition Tables in Appendix A including the following:
 - .1 Demolition, removal, and disposal of the building components and utilities as indicated on the Drawings and in Appendix A.
 - .2 Demolition, shredding/incineration and transportation to the on-site Non-Hazardous Waste Landfill all Non-Hazardous Waste building components and building contents identified for demolition.
 - .3 Abatement of structural materials containing PCB and/or lead amended paint listed in Appendix A in accordance with Sections 02 83 10 – Lead and PCB Amended Paint Abatement Precautions, containerization and transportation to on-site Temporary Storage Area of lead and PCB amended paint removed, and disposal of remaining substrate materials in the on-site Tier II Landfill.
 - .4 Removal, segregation and on-site disposal of asbestos material within the garage structure in accordance with Sections 02 82 00.01 and 08 82 00.02 – Asbestos Abatement Precautions.
 - .5 Reshaping or re-grading of all areas affected by demolition work in accordance with Section 31 22 15 - Grading.
 - .6 Application of appropriate labelling and placards to the containers in the Temporary Storage Area.
 - .7 Preparation and maintenance of an inventory of hazardous waste containers and their contents.
 - .8 Provision of a photographic record of the internal contents of all completed hazardous containers for off-site transport prior to closure.
- .2 Re-grading of above-grade concrete foundations to match existing grade with the placement of additional granular fill in accordance with Section 31 22 15 - Grading. The foundations requiring re-grading at the site include the garage foundation, warehouse foundation, and antennae foundations.
- .3 Existing Petroleum, Oil and Lubricants (POL) foundations and pumping equipment to be removed during contaminated soil excavation. Pumping equipment to be handled in accordance with 02 61 33 – Hazardous Waste Materials. Concrete POL foundations to be broken down and disposed of in the appropriate on-site landfill based on presence or absence of impacts upon removal.
- .4 Remove and dispose in NHW Landfill of sewage outfall pipe, utility lines, fuel storage tanks and associated piping, following the removal of product and cleaning of lines, as applicable, as described in Section 02 61 33 – Hazardous Waste Materials. Crush/compact materials in a manner to reduce space required in the NHW Landfill prior to disposal.
- .5 The offsite disposal of all hazardous waste from Structure Demolition will not be included for payment under this section, but is to be provided as indicated in Section 02 61 33 – Hazardous Waste Material.

1.4 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 23 – Debris Removal.
- .7 Section 02 55 13 – Contaminated Soil.
- .8 Section 02 61 33 – Hazardous Waste Material.
- .9 Section 02 82 00.01 – Asbestos Abatement Minimum Precautions.
- .10 Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions.
- .11 Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .12 Section 31 22 15 – Grading.

1.5 EXISTING CONDITIONS

- .1 The information presented on the Drawings and in the Specifications that describe the infrastructure to be demolished is based upon site conditions described in the *Phase III Environmental Site Assessment, CAM-E (Keith Bay), Nunavut*, prepared by Stantec Consulting Limited and dated December 2013.
- .2 Take over infrastructure to be demolished based on their condition on the date that the Contractor mobilizes to the site.
- .3 The information presented in the Appendices and Drawings, including photographs and inventory tables, provide brief descriptions for the structures and facilities to be demolished. These tables and drawings indicate only the major construction details and building systems, and are not to be construed as exact for final demolition requirements. Be responsible for all work described in this Section, which includes the complete demolition and appropriate disposal of all infrastructures designated for demolition.
- .4 The information presented in the Appendices indicates types and estimated quantities of Hazardous Waste Materials that have been previously identified, and must be removed and disposed of in accordance with these Specifications. Should other potentially Hazardous Waste Material, other than that already identified, be encountered in the course of demolition work, stop work immediately, and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.
- .5 Contractor is advised that site buildings to be demolished have been in a cold-soaked condition, and as a result, paint flaking/chipping may be extensive. Paint flakes/chips and well adhered paint are to be removed as described in Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .6 A listing of the major building components of the structure (garage) is presented in Appendix A. Painted surfaces of the structure have been sampled and analyzed for PCBs and Lead. Remove and dispose of paint and painted materials in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

1.6 QUALIFICATIONS

- .1 Be thoroughly familiar with, and knowledgeable about, existing site conditions, scope of work and requirements of the Specification.
- .2 Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management, and who can satisfy Federal and Territorial requirements, will be permitted to carry out the work of this Section.
- .3 Follow at all times guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA - Contractors Training Council, 1992.
- .4 All activities involving the handling of hazardous materials are to be directly supervised by Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .5 Contractor's personnel trained as described above are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .6 Provide workers with protection appropriate to the potential type and level of exposure. Establish specific safety protocols prior to commencing clean-up activities.
- .7 Provide suitable personal protective clothing and equipment as required during the course of the work. Supply sufficient quantities and various sizes of protective equipment to fit all site personnel including Departmental Representative, Department Representative's staff, and site visitors.
- .8 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) documentation and recording requirements.

1.7 REPORTING REQUIREMENTS

- .1 Submit waste transport manifests, chain of custody documentation and transport documentation for materials to be removed from the Site to the Department Representative and other regulatory agencies, as required.

1.8 PROTECTION

- .1 Prevent movement, settlement, or damage to adjacent services, roadways, and parking areas to remain. Provide bracing and shoring as required. Make good damage and be liable for injury caused by demolition.
- .2 Take precautions to support structures and, if safety of building being demolished or adjacent services appear to be endangered, cease operations and notify Departmental Representative.
- .3 All personnel engaged in demolition activities are to wear and use protective clothing and equipment. Refer to Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions for materials and protection requirements.
- .4 Protect the environment from fugitive waste materials resulting from demolition activities.

- .5 Prevent damage and minimize stripping of natural terrain, features, and vegetation. Make good all damage.
- .6 Provide safe passage of persons around area of demolition.
- .7 Do not proceed with demolition work when weather conditions constitute a hazard to the workers and the site. Prevailing weather conditions and weather forecasts are to be considered.
- .8 Cover and wet down dry materials, ash and rubbish to prevent blowing of dust and debris. Provide dust control for existing and temporary roads.

1.9 FIRES

- .1 Provide supervision, attendance, and fire protection measures in accordance with Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .2 Comply with all regulatory requirements and obtain Burn Permit, if required.
- .3 Burning of any painted materials is strictly prohibited.
- .4 Where fires or burning are permitted, prevent staining or smoke damage to structures, materials, or vegetation which are to be preserved. Restore, clean and return to new condition stained or damaged work.

1.10 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs in lump sum prices for Item 02 41 16-1 Structure Demolition as indicated in the Basis of Payment Schedule. Work indicated under the lump sum item includes, but is not limited to:
 - .1 Demolition, removal, handling, segregation, hauling, and disposal of non-hazardous materials to the on-site Non-Hazardous Waste Landfill, including, but not limited to: buildings, metal, glass, insulation, boiler ducting, electrical equipment, compressed gas cylinders and other inert items as described in Appendix A and on the drawings.
 - .2 Removal, handling, segregation, hauling, and incineration of unpainted wood materials on-site to include, but not limited to:
 - .1 Collection, sorting and on-site transport of all untreated wood to the burning location.
 - .2 Provide an ash collection system which is capable of containing ash until it is sampled. A water-tight metal tray with sides of at least 300 mm high is acceptable. A tray salvaged from materials on-site is acceptable. Provide means to protect the ash from wind and water until it is sampled.
 - .3 Obtain necessary burn permits required from Authorities Having Jurisdiction.
 - .3 Separation, abatement, handling, and segregation of structural materials containing lead and/or PCB amended paint, containerization and transportation to on-site Temporary Storage Area of lead and PCB amended paint removed, and disposal of remaining substrate materials in the on-site Tier II Landfill.
 - .4 Removal, segregation, packaging (double bagging), and disposal of asbestos containing materials in the on-site Non-Hazardous Waste Landfill.
 - .5 Separation, removal, handling, and segregation of all other hazardous materials, including but not limited to miscellaneous hazardous waste (oil/lubricants/fuels/sludge).

- .6 Transport of all hazardous materials designated for off-site disposal to the Temporary Storage Area until materials are removed from the site.
- .7 Removal of concrete POL foundations and disposal in appropriate on-site landfill.
- .8 The demolition, removal and containerization, as required, including supply of containers, of sewage and sewage sludge from sewage lines to be demolished, including line supports, marker posts and barrels, if required.
- .9 The demolition, removal and disposal of pipelines in accordance with Section 02 61 33 – Hazardous Waste Material.
- .10 The removal, cleaning, demolition and landfilling of the approximately 600 L fuel oil storage tank at Garage.
- .2 Construction of Temporary Storage Areas will not be included for payment under this section, but is to be provided as indicated in Section 02 61 33 – Hazardous Waste Material.
- .3 The supply of Hazardous Waste Containers for containerization of hazardous waste derived from Structure Demolition will not be included for payment under this section, but is to be provided as indicated in Section 02 61 33 - Hazardous Waste Material.
- .4 The off-site transport and disposal of containerized Hazardous Waste Material deemed to require off-site disposal to the Contractor's Designated Hazardous Waste Disposal Facilities will not be included for payment under this section, but is to be provided as indicated in Section 02 61 33 - Hazardous Waste Material.
- .5 The following work items will be incidental to the work described in this Section, and will not be measured separately:
 - .1 Collection and sorting, as required of all debris.
 - .2 Cutting, crushing, and placement of debris material in the on-site landfills for disposal as specified in Section 31 22 15 - Grading.
 - .3 Supply and placement of on-site borrow material, as required by Departmental Representative, to backfill areas excavated to facilitate demolition requirements.
 - .4 General site grading of areas disturbed by demolition operations as specified in Section 31 22 15 – Grading.
 - .5 Labour, materials, and equipment required to remove existing buried or partially buried materials, including non-concrete building foundations/posts.
- .6 Regrading of concrete foundation pads will not be included for payment under this section, but will be paid for as indicated in Section 31 22 15 – Grading.
- .7 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Polyethylene sheeting:
 - .1 6 mil (0.15 mm) minimum thickness for lead and PCB amended paint particles.

- .2 Hazardous Waste Material Containers: Containers for storage and transport of hazardous demolition waste to be as described in Section 02 61 33 – Hazardous Waste Material.
- .3 Appropriate personal protective equipment for asbestos and lead/PCB paint abatement, in accordance with Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .4 Appropriate materials and decontamination areas as described in Section 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

Part 3 EXECUTION

3.1 WORK

- .1 Before commencing demolition, remove all Hazardous Waste Materials and asbestos-containing products as detailed in Sections 02 61 33 – Hazardous Waste Material and Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions. Hazardous Waste Material and asbestos removal work must be completed, inspected, and accepted in writing by the Departmental Representative prior to the start of the general demolition.
- .2 Before commencing demolition of fuel storage tanks and pipelines, remove and dispose of any remaining contents and sludge, and clean tanks and pipelines, in accordance with Section 02 61 33 - Hazardous Waste Material.
- .3 Clean sewage lines in accordance with Section 02 61 33 - Hazardous Waste Material.
- .4 Remove and dispose of hazardous demolition debris as specified in this Section and Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .5 Remove and dispose of remaining demolition debris as specified in this Section.

3.2 ENVIRONMENTAL PROTECTION

- .1 Complete work in an environmentally acceptable manner. Comply with requirements of Section 01 35 43 – Environmental Procedures, and all other applicable standards and licenses.

3.3 SAFETY AND PERSONNEL PROTECTION

- .1 Unless otherwise specified, carry out demolition work in accordance with Section 01 11 00 – Summary of Work and Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .2 Some areas designated for demolition under this contract involve materials which contain lead and PCB amended paints, as well as other contaminants which are considered hazardous to human health.
- .3 During the removal of lead and PCB amended paint materials, follow the Personnel Protection Requirements specified for the abatement/removal of these paints in Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

- .4 During the removal of asbestos-containing materials, follow the Personnel Protection Requirements and decontamination requirements specified for the abatement/removal of asbestos in Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions.
- .5 When working with lead and PCB amended paints, asbestos, and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees, subcontractors, Departmental Representatives, Departmental Representative's staff, and other authorized personnel. Refer to Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions for details.

3.4 PREPARATION

- .1 Inspect and verify with Departmental Representative items designated for demolition.
- .2 Follow requirements listed in Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions to prepare Work Area for abatement activities.

3.5 ON-SITE BURNING OF UNTREATED WOODEN DEBRIS

- .1 Burn all Untreated Wooden Debris.
- .2 Provide an ash collection system capable of containing ash until it is sampled. A water-tight metal tray with sides of at least 300 millimetres high is acceptable. A tray from materials on-site is acceptable. Provide means to protect the ash from wind and water until it is sampled.
- .3 A leachate extraction test is to be carried out by Departmental Representative on the solid residual material resulting from the burning process. The leachate toxicity of the material will be determined in accordance with CEPA regulations (IMHWR and EIHWHRM). Residual materials found to be non-hazardous must be packaged and transported to the NHW Landfill. Dispose of materials found not to be leachate toxic, but exceeding Tier II contaminated soil criteria as described in the INAC AMSRM in the Tier II Landfill. Package leachate toxic material in accordance with CEPA regulations (IMHWR and EIHWHRM), as required, and dispose of as described in this Section and Section 02 61 33 – Hazardous Waste.
- .4 Comply with all requirements of the Land Use Permit burning exemption.

3.6 REMOVAL OF LEAD AND PCB AMENDED PAINTS

- .1 Prior to dismantling structure, remove all paint from substrate and place in appropriate bags. The use of heat to remove paint is not permitted. Place bags of removed paint materials in the Hazardous Waste Containers specified in Section 02 61 33 - Hazardous Waste Material. Remove paint in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .2 During the structure dismantling operations, contain paint particles and dust by the use of polyethylene sheets or other measures to seal facilities. Use drop sheets, as required, to collect paint particles that become removed from surfaces during dismantling operations. Establish a control area around these activities to provide

protection to personnel from airborne paint particles. Construct a control area to prevent the escape of paint chips. Follow required precautions and protective measures as described in Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

- .3 The use of heat (e.g. cutting torches) to cut or dismantle facilities containing paint materials is not permitted unless the paint has been removed from the areas to be cut such that excessive heating of the remaining paint does not occur. Notify Departmental Representative prior to torching activities.
- .4 Following abatement, dispose of un-painted substrate materials in the on-site Tier II Landfill, as per Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

3.7 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

- .1 Prior to dismantling the structure, conduct an asbestos abatement of asbestos-containing materials listed in Appendix A. Follow requirements presented in Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions.

3.8 DEMOLITION

- .1 Blasting operations are not permitted during demolition.
- .2 Remove and collect all paint from structures prior to demolition. Containerize all paint in accordance with Sections 02 61 33 – Hazardous Waste Material and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions. Dispose of remaining substrate materials in the on-site Tier II Landfill.
- .3 Where cutting is required, collect all cuttings and sawdust associated with demolition of structures in accordance with Section 02 61 33 – Hazardous Waste Material. Conduct cutting operations such that toxins from paint or other building materials are not released to the atmosphere.
- .4 Remove existing equipment, services, and finishes from building. Remove any visible electrical cables and wiring.
- .5 Remove non-hazardous materials (as described in Appendix A).
 - .1 Conduct the separation of non-hazardous materials from buildings and removal from debris area. If removal of non-hazardous materials may cause the disturbance of hazardous materials, appropriate PPE must be implemented.
 - .2 Disconnect piping before fuel oil tank removal.
 - .3 Clean drums, tanks and piping and remove residual fluids/fuels according to Section 02 61 33 – Hazardous Waste Material.
 - .4 Cut up tanks, sewage outfall line; crush the metal materials and drums.
 - .5 Dispose of materials following compaction in the on-site NHW landfill.
- .6 Purge harmful and flammable vapours from fuel storage tanks in accordance with referenced standards prior to cutting tanks. Upon request, submit the Lower Explosive Limit (LEL) results of Volatile Organic Compound (VOC) testing to Departmental Representative.
- .7 Cut structural steel in accordance with referenced standards.
- .8 Collect and dispose of fibreglass insulation material and place in polyethylene bags for disposal as non-hazardous waste.

- .9 Compact Non-Hazardous Waste as to minimize space required in the on-site Non-Hazardous Waste Landfill.
- .10 Vent non-ventilated gas cylinders associated with the structures in a remote and safe area acceptable to Departmental Representative. Dispose of vented gas cylinders in the on-site Non-Hazardous Waste Landfill.
- .11 Structures are to be demolished to concrete foundations. Where concrete foundations are above grade, the area will be re-graded with the placement of additional granular fill to match surrounding topography in accordance with Section 31 22 15 – Grading. Structure foundations (not including concrete, as mentioned in this section) are to be included in the demolition of all structures.
- .12 At the end of each day's work, leave Work in safe condition to that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.
- .13 Demolish to minimize dusting. Keep dusty materials wetted with water only.
- .14 Remove lower structural framing and other heavy or large objects in a safe manner.
- .6 Re-grade all on-grade foundation pads as specified in Section 31 22 15 – Grading, with the exception of the POL foundations.
- .7 Existing POL foundations to be removed during contaminated soil excavation. Concrete POL foundations to be broken down and disposed of in the appropriate on-site landfill (location will be dependent on presence or absence of impacts to concrete observed upon removal).

3.9

CLEANING

- .1 Designate appropriate security resources/measures to prevent vandalism, damage, and theft.
- .2 Containerize materials designated for off-site disposal in a location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
- .1 Label containers, indicating material type and quantity in accordance with Section 02 61 33 – Hazardous Waste Materials.
- .3 Stockpile non-hazardous materials for on-site in a neat and orderly fashion in the location and as directed by Departmental Representative for compaction and disposal in the on-site landfills. Stockpile materials in accordance with applicable fire and safety regulations.
- .4 Supply separate, clearly marked areas for categories of waste material, crush as appropriate.
- .5 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.
- .6 Remove stockpiles of like materials by on-site disposal option once the landfill construction and collection of materials is complete in accordance with 1.4 – Related Sections.

3.10

SALVAGE OF DEMOLITION MATERIALS

- .1 The facilities and structures to be demolished may have salvage value. Contractor will continue to be responsible for the disposal of materials for reuse/recycling.

- .2 Fuel storage tanks designated for disposal cannot be reused or salvaged, except if accepted by the Departmental Representative for on-site temporary storage of wastewater or effluent.
- .3 Sign a Waiver Form provided by the Departmental Representative for any salvaged materials.

3.11 DISPOSAL OF DEMOLITION MATERIALS

- .1 Dispose of Non-Hazardous, Lead and PCB Amended Paint Materials, Asbestos, and Hazardous Waste Materials in accordance with this Section, Sections 02 41 23 (Debris Removal), 02 61 33 (Hazardous Waste Materials), 02 82 001.01, 02 82 001.02 (Asbestos Abatement), 02 83 10 (Lead and PCB Amended Paint Abatement Precautions).

3.12 TEMPORARY STORAGE AREA

- .1 Establish a Temporary Storage Area for the storage of containerized hazardous materials designated for off-site disposal generated during demolition operations on site as described in Section 02 61 33 – Hazardous Waste Materials.

3.13 SITE GRADING AND RESTORATION

- .1 Upon completion of demolition work, remove debris and leave work sites clean to a condition satisfactory to Departmental Representative.
- .2 Grade building sites and restore all areas affected by demolition work in accordance with Section 31 22 15 - Grading.
- .3 Reshape or backfill with in accordance with Section 31 22 15 – Grading, areas excavated to facilitate demolition requirements.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the collection, dismantling, sorting, handling, transport, compaction and on-site disposal or incineration of surficial and partially buried debris.
- .2 This Section includes removal of surface debris located in areas identified as Buried Debris Areas (BDAs).
- .3 Additional requirements for Class A/B buried debris areas (BDAs) (BDA3 and BDA8), including excavation of buried debris, are included under Section 31 23 11 – Buried Debris Excavation.
- .4 Additional requirements for Class C BDAs (BDA1, BDA2, BDA4, BDA5, and BDA7) include placement of a minimum of 0.75 m of granular fill material over BDA and re-grading in accordance with Section 31 22 15 – Grading.
- .5 An inventory of the known debris areas, including estimated crushed volumes, is provided in Appendix B. Scattered debris has been identified throughout the Site in Debris Area 1, Debris Area 2 and Debris Area 3 as indicated on Drawing C01. General locations of consolidated debris are identified on Drawings C02 – C06. Identified BDAs are indicated on the Drawings as BDA1 through BDA8. The Site Photographs show some of the site debris areas as observed during the Phase III ESA field investigation program. These photographs provide information on the general location, nature and extent of site debris, and are not intended to depict the total scope of work.

1.2 DEFINITIONS

- .1 Known Debris: Scattered or accumulated visible debris on the existing ground surface, including open storage areas, or visible partially buried debris within 0.5 m of the existing ground surface, or debris located within the upper two (2) metres of water and consisting of hazardous and/or non-hazardous material, and that:
 - .1 Has been identified on the Drawings and/or in the Appendices as debris to be removed; or
 - .2 Is located within approximately 50 m of the undisturbed edge of any former or existing access road or water course on the site.
 - .3 Is located within a water body, within 10 m of shore.
- .2 Unknown Debris: Scattered debris on the existing ground surface, partially buried debris and/or debris that may be exposed during the site remediation consisting of hazardous and/or non-hazardous material other than the Known Debris described above.
- .3 Untreated Wooden Debris: Wood that is designated by Departmental Representative as suitable for on-site burning.
- .4 Hazardous Waste Materials: Items or debris no longer used for their original purpose; now hazardous and intended for recycling, treatment, or disposal. Also material that is designated as “hazardous” under Nunavut Territorial or Federal Legislation; or as a “dangerous good” under the TDGA. This may include dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to poisons, flammable substances,

corrosive agents, ammunition, radioactive substances, or materials that endanger human health or the environment if handled improperly, including but not limited to batteries, asbestos, lead, and PCBs.

- .5 Hazardous Materials Specialist: Contractor representative responsible for supervising all hazardous waste activities as well as coordinating required submittal and reporting requirements.
- .6 Non-Hazardous Waste Materials: Waste materials that are not designated as hazardous under Territorial or Federal Legislation and can be disposed of in the on-site Non-Hazardous Waste (NHW) Landfill, including double-bagged asbestos.
- .7 Class A BDA: Buried Debris Area (BDA) located in an unstable, high erosion location requiring relocation to a properly engineered landfill.
- .8 Class B BDA: BDA located in a suitable, stable location, but with evidence of contaminant migration requiring relocation to a properly engineered landfill.
- .9 Class C BDA: BDA located in a suitable, stable location, with no evidence of contaminant migration, that may be left in place with the addition of granular fill placement to ensure erosion protection and proper drainage, as required.

1.3 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 55 13 – Contaminated Soil.
- .8 Section 02 61 33 – Hazardous Waste Material.
- .9 Section 02 82 00.01 – Asbestos Abatement Minimum Precautions.
- .10 Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions.
- .11 Section 02 83 10 – Lead and PBC Amended Paint Abatement Precautions.
- .12 Section 31 22 15 – Grading.

1.4 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the collection, sorting, stockpiling, dismantling or size reduction, on-site transport of known debris in the lump sum price for Debris Removal, Item 02 41 23-1 in Basis of Payment Schedule.
- .2 The scope of work for the payment Item 02 41 23-1 in the Basis of Payment Schedule is to include, but is not limited to:
 - .1 Collection, sorting, dismantling, stockpiling, and on-site transport of all known hazardous and non-hazardous debris as indicated in Appendix B and on Drawings C02 – C06.
 - .2 Incineration of untreated/unpainted wooden surface debris including, but not limited to:

- .1 Collection, sorting, and on-site transport of all untreated wood to the burning location.
- .2 Provision of an ash-collection system. The system is to be capable of containing ash until it is sampled. A water-tight metal tray with sides of at least 300 mm high is acceptable. A tray salvaged from materials on-site is acceptable. Provide means to protect the ash from wind and water until it is sampled.
- .3 Obtain necessary burn permits required from Authority Having Jurisdiction
- .3 Disposal of Non-Hazardous debris (with the exception of untreated/unpainted wood) in the on-site NHW Landfill.
- .4 Transport of drums to the Hazardous Materials Processing Area for processing/cleaning as described in Section 02 61 33 – Hazardous Waste Material. Crushing of cleaned drums and transport and placement of cleaned/crushed drums in the on-site NHW Landfill.
- .5 All costs for the removal, processing, and disposal of liquids from within known waste vessels, including drums, to be disposed of will not be included for payment under this Section, but will be negotiated with the Departmental Representative using the Labour and Materials rates provided in the Potential Additional Work section of the Basis of Payment Schedule.
- .6 Providing and operating a drum crusher on-site, including provision of all required absorbent materials to contain spill and/or contaminated run-off. Handling and disposal of contaminated soils produced from the drum crushing operations will not be paid to the Contractor for this task.
- .7 Abatement of lead and PCB amended paint from debris materials. Transport of remaining substrate materials to the on-site Tier II Landfill following abatement of all paint.
- .8 Packaging (double bagging), and disposal of asbestos containing materials in the on-site NHW Landfill.
- .9 The collection and disposal of the vehicles and other machinery will not be measured separately. Payment will be included under Item 02 41 23-1, as indicated in the Basis of Payment Schedule.
- .10 Collection and disposal of any liquids from within vehicles and machinery will be included as part of Section 02 61 33 - Hazardous Waste Material.
- .3 All costs for the collection and disposal of unknown non-hazardous and hazardous surface debris will not be considered for payment under Section 02 43 23-1, but will be negotiated with Departmental Representative using the Labour and Materials rates provided in the Potential Additional Work section of the Basis of Payment Schedule.
- .4 The packaging/containerization of all hazardous waste collected or derived from Debris Removal will not be measured separately. Payment will be included under Item 02 41 23-1, as indicated in the Basis of Payment Schedule. Specification of containerization requirements are included as part of Section 02 61 33 – Hazardous Waste Material.
- .5 The supply of Hazardous Waste Containers for containerization of hazardous waste for off-site disposal derived from Debris Removal will not be included for payment under this Section, but is to be provided as indicated in Section 02 61 33

- Hazardous Waste Material.
- .6 The off-site disposal of all hazardous waste from Debris Removal will not be included for payment under this Section, but is to be provided as indicated in Section 02 61 33 – Hazardous Waste Material.
- .7 Placement and regrading of granular fill material at Class C BDAs will not be included for payment under this section, but will be paid for as indicated in Section 31 22 15 – Grading.
- .8 Excavating of Class A/B BDAs will not be included for payment under this section, but will be paid for as indicated in Section 31 23 11 – Buried Debris Excavation.
- .9 The following work items will be incidental to the work described in this Section, and will not be measured separately:
 - .1 Collection and sorting, as required of all debris.
 - .2 Cutting, crushing, and placement of non-hazardous debris material in the on-site NHW Landfill for disposal as specified in Section 31 22 15 - Grading.
 - .3 Reshaping or regrading associated with removal of debris as specified in Section 31 22 15 – Grading.
 - .4 Labour, materials, and equipment required to remove existing buried or partially buried materials, or visible foreign materials in on-site water bodies, including the surficial debris located in buried debris areas (BDAs) as shown on the drawing.
- .10 Except as indicated above, Work under this Section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Hazardous Waste Containers for hazardous waste materials to be in accordance with Section 02 61 33 – Hazardous Waste Material.
- .2 Appropriate personal protective equipment for asbestos and lead/PCB paint abatement, in accordance with Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .3 Appropriate materials and decontamination areas as described in Section 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions.

Part 3 Execution

3.1 PROTECTION PROCEDURES

- .1 When excavating or removing debris within, or in the vicinity of, a drainage course or a body of water, erect silt fences and/or floating silt curtains to prevent the release of sediment or deleterious materials into the water.

- .2 Environmental protection measures are to be in accordance with the requirements specified in Section 01 35 43 - Environmental Procedures.
- .3 Remove oil, fuel, antifreeze and brake fluid from vehicles and equipment to be disposed of.
- .4 Protect historic and archaeological features as specified in Section 01 35 43 – Environmental Procedures.
- .5 Conduct removal of debris known to contain hazardous materials (asbestos and lead and PCB amended paints) in accordance with Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .6 Conduct barrel processing and disposal activities in accordance with Section 02 61 33 – Hazardous Waste Material.

3.2 REMOVAL AND SORTING

- .1 Examine the site to assess the material type and nature of the debris.
- .2 Non-Hazardous Debris
 - .1 Proceed with the collection of debris if, based on the visual assessment, the debris is determined to be non-hazardous.
 - .2 Contractor's Hazardous Materials Specialist to continuously monitor the operation to identify potentially hazardous materials.
 - .3 Immediately suspend the operation if suspected Hazardous Waste Material or debris is encountered and allow visual confirmation of the nature of the material or debris to be established.
 - .4 Collect and sort by hand debris requiring removal located in close proximity to historic or archaeological features. Confirm debris removal requirements with Departmental Representative prior to commencing debris removal work in close proximity to archaeological features.
 - .5 Store suspicious material in a secured area in secured containers and, if the nature of the material or debris can't be confirmed, notify Departmental Representative about the findings. Testing for classification of hazardous products will be carried out and paid for by Departmental Representative.
 - .6 Completely remove partially buried debris unless otherwise indicated on the Drawings or directed by Departmental Representative.
 - .7 Advise Departmental Representative of any stained soils encountered during debris removal operations. If authorized by Departmental Representative, excavate stained and contaminated soil areas, identified during debris removal operations, in accordance with the requirements of Section 02 55 13 - Contaminated Soil. Testing for classification and confirmatory testing will be carried out and paid for by Departmental Representative.
 - .8 Clean empty barrels in accordance with the requirements of Section 02 61 33 - Hazardous Waste Material. Crush the clean empty barrels in a manner to reduce the total original barrel volume by a minimum of 75 percent prior to disposal in the on-site NHW Landfill.
 - .9 Vent compressed gas cylinders until empty and dispose of in the on-site NHW Landfill.
 - .10 Perform paint abatement in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions and pump out existing water tanks and

- clean in accordance with Section 02 61 33 – Hazardous Waste Materials prior to disposal.
- .11 Dispose of non-hazardous debris at the on-site NHW landfill as per Section 31 22 15 – Grading.
- .3 Hazardous Debris – Asbestos
- .1 Collect, handle, and dispose of asbestos-containing debris in accordance with Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions. Requirements for the placement of double bagged asbestos into the on-site NHW Landfill is specified in Section 31 22 15 – Grading.
- .4 Hazardous Debris – Lead and PCB Containing Paints
- .1 Collect, handle, and dispose of materials with Lead and PCB amended paint in accordance with Section 02 83 10 – Lead and PBC Amended Paint Abatement Precautions.
- .5 Hazardous Debris – Batteries
- .1 Collect and containerize all batteries. Transport and dispose of batteries off-site in accordance with Section 02 61 33 – Hazardous Waste Material.
- .6 Hazardous Debris – Liquid contents of barrels, drums, tanks, vehicles
- .1 Collect, handle, and dispose of liquid waste in accordance with Section 02 61 33 – Hazardous Waste Material.

3.3 ON-SITE BURNING OF UNTREATED WOODEN DEBRIS

- .1 Burn all Untreated Wooden Debris.
- .2 Provide an ash collection system capable of containing ash until it is sampled. A water-tight metal tray with sides of at least 300 millimetres high is acceptable. A tray from materials on-site is acceptable. Provide means to protect the ash from wind and water until it is sampled.
- .3 A leachate extraction test is to be carried out by Departmental Representative on the solid residual material resulting from the burning process. The leachate toxicity of the material will be determined in accordance with CEPA regulations (IMHWR and EIHWHRM). Residual materials found to be non-hazardous must be packaged and transported to the Contractor's designated off-site Non-Hazardous Waste Disposal Facilities. Dispose of materials found not to be leachate toxic, but exceeding Tier II contaminated soil criteria as described in the INAC AMSRM in the Tier II Landfill. Package leachate toxic material in accordance with CEPA regulations (IMHWR and EIHWHRM), as required, and dispose of as described in this Section and Section 02 61 33 – Hazardous Waste.
- .4 Comply with all requirements of the Land Use Permit burning exemption.

3.4 OFF-SITE DISPOSAL FACILITIES

- .1 Provide off-site transport of containerized hazardous debris to Contractor's Designated Hazardous Waste Disposal Facility as per the requirements of Section 02 61 33 – Hazardous Waste Material.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies the requirements for the supply and installation of survey control monuments, monitoring wells, and ground temperature cables complete with data loggers. These instruments are used to monitor the ground temperatures within the Tier II Landfill and the groundwater surrounding the landfills and Hydrocarbon Soil Treatment Cell. Instrumentation shall be installed under the supervision of the Departmental Representative who will prepare the Installation Reports.
- .2 Complete the installation of the survey control monuments prior to the start of construction activities. Complete the installation of the monitoring wells as indicated on Drawing C10 prior to placement of any waste in the proposed landfill/treatment cell facilities. Complete the installation of the ground temperature cables during closure of the Tier II landfill.

1.2 MEASUREMENT OF PAYMENT

- .1 Include all costs as cost per meter drilled for the drilling of the boreholes, as required for the installation of monitoring wells, select thermistors, ground temperature cables and permanent survey control, in Item 02 51 00-1 Borehole Drilling in the Basis of Payment Schedule. Cost to include but is not limited to:
 - .1 Transport to site all equipment required to complete the Work.
 - .2 Include all drilling supplies and materials, including but not limited to temporary borehole casings.
- .2 Include all costs for the supply and installation of monitoring wells in Item 02 51 00-2 Monitoring Well Installation in the Basis of Payment Schedule. Include all costs as costs per number of monitoring wells supplied and installed as specified herein. Cost to include but is not limited to:
 - .1 Well supplies including protective covers, bentonite, filter sand, grout, painting, permanent well casings, barricades and all other supplies required for functional water wells.
- .3 Include all costs for the supply and installation of ground temperature cables (thermistors) in Item 02 51 00-3 Thermistor Installation in the Basis of Payment Schedule. Include all costs as costs per number of complete installations supplied and installed as specified herein. Cost is to include but is not limited to:
 - .1 Supplies including thermistor strings, cables, splitter boxes, data loggers, switchbox and multimeter, PVC pipe, grout, granular bedding material, painting, barricades and all accessories required for functional ground temperature cables (thermistors). The Departmental Representative will test the thermistors prior to their installation.
- .4 Include all costs for the supply and installation of permanent survey control monuments, including all accessories, in Item 02 51 00-4 Survey Control Installation in the Basis of Payment Schedule. Include all costs as costs per number of complete installations as specified herein.
- .5 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost

breakdown specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

Part 2 Products

2.1 DRILLING EQUIPMENT

- .1 The drilling equipment shall be capable of accessing the required locations.
- .2 The drilling equipment shall be capable of drilling 125 mm diameter holes.
- .3 The drilling equipment shall be capable of penetrating unfrozen and frozen overburden soils including granular and ice rich soils, saturated soils, and bedrock.

2.2 MONITORING WELLS

- .1 50 mm (nominal diameter), Schedule 10 #304 stainless steel pipe with watertight end cap (top and bottom).
- .2 50 mm (nominal diameter), Schedule 10 #304 stainless steel screen, 1.0 metre maximum section length with flush threads both ends. Screen slot size to be 0.5 mm.
- .3 All pipe and screen to remain in protective wrapping until installation.
- .4 Filter sock, complete with stainless steel band clamps, as cover over monitoring well screen.

2.3 GROUND TEMPERATURE CABLE WELL

- .1 50 mm (nominal diameter), Schedule 80 PVC, or ductile iron pipe with pre-threaded connections, flexible couplings and watertight end cap, as required to make the complete installation.

2.4 SURVEY CONTROL MONUMENTS

- .1 25 mm (nominal diameter), steel pipe, threaded/welded as required to provide the lengths given on Drawings.
- .2 The steel pipe shall have a flange welded to the base. The flange size should be no less than the hole diameter less 50 mm.
- .3 Grease to be an acceptable “food grade” product.

2.5 GROUND TEMPERATURE CABLES

- .1 Thermistor Beads: with a 0.2°C accuracy, and a nominal resistance of 5,000 ohms at 25°C.
- .2 Cable: stranded copper conductors, 20 conductor and 24 gauge with a Kevlar jacket.
- .3 Connectors: Cable to be supplied with an Amphenol connector comprising: a shell end (97-3057-1012-1); male insert (9720-29P); male shell (97-3106A-20); and a screw cap (9760-20P) with a chain attachment to the shell end. A set screw shall be drilled and tapped into the connector to prevent the connector from being unscrewed from the cable.
- .4 Thermistor Moulding: Heat injection polyurethane moulding, to seal the thermistor beads. The outside diameter of the moulding is to be compatible with installation in a 50 mm diameter PVC pipe (Clause 2.3). The cable is to remain watertight under a water head of 100 m.

INSTRUMENTATION

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- .5 Identification Tag: to be permanently installed, indicating the site name and the ground temperature cable serial number.
- .6 Cable Fabrication: Cable length and bead spacing details are shown on Drawings. Additional cable fabrication details are as follows:
- .1 Beads to be spaced on the cable within 10 mm of the indicated location.
- .2 Wire the cables using the following wiring code (note that the number of beads varies as indicated on the drawings. For cables with less than 16 beads, numbering shall begin with Bead 1 and Terminal A, common shall be on Terminal Letter M):
- | Thermistor Bead Number | Terminal Letter on Connector |
|------------------------|------------------------------|
| 1(top of cable) | A |
| 2 | B |
| 3 | C |
| 4 | D |
| 5 | E |
| 6 | F |
| 7 | G |
| 8 | H |
| 9 | J |
| 10 | K |
| 11 | L |
| 12 | N |
| 13 | P |
| 14 | R |
| 15 | S |
| 16 (bottom of cable) | T |
| Common | M |
- .3 Mark the identification and serial number of each cable permanently onto the body of the connector.
- .4 Provide all beads with a common lead. Solder the beads to the common lead and to the cable harness.
- .5 Prepare the cable harness by removing a 25 to 35 mm length of cable jacket (jacket cutouts) at each bead location, and extracting the appropriate wire for the bead location and the common wire for the cable.
- .6 Solder the beads to both wire with some slack incorporated into the wiring and placed on the outside of the cable bundle. During soldering, protect the beads to keep their temperature below the manufacturer's recommended limit.
- .7 Cover the beads with a layer of heat reflective tape with the adhesive side of the tape not in contact with the bead. Place a second layer of heat reflective tape with the adhesive side down, on either side of the jacket cutout.
- .8 Cover each bead with injection moulding extending a minimum of 40 mm above and below the bead location.
- .7 Thermistor Calibration:
- .1 Provide copies of calibration data to the Departmental Representative prior to shipping to site.
- .2 Verify that each ground temperature cable is functioning properly, and calibrate the thermistor beads and data logger.
- .3 Immerse into an ice bath, each section of the cable with a thermistor bead. Once thermal equilibrium is reached, record the resistance reading using a digital

multimeter and the temperature reported on the cable's associated data logger. Also report the temperature provided by the data logger assigned to the specific ground temperature cable.

- .4 Repeat the process a minimum of three times, and determine the average 0°C connection for each bead.

2.6 SWITCH BOX AND MULTIMETER

- .1 Switchbox: A metal or plastic box to house a rotary switch; a 17 pin Amphenol female connector to couple the switchbox to the installed ground temperature cable; and a 2 pin, 0.6 m long cable with a strain relief connector for connection to a digital multimeter. The rotary switch is to be a 75 mm diameter rotary selector switch with 16 settings and a standard round grip, or approved equivalent.
- .2 Multimeter: digital with two decimal place display at 30 kilo ohms, an accuracy of +0.5% and a resolution of 0.01 kilo ohms.

2.7 DATA LOGGERS

- .1 Data Storage Unit. Provide one data logger for each ground temperature cable (thermistor) installation.
- .2 Data logger to include:
 - .1 16 channel terminal board and multiplexer.
 - .2 Resistor RMIOKSIP (2 per data logger required).
 - .3 Lithium Battery Model UL-16.
 - .4 19 mm diameter, 2.5 m long grounding rod strap between rod and weatherproof housing.
 - .5 Nema 4 Aluminum Enclosure.
 - .6 UL-MX-64K Memory Expansion.
- .3 Provide one Com Cable Model No. UCC-7 and one USB to serial adaptor.
- .4 The data logger shall have a female Amphenol multi-pin connector compatible with the thermistor cable described in Clause 2.5 of this Section.
- .5 Program data loggers to read cables once every 12 hours. Provide Windows Dataview plus software on site to monitor, retrieve data and reset the data logger. Software to be registered to the Departmental Representative and specific project site. Provide specific project format files for the data loggers.
- .6 Provide to the Departmental Representative, three copies of the Operations and Maintenance Manuals for the data loggers.
- .7 Each data logger should be clearly labelled with an identification number.
- .8 Each data logger shall be installed together with the same thermistor cable that was calibrated to.

2.8 GROUND TEMPERATURE CABLE (THERMISTOR) PROTECTIVE CASING

- .1 Provide a 1.8 m long, 200 mm diameter data housing unit coated with electrostatic paint and with a locking cap.
- .2 Keyed pad-locks to be provided by the Departmental Representative.

2.9 MONITORING WELL PROTECTIVE CASING

- .1 150 mm diameter galvanized, Schedule 40 steel pipe, threaded as required.
- .2 Hinged, locking steel cap for monitoring wells.
- .3 Keyed padlock to be provided by the Departmental Representative.

2.10 FILTER SAND

- .1 Inert and free of organic material.
- .2 #20 - #40 Silica Sand.

2.11 BENTONITE SEAL

- .1 Bentonite product certified as polymer, granular and organic free.

2.12 GROUT

- .1 Sika Grout Arctic 100 or Set 45 Grout.

2.13 PAINT

- .1 Fluorescent orange that is suitable for environment and substrate.

Part 3 Execution

3.1 INSTALLATION OF MONITORING WELLS

- .1 Provide the Departmental Representative a minimum of 10 days notice prior to the drilling program to allow scheduling of inspection services. The Departmental Representative or designated representative will be in attendance for the duration of the drilling program.
- .2 Layout monitoring wells at locations as indicated on Drawing C10 and confirm the final drilling locations with the Departmental Representative prior to drilling.
- .3 Install monitoring wells at the locations and to the depths as indicated on the Drawings or as directed by the Departmental Representative.
- .4 Use a suitable drill rig to drill 125 mm diameter holes for the monitoring wells.
- .5 Make available on site, temporary hole casing material and install as required to prevent sloughing of the hole.
- .6 Grout the pipe in place at the depth indicated on the Drawings using Arctic Grout according to manufacturer's recommendations. Place grout in the hole so as not to contaminate the upper portion of the hole, or the slotted section of the pipe.
- .7 Record the depth of the top of the grout.
- .8 Backfill remainder of the hole with clean filter sand to a depth of 150 mm above the screened portion of the pipe. Gradually remove hole casing material during backfilling operations.
- .9 Place granular bentonite around the pipe to fill the annulus from ground surface to a depth of 150 mm. Mound ground surface material to a height of approximately 150 mm around the perimeter of the well to promote hydration of the bentonite pellets.
- .10 Measure stick up of pipe from ground surface.

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- .11 Place the protective casing and lockable cap over the pipe.
 - .12 Paint metal casing, cap and marker posts with fluorescent orange paint.
 - .13 Survey location & top of casing elevation of monitor wells.

3.2 INSTALLATION OF GROUND TEMPERATURE CABLES (THERMISTORS)

- .1 Install ground temperature cables at the locations and to the depths indicated on Drawing C10 or as directed by the Departmental Representative. Final locations of the ground temperature cables are to be confirmed in the field by the Departmental Representative.
- .2 Take precautions not to damage liner materials when installing ground temperature cables.
- .3 Use a suitable excavator or drill rig to install vertical thermistors below the original ground surface. Compact granular fill material to 95% of Maximum Dry Density in accordance with ASTM D698. Use hand equipment to ensure compaction requirements are met.
- .4 If drilling is to be used to install ground temperature cables, confirm in advance that there is no evidence of buried debris by the excavation of test pits. If excavation is used to install the ground temperature cables in landfill areas, use suitable precautions in excavating of the landfill. If debris is encountered, stop immediately. Proceed as directed by the Departmental Representative.
- .5 Make available on site hole casing material and install as required to prevent sloughing of the hole.
- .6 Grout the pipe in place according to grout manufacturer's recommendations.
- .7 Place the data housing and lockable cap over the pipe.
- .8 Paint caps with fluorescent orange paint.
- .9 Install the data logger in the data housing so that it can be easily removed and replaced.
- .10 Install grounding rod 2.5 m below ground surface and connect grounding rod to data logger and data housing.
- .11 The Departmental Representative will complete the ground temperature cable installation report. Advise the Departmental Representative 96 hours prior to the installation. Provide required information for completion of report, upon Departmental Representative's request.
- .12 The Departmental Representative will confirm the data logger and ground temperature cable operation by downloading data after 100 hours of operation and by taking manual thermistor readings using the switch box and multimeter. Repair any malfunctions at no expense to the Departmental Representative.
- .13 Record depth and survey locations of ground temperature cables.

3.3 INSTALLATION OF PERMANENT SURVEY CONTROL MONUMENTS

- .1 Install permanent survey control monuments at locations as indicated on Drawing C01, or as directed by the Departmental Representative, to a minimum of 5 metre depth. Final locations of the survey control monuments to be confirmed in the field by the Departmental Representative.

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- .2 If bedrock is encountered, the minimum depth may be reduced, at the Departmental Representative's discretion, to maintain 2 metres embedment.
 - .3 Use a suitable drill rig to drill holes for the pipe which serves as permanent survey control.
 - .4 Make available on-site, hole casing material and install as required to prevent sloughing.
 - .5 Apply "food-grade" grease to the 25 mm steel pipe before installation.
 - .6 Grout the control monument in the hole for the lower 2 metres ONLY. Use Sika Grout Arctic 100 or Set-45 according to manufacturer's recommendations. Grout must be suitable for placement into substrates to -10°C. Fill the remaining voids with sand.
 - .7 The control monument shall be flush with ground surface following completion.
 - .8 Ensure positive drainage away from the survey control monument.
 - .9 Following set-up of the grout, tie-in survey control monuments to the site survey coordinate system. Survey horizontal accuracy to be within 0.1 cm and vertical accuracy to be less than 1 cm. Mark with a drill hole or punch the top of the 25 mm steel pipe. Provide coordinates and elevation data at this mark to the Departmental Representative for each monument installed.
 - .10 Construct clearly visible markers around the survey control monuments, to prevent damage and to facilitate identification. Immediately replace or repair, at Contractors cost, any monuments damaged by the Contractor.

3.4 PROTECTION OF MONITORING WELLS AND GROUND TEMPERATURE CABLES

- .1 Construct clearly visible barricades to protect the installed monitoring wells and ground temperature cables. Immediately replace, at Contractor's cost, any existing and installed monitoring wells and ground temperature cables damaged by the Contractor.
- .2 Provide access to any ground temperature cable and monitoring well, and cooperate with the Departmental Representative when the Departmental Representative is obtaining groundwater samples, recording ground temperature and pore pressure readings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 61 00 – Hydrocarbon Soil Treatment.
- .2 Section 31 05 17 – Aggregate Materials.
- .3 Section 31 22 15 – Grading.

1.2 DESCRIPTION

- .1 This Section specifies the requirements for the excavation, handling and disposal or treatment of contaminated soils, including supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area. Locations and volumes of contaminated soil requiring excavation are indicated on Drawings C02 to C06. Contaminated soil excavation and disposal requirements include the following:
 - .1 Tier I and Type A Petroleum Hydrocarbon (PHC) Contaminated Soils:
 - .1 Excavation and on-site transport of the contaminated soil to the Non-Hazardous Waste (NHW) Landfill.
 - .2 Disposal of the contaminated soil by placement in the NHW Landfill.
 - .2 Type B PHC Contaminated Soil:
 - .1 Excavation and on-site transport of Type B PHC Contaminated Soils to the on-site Soil Treatment Cell.
 - .3 Tier II Contaminated Soil:
 - .1 Excavation and on-site transport of the contaminated soil to the Tier II Landfill.
 - .2 Disposal of the contaminated soil by placement in the Tier II Landfill.

1.3 DEFINITIONS

- .1 Contaminated Soil: includes the following contaminated soils which are defined by the INAC 2009 Abandoned Military Site Remediation Protocol (AMSRP):
 - .1 Tier I Contaminated Soil: Soils containing concentrations of any or all contaminants listed as follows:
 - .1 Lead >200 mg/kg and <500 mg/kg
 - .2 PCBs >1mg/kg and <5 mg/kg
 - .2 Tier II Contaminated Soil: Soils containing concentrations of any or all of the contaminants listed as follows:
 - .1 Arsenic >30 mg/kg
 - .2 Cadmium >5 mg/kg
 - .3 Chromium >250 mg/kg
 - .4 Cobalt >50 mg/kg
 - .5 Copper >100 mg/kg
 - .6 Lead >500 mg/kg
 - .7 Mercury >2 mg/kg
 - .8 Nickel >100 mg/kg

- .9 Zinc >500 mg/kg
- .10 PCBs >5 mg/kg and <50 mg/kg
- .3 Type A PHC Contaminated Soil: Soils exceeding the concentrations within PHC fractions F3 and F4 as defined in the AMSRP for PHC in Soil.
- .4 Type B PHC Contaminated Soil: Soils exceeding the concentration within PHC fractions F1, F2 and F3 as defined in the AMSRP for PHC in Soil.
- .5 Hazardous Contaminated Soil: Contaminated Soil classified as hazardous in accordance with the Canadian Environmental Protection Act (CEPA), including CEPA PCB Contaminated Soil and Leachable Soil.
- .6 CEPA PCB Contaminated Soil: Soil containing concentrations of PCBs equal to or in excess of 50 parts per million (mg/kg) is legislated as a hazardous material. Storage, handling, and disposal of PCBs are regulated under the CEPA and the Federal Transportation of Dangerous Goods (TDG) Act. Comply with all applicable regulations.
- .7 Leachable Soil: Soil Containing contaminants that when subject to Toxicity Characteristic Leaching Procedure (TCLP) analysis, leach contaminants at concentrations in excess of those specified in CEPA regulations E1HWHRMR and IMHWR. Handling and disposal are regulated under Federal, Territorial and Provincial Regulations. Comply with all applicable regulations.
- .2 Clean Soil: Soil that has been sampled, analyzed, and determined to have contaminant concentrations below the INAC 2009 AMSRP levels.
- .3 Petroleum Hydrocarbons (PHCs): Hydrocarbon products described by laboratory analysis as lubricating oil and grease, fuel oil, diesel and/or gasoline.
- .4 Free Product: The presence of a layer of separated phase liquid PHC product.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Quality Control in accordance with Section 01 45 00 – Quality Control.
 - .1 Submit survey of existing conditions as described in Article 1.10 of this Section.
 - .2 Submit to Departmental Representative written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.
 - .3 Submit to Departmental Representative written notice when limits of excavation is reached (i.e., bottom and sides).

1.5 QUALIFICATIONS

- .1 Be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the Specification.
- .2 Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and who can satisfy Federal and Territorial requirements will be permitted to carry out the work of this Section.
- .3 Follow at all times, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA - Contractors Training Council, 1992.

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- .4 All activities involving the handling of hazardous materials, including Hazardous Contaminated Soil, are to be directly supervised by Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
 - .5 Contractor's personnel trained as described in this Section are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
 - .6 Provide workers, Department Representative and Department Representative's staff when required with protection appropriate to the potential type and level of exposure. Establish specific safety protocols in the Site Specific Health and Safety Plan.
 - .7 Provide suitable safety clothing and equipment as required during the course of the work.
 - .8 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) and Interprovincial Movement of Hazardous Waste Regulation (IMHWR) documentation and recording requirements.

1.6 SITE CONDITIONS

- .1 Suspend operations whenever climatic conditions are unsatisfactory for excavating or backfilling to conform with this Specification.
- .2 After occurrence of heavy rains, do not operate equipment in designated areas until the material has dried sufficiently to prevent excessive rutting.
- .3 The Contractor is advised that the ground in low-lying areas is often saturated. Dewater saturated ground and ponded areas as required, complying with this Section.
- .4 Prior to the commencing excavation work, remove debris, snow, ice and standing water from areas to be excavated and backfilled.
- .5 During excavation of contaminated soil, maintain a stable excavation and dewater as required or as directed by the Department Representative.

1.7 ENVIRONMENTAL PROTECTION

- .1 Environmental protection measures are to be in accordance with the requirements specified in Section 01 35 43 - Environmental Procedures.
- .2 Protect natural and man-made features required to remain undisturbed including but not limited to benchmarks, existing buildings, surface and underground service and utility lines not designated for demolition, and instrumentation excavations. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing tundra from damage.
- .3 The release of all water resulting from the dewatering of ponded contaminated soil areas and the decontamination of equipment is to conform to the Wastewater Discharge Criteria outlined in Section 01 35 43 - Environmental Procedures and Section 01 35 15 - Special Project Procedures for Contaminated Sites.

1.8 PERSONNEL PROTECTION

- .1 Some areas designated for cleanup under this contract involve soils and hazardous materials which contain PCBs, inorganic elements, PHCs, and other contaminants which are considered hazardous to human health.

- .2 Materials containing polychlorinated biphenyls (PCBs) at concentrations equal to or in excess of 50 ppm are considered to be hazardous substances. Storage, handling and disposal of PCBs are regulated under the Canadian Environmental Protection Act and the Federal Transportation of Dangerous Goods Act. Comply with all applicable regulations.
- .3 When working with inorganic elements, PCB containing materials, PHCs, and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and Subcontractors, Department Representative and other authorized site personnel. Provide details of protective clothing and equipment required for each work area in the Site Specific Health and Safety Plan as required by Section 01 35 32 - Health and Safety Plan.
- .4 Supply sufficient quantities of designated protection equipment to fit all site personnel including Department Representative and authorized visitors. Educate workers as to risks, and train in safe work practices.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert Tier I and Type A PHC Contaminated Soil to an on-site NHW Landfill facility for disposal.
- .2 Divert Type B PHC Contaminated Soil to an on-site Soil Treatment Cell for treatment in accordance with Section 02 61 00 – Hydrocarbon Soil Treatment.
- .3 Divert Tier II Contaminated Soil to an on-site Tier II Landfill facility for disposal.

1.10 EXISTING CONDITIONS

- .1 Examine Phase III ESA and RAP reports available.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of the natural ecosystem which may be affected by the Work.
 - .2 As much as possible, protect the natural ecosystem from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

1.11 MEASUREMENT FOR PAYMENT

- .1 The excavation of Tier I and Type A PHC Contaminated Soil from site areas will be measured for payment by the cubic metre of contaminated soil as determined from survey method identified in Section 31 22 15 - Grading. Tier I and Type A PHC Contaminated Soil Excavation will be paid under Item 02 55 13-1 in the Basis of Payment Schedule. The scope of work for Item 02 55 13-1, includes:
 - .1 Excavation of Tier I and Type A Contaminated Soil as indicated on the Drawings.

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- .2 Removal, sorting, segregation and on-site transport of all debris from excavated soils. Disposal of non-hazardous debris in on-site NHW landfill is included in this Section. Off-site transport and disposal of hazardous debris is included in Section 02 61 33 – Hazardous Waste Materials.
 - .3 Handling and on-site transport of Tier I and Type A Contaminated Soil to the NHW Landfill and placement within the landfill cell in accordance with Section 31 22 15 - Grading.
 - .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area.
- .2 The excavation of Type B PHC Contaminated Soil from site areas will be measured for payment by the cubic metre of excavated contaminated soil as determined from survey method identified in Section 31 22 15 - Grading. Type B PHC Contaminated Soil Excavation will be paid under Item 02 55 13-2 in the Basis of Payment Schedule. The scope of work for Item 02 55 13-2 includes:
- .1 Excavation of Type B PHC Contaminated Soil from all site areas as indicated on the drawings.
 - .2 Removal, sorting, segregation and on-site transport of all debris from excavated soils. Disposal of non-hazardous debris in on-site NHW landfill is included in this Section. Off-site transport and disposal of hazardous debris is included in Section 02 61 33 – Hazardous Waste Materials.
 - .3 Handling and on-site transport of Type B PHC Contaminated Soil to the Soil Treatment Cell.
 - .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade and reshaping of the area.
- .3 The excavation of Tier II Contaminated Soil from site areas will be measured for payment by the cubic metre of contaminated soil as determined from survey method identified in Section 31 22 15 - Grading. Tier II Contaminated Soil Excavation will be paid under Item 02 55 13-3 in the Basis of Payment Schedule. The scope of work for Item 02 55 13-3 includes:
- .1 Excavation of Tier II Contaminated Soil as indicated on the Drawings.
 - .2 Removal, sorting, segregation and on-site transport of all debris from excavated soils. Disposal of non-hazardous debris in on-site NHW landfill is included in this Section. Off-site transport and disposal of hazardous debris is included in Section 02 61 33 – Hazardous Waste Materials.
 - .3 Handling and on-site transport of Tier II Contaminated Soil to the Tier II Landfill and placement within the landfill cell in accordance with Section 31 22 15 - Grading.
 - .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area.
- .4 The on-site treatment and disposal of Type B PHC Contaminated soil will not be included for payment under this section, but will be provided as indicated in Section 02 61 00 – Hydrocarbon Soil Treatment.
- .5 The excavation of any unknown Hazardous Contaminated Soil identified at the site, including the supply and transport to the site of containers for Hazardous Contaminated Soil, including leakproof/hydrocarbon resistant liners as required,

will not be included for payment under this section, but will be provided as indicated in Section 02 61 33 – Hazardous Waste Material.

- .6 No extra payment will be made for soil removed from beyond the specified limits of excavation, unless such removal has been specifically directed by the Departmental Representative. The volume of contaminated soil excavation beyond the specified limits that have been approved by Departmental Representative will be determined by survey.
- .7 All costs associated with the cleanup or treatment of contamination of areas within or surrounding the contaminated soil handling areas due to the migration of contaminants from those areas as a result of Contractor's actions or inactions are the responsibility of Contractor. These costs are to include all costs of investigation to determine the extent of contamination migration, as well as soil excavation and treatment costs.
- .8 The following activities are considered incidental to the work identified by Items 02 55 13-1 through 02 55 13-3 in the Basis of Payment Schedule and will not be measured separately:
 - .1 Site access road construction, maintenance and rehabilitation including construction of watercourse/drainage course crossings to facilitate site remediation activities as required for construction including placement of granular material and installation and removal of culverts.
 - .2 Installation of monitoring equipment as required to confirm and/or calibrate process requirements, as applicable.
 - .3 Testing for the disposal and disposal of wastewater or other process effluents, as applicable.
 - .4 Any necessary excavation to facilitate testing of contaminated soils.
 - .5 Equipment decontamination including preparation and operation of the equipment decontamination area.
 - .6 Provision of all necessary safety equipment and clothing, as specified in Section 01 35 32-Site Specific Health and Safety Plan.
 - .7 Any requirements of permits.
 - .8 Loading, hauling, backfilling and compacting select granular fill materials at the excavation limits. Contractor is advised that areas susceptible to erosion will require Type 1 granular fill as surface materials.
 - .9 Grading of backfilled excavations to prevent ponding and blending in with the surrounding terrain, as directed by Departmental Representative.
 - .10 Excavation of contaminated soils within permafrost-affected zones.
 - .11 Water for moisture conditioning, compaction, and dust control.
 - .12 Surveying and calculation of granular material quantities for progress payment purposes.
 - .13 Reshaping and regrading of borrow areas and Contractors laydown areas including the supply, placement and compaction of granular material.
 - .14 Draining of wet areas prior to regrading operations.
 - .15 Provision of liners beneath contaminated soil stockpiles, if required, in accordance with Section 01 35 15 – Special Procedures for Contaminated Sites.
- .9 Costs for the dewatering of excavations will not be measured for payment. Include all costs for collection of wastewater from contaminated soil areas and

associated storage, treatment and discharge in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule.

- .10 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 ENVIRONMENTAL PROTECTION SUPPLIES

- .1 Environmental Protection Supplies: as per Section 01 35 43 - Environmental Procedures.

2.2 MATERIALS

- .1 Type 1, Type 2, Type 3, and Type 4 fill as described in Section 31 05 17 – Aggregate Materials.

Part 3 Execution

3.1 HAZARDOUS CONTAMINATED SOIL CONTAINERS

- .1 Containers shall satisfy the requirements of the latest edition of the Transportation of Dangerous Goods Act and Regulations, and in particular, the requirements for Intermediate Bulk Containers for marine transport of hazardous materials.
- .2 Submit details of the containers to the Departmental Representative for review prior to commencement of the work. These details shall include written confirmation from Transport Canada that the Contractor's proposed containers satisfy TDGA regulatory requirements for marine transport.
- .3 Containers shall include all necessary liners to satisfy the TDGA requirements for marine transport.
- .4 Hydrocarbon Resistant Liners: Reinforced Polyethylene (Oil-Resistant) OR RPE 25, to the following requirements:
- .1 High strength, oriented-tape high density polyethylene (HDPE) scrim coated on both sides with an impervious HDPE coating for oil resistance.
 - .2 Thickness: 20 mil; 0.51 mm nominal.
 - .3 Coating Thickness: 2 mil 0.05 mm nominal.
 - .4 Tensile Strength (ASTM D751): 1512 N (340 pounds)
 - .5 Elongation (ASTM D751): 15 percent.
 - .6 Tear Strength (ASTM D751 Tongue Tear): 222 N (50 pounds).
 - .7 Low Temperature Bend (ASTM D2136): -55 degrees C.
 - .8 Burst Strength (ASTM D751): 4140 kPa.
 - .9 UV Resistance (G53-84; 2000 hours): > 80 percent.

3.2 EXCAVATION OF CONTAMINATED SOIL, STOCKPILING, AND BACKFILLING

- .1 Contractor to initiate and complete topographic survey in advance of excavation operations for initial cross sections to be taken.
- .2 Remove all surface debris prior to excavation in accordance with Section 02 55 13 – Debris Removal.
- .3 Layout and excavate areas of contaminated soil to the limits as indicated. All layouts are to be field verified by Department Representative prior to excavation.
- .4 Prior to excavation of impacted areas, remove all surface snow/ice and direct surface water run-off around the excavation.
- .5 Remove all debris from excavated soil, sort, and dispose of in accordance with Section 31 23 11 - Buried Debris Excavation.
- .6 If required, stockpile contaminated soil in areas designated by Departmental Representative in accordance with Section 01 35 15 – Special Procedures for Contaminated Sites including the use of liners, if required, below stockpiled soil. Cover impacted materials from precipitation to reduce leachate pending transportation to disposal area. Place stockpiles of contaminated soil at a distance from the excavation equal to the depth of the excavation. Stockpile height not to exceed 2 meters.
- .7 Transport Tier I and Type A PHC Contaminated Soils in a manner such that no soil or liquid will be spilled during transport to the NHW Landfill.
- .8 Place Tier I and Type A PHC Contaminated Soils as intermediate fill in the NHW Landfill as per Section 31 22 15 - Grading.
- .9 Transport Tier II Contaminated Soil in a manner such that no soil or liquid will be spilled during transport to the Tier II Landfill.
- .10 Place Tier II Contaminated Soil in the Tier II Landfill as per Section 31 22 15 - Grading.
- .11 Transport Type B PHC Contaminated Soil in a manner such that no soil or liquid will be spilled during transport to the Soil Treatment Cell.
- .12 Place Type B PHC Contaminated Soil in Soil Treatment Cell as per Section 02 61 00 – Hydrocarbon Soil Treatment.
- .13 Prior to placing Hazardous Contaminated Soil in containers, remove all boulders and rocks greater than 200 mm in maximum dimension. Remove hazardous contaminated soil from these materials. Boulders and rocks shall be used as backfill in the excavation.
- .14 Place the Hazardous Contaminated Soil in containers as described in this Section. Place hazardous contaminated soil containing hydrocarbon contamination in containers with hydrocarbon resistant liners. Transport the soil in its container to the designated on-site Temporary Storage Area. Prior to transport of materials, ensure that the hazardous contaminated soil containers are leakproof. If containers show any evidence of leakage, remove the contents from the container and re-containerize in a leakproof container, as required. Develop a numbering system for the identification of each hazardous contaminated soil container. Based on this numbering system, mark on the containers, the number and contents (e.g. CEPA Soil, CEPA F1/F2 Soil) of the container. Submit to the Departmental Representative,

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- a listing of the numbered containers, their contents, and the Hazardous Contaminated Area designation from where the soil was excavated.
- .15 Use a volatile organic compound (VOC) instrument to continuously measure the concentrations of VOC during contaminated soil excavation operations. When the concentrations of VOC exceed 20% LEL, temporarily halt work until ventilation (natural or induced) reduces the concentration levels to a safe working level.
 - .16 Suppress dust generated during excavation operations with a water spray. Prevent surface water from entering the excavated area.
 - .17 Dewater ponded contaminated soil areas, as required. Maintain soil excavations free of standing water during soil removal, and confirmatory sampling activities. Comply with the requirements of the Waste Water Discharge Criteria indicated in Section 01 35 15 - Special Project Procedures for Contaminated Sites and Section 01 35 43 - Environmental Procedures.
 - .18 No damage to permafrost during the excavation. Provide permafrost protection measures while excavation remains open.
 - .19 When excavating in the vicinity of a drainage course or a body of water, erect silt fences, floating silt curtains and/or containment berms to prevent the release of sediment and deleterious materials into the water in accordance with the requirements of Section 01 35 43 – Environmental Procedures for Work in or Adjacent to Waterways.
 - .20 Decontaminate the equipment used for the excavation of Contaminated Soil in accordance with Section 01 35 15 - Special Project Procedures for Contaminated Site before commencing contaminated soil excavation at another location.
 - .21 Notify Departmental Representative when the bottom of excavation is reached. The Department Representative will collect confirmatory soil samples after reaching the contaminated soil excavation limits indicated on Drawings. No further excavation of the soil will proceed until the results of confirmatory samples are assessed by the Departmental Representative.
 - .22 Do not operate equipment in contaminated soil areas that have been excavated until Department Representative has confirmed, based on the results of confirmatory testing, that no further excavation of contaminated soil in the area is required.
 - .23 Do not proceed with backfilling operations until completion of the following:
 - .1 Survey of the ground profile upon completion of the final excavation limits and Departmental Representative has inspected and approved final excavation limits.
 - .2 The confirmatory soil results indicate that soils along the final excavation limits meet the applicable guidelines and confirmed by Departmental Representative.
 - .24 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground. Do not use backfill material which is frozen or contains ice, snow or debris.
 - .25 Place granular backfill material in uniform layers not exceeding 250 mm compacted thickness up to 0.3 meters above original grade to account for settlement, prevent ponding and blend into the surrounding terrain. Compact each layer to 95% Standard Proctor maximum dry density (ASTM D698) before placing succeeding layer. Type 1 granular fill is to be used on surfaces where there is potential for erosion. Have Departmental Representative approve amount and areas for Type 1 granular fill.

3.3 EROSION, SEDIMENT AND DRAINAGE CONTROLS

- .1 Prior to commencement of the work, install temporary erosion, sediment and drainage controls to prevent siltation and disruption of water bodies in accordance with this Section and Section 01 35 15 - Special Project Procedures for Contaminated Sites and Section 01 35 43 - Environmental Procedures.
- .2 Erosion, sediment and drainage controls are to be maintained during all stages of work.
- .3 At the completion of contaminated soil excavation, remove the erosion, sediment and drainage controls, as directed by Departmental Representative. Dispose of all non-granular erosion, sediment and drainage control materials off-site.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the treatment of Type B Petroleum Hydrocarbon (PHC) Contaminated Soil at CAM-E, including the following:
 - .1 Submission of a Type B PHC Contaminated Soil Treatment Plan.
 - .2 Provision of proprietary equipment, materials, labour, and supplies as required, to support the soil treatment program.
 - .3 Handling and storage of material, equipment, and supplies required for the soil treatment process.
 - .4 Treatment of Type B PHC Contaminated Soil to specified treatment criteria by a method chosen by the Contractor and reviewed by the Departmental Representative.
 - .5 Design and implementation of a contaminated soil sampling and laboratory testing program to monitor, calibrate, and verify the contaminated soil treatment process.
 - .6 Decommissioning and deconstruction of the Soil Treatment Cell following completion of soil treatment operations.
- .2 Construction of the Soil Treatment Cell detailed on Drawings C01 and C09 to be utilized for the treatment of Type B PHC Contaminated Soil is included under Section 31 22 15 - Grading. Geomembrane liner and geotextile requirements are included under Sections 31 32 19.01 – Geotextile and 31 32 19.02 – Oil Resistant RPE Geomembrane, respectively.
- .3 Contractor is to immediately notify Department Representative if Contractor believes that the proposed treatment system will not yield suitable results within the time frame specified due to the nature of the contaminant, soil conditions, or site conditions.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 55 13 – Contaminated Soil

1.3 DEFINITIONS

- .1 Treated Soil: Soil, previously classified as Type B PHC Contaminated Soil, that has been treated, sampled, analyzed, and determined to contain concentrations of PHCs lower than the applicable criteria identified below:

| PHCFRACTION | Soil Treatment |
|---|----------------|
| TYPE B = F1 (C6 to C10) + F2 (>C10 to C16) + F3 (>C16 to C34) | 2500 mg/kg |

- .2 Soil Treatment Facility: The site area where Type B PHC Contaminated Soil is to be treated to reduce PHC concentrations indicated as Soil Treatment Cell on Drawings C01 and C09.

1.4 QUALIFICATIONS

- .1 Contractor is to be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the Specification.
- .2 Only Contractor's Soil Remediation Specialist, capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and remediation of PHC-contaminated soil in Arctic environments, will be permitted to carry out the work of this Section.
- .3 Follow at all times, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA - Contractors Training Council, 1992.
- .4 All activities involving the handling of hazardous materials, are to be directly supervised by Contractor's Soil Remediation Specialist, who has successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .5 Personnel trained as described above are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .6 Provide suitable safety clothing and equipment as required during the course of the work.

1.5 SITE CONDITIONS

- .1 During or after occurrence of heavy rains, do not operate equipment in designated areas until the material had dried sufficiently to prevent excessive rutting.
- .2 Remove debris, snow, ice and standing water from areas prior to construction of the Soil Treatment Facility or placement of soil within the Facility.

1.6 PROTECTION

- .1 Environmental protection measures are to be in accordance with the requirements of Section 01 35 43 – Environmental Procedures.
- .2 Decontaminate equipment in accordance with Section 01 35 15 – Special Procedures for Contaminated Sites.
- .3 The release of all Wastewater shall conform to the Wastewater Discharge Criteria indicated in Section 01 35 15 – Special Procedures for Contaminated Sites.

1.7 PERSONAL PROTECTION

- .1 When working with PHCs and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the Work Area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and subcontractor, Departmental Representative and other authorized site personnel.

- .2 Air quality shall be monitored during hydrocarbon soil remediation activities according to the requirements of the Authorities Having Jurisdiction. Safety precautions shall be implemented dependent on the results of air quality monitoring such as temporarily halting work until ventilation (natural or induced) reduces the concentration levels to a safe working level.
- .3 Include requirements for protective clothing for the work outlined in this section in the Site Specific Health and Safety Plan specified in Section 01 35 32 – Site Specific Health and Safety Plan for Contaminated Sites.
- .4 Supply sufficient quantities of designated protection equipment to fit all site personnel including Departmental Representative and authorized visitors. Supply at least five sets of protection equipment for Departmental Representative and authorized visitors.

1.8 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit a Type B PHC Contaminated Soil Treatment Plan outlining the treatment methodology and equipment proposed by the Contractor to complete the Type B PHC Contaminated Soil treatment. Type B PHC Contaminated Soil Treatment Plan must be acceptable to AHJs. Submit the Plan ninety (90) days prior to construction.
- .3 At minimum, the Type B PHC Contaminated Soil Treatment Plan is to detail the following:
 - .1 The chosen soil treatment method.
 - .2 Description of why the chosen treatment methodology is appropriate for site locations and conditions including past experience and relevant technical documentation. Include confirmation that the chosen treatment methodology is appropriate for use at the designed Soil Treatment Cell specified on Drawing C09.
 - .3 The equipment, materials, and supplies required to conduct the treatment, including provisions to deal with equipment breakdown.
 - .4 Labour and temporary facilities required for the implementation of the treatment program.
 - .5 The size, shape, and location of treatment cell if not consistent with proposed treatment cell presented on Drawing C09. Approval from Departmental Representative required should proposed design be altered. Details of the Contractors contaminated soil sampling and laboratory testing methodology, personnel, and protocols to calibrate, monitor, and verify the effectiveness of the contaminated soil treatment process. Sampling methodology is to meet or exceed requirements of industry best practice and INAC Abandoned Military Site Remediation Protocol, 2009.
 - .6 Schedule of predicted treatment durations.
 - .7 Details of the handling and storage of material, equipment, and supplies required for the soil treatment process.
 - .8 Details of the final placement of treated soils.
 - .9 Details for the final decommissioning of the treatment area and associated facilities.

1.9 SIGNS

- .1 Signage: Provide and erect signage at access points to the Soil Treatment Facility. Signage is to be visible from all sides of these areas. The English Version of the signs is to read:

**CAUTION, CONTAMINATED SOIL TREATMENT AREA
RESTRICTED ACCESS.**

Post a similar sign in French and in the language of local dialect.

1. Graphic Symbols: All lettering is to conform to CAN3-Z321-77, or latest edition thereof. All lettering is to be black, not less than 100 mm high, with a 25 mm wide stroke, on a white background.

1.10 MEASUREMENT FOR PAYMENT

- .1 Treatment of Type B PHC Contaminated Soil will be measured for payment by cubic metre of Type B PHC Contaminated Soil excavated, based on survey methods outlined in Section 31 22 15 – Grading, and will be paid under the unit price Item 02 61 00-1, Treatment of Type B PHC Contaminated Soil in the Basis of Payment Schedule. Item 02 61 00-1 will have the same cubic metre volume as payment item 02 55 13-2 – Type B PHC contaminated soil excavation.
- .2 The scope of work for Payment Item 02 61 00-1 is to include all direct work associated with the operation of the Soil Treatment Facility, according to the accepted Type B PHC Contaminated Soil Treatment Plan, including the following:
 - .1 Provision of all materials, equipment, labour and supplies necessary to operate the Soil Treatment Facility.
 - .2 Removal, treatment and discharge of Contact Water, as required to facilitate treatment operations.
 - .3 Provision and erection of signage as described.
 - .4 Reporting and record keeping.
 - .5 Equipment decontamination including preparation and operation of an equipment decontamination area, as applicable.
 - .6 Provision of all necessary safety equipment and clothing.
 - .7 Any requirements of permits.
 - .8 Final disposal of treated soil.
 - .9 Decommissioning of Soil Treatment Facility.
- .3 All costs associated with the cleanup or treatment of contamination of areas within or surrounding the Soil Treatment Facility or due to the migration of contaminants from the soil being treated as a result of Contractor's actions or inactions are the responsibility of the Contractor. These costs are to include all costs of investigation to determine the extent of contamination migration, as well as soil excavation and treatment costs.
- .4 No separate pay item is to apply to the work practice requirements, including personal protection, of this Section. Costs are to be included in the applicable payment items to which this Section applies.
- .5 Provision of all materials, equipment, labour and supplies to construct the Soil Treatment Cell specified on Drawing C09 will not be considered for payment under this Section and will be measured separately under Sections 31 22 15 – Grading, Section 31 32 19.01 – Geotextile, and Section 31 32 19.02 – Oil Resistant RPE

Geomembrane.

- .6 Installation of monitoring equipment, as specified on Drawing C10, will be measured separately under Section 02 51 00 – Instrumentation.
- .7 Submission of a Type B PHC Contaminated Soil Treatment Plan will not be measured for payment under this Section. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedule – Bar (GANTT) Chart.
- .8 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedule – Bar (GANTT) Chart.

Part 2 Products

2.1 NOT USED

Part 3 EXECUTION

3.1 GENERAL

- .1 Handling and storage of material, equipment, and supplies required for the soil treatment process upon their arrival at site.
- .2 Operate the treatment system in the most efficient manner necessary to complete treatment in the minimum time frame possible.

3.2 SOIL TREATMENT PROCESS REQUIREMENTS

- .1 Construct the Soil Treatment Cell specified on Drawing C09 in accordance with Section 31 22 15 - Grading, in consultation with the Departmental Representative to satisfy AHJ requirements.
- .2 Treat Type B PHC Contaminated Soil as described in the accepted Type B PHC Contaminated Soil Treatment Plan.
- .3 Remove, handle and transport Treated Soil to the disposal location(s) approved by the Departmental Representative.
- .4 Dilution of the contaminated soil with clean or treated soil to reduce the overall contaminant concentration will not be accepted as a remediation approach.

3.3 TESTING

- .1 Carry out and pay for all testing required to confirm and/or calibrate treatment process requirements and to confirm that contaminated soils have been treated to specified contaminant levels. This testing is to include a baseline sampling and analysis program in the area of the stockpile and treatment areas to verify existing conditions, as well as a confirmatory testing program.
- .2 Duplicates of a minimum of 10 percent of the samples extracted will be collected for Contractor's confirmatory testing program by the Departmental Representative. Costs for this testing will be the responsibility of the Departmental Representative.

- .3 Contaminated soil will be designated as treated soil if the results of the laboratory analytical testing of a composite sample obtained from five discrete soil sample locations representative of a 100 cubic metre soil volume indicate concentration levels of PHCs to be less than the applicable remediation criteria.

3.4 CONTACT WATER AND FREE PRODUCT

- .1 Handle and treat Contact Water encountered during the soil treatment operation as described in Section 02 35 15 – Special Procedures for Contaminated Sites.

3.5 SOIL DISPOSAL

- .1 Dispose of all Treated Soil in locations greater than 30 m from water bodies and in accordance with AHJ.
- .2 Dispose of Treated Soil by placing and trackpacking in low piles less than 1.5 metres high with sides that have a maximum slope of 1 vertical to 5 horizontal.

3.6 REPORTING

- .1 Submit to the Departmental Representative on a monthly basis during Type B PHC Contaminated Soil treatment activities, a Type B PHC Contaminated Soil Treatment Operation Report which is to include the following information, as applicable to the treatment process:
 - .1 volume of contaminated soil excavated;
 - .2 schedule of treatment process activities;
 - .3 date and application rates of amendments added to the soil;
 - .4 results of visual inspection program;
 - .5 effluent and contaminated soil test results, including the results of the baseline sampling and analytical program;
 - .6 climate data including average daily temperature, dates of precipitation events, and amount of precipitation.
- .2 Within thirty (30) days of completion of each season/year of work, submit to Departmental Representative an Interim Soil Remediation Report. This report is to include, but not necessarily be limited to, the following information as applicable to the treatment process:
 - .1 nature and volume of treated soil;
 - .2 equipment usage;
 - .3 fuel and/or power usage;
 - .4 environmental monitoring and inspection records;
 - .5 temperature and precipitation records for the duration of the work season;
 - .6 results of all testing including sampling procedures, analytical procedures, analytical results, and QA/QC procedures for baseline and confirmatory testing programs;
 - .7 proposed modifications to the treatment process, as required; and,
 - .8 any other information required to meet the water licence and land use permit annual report requirements.

END OF SECTION

Part 1 GENERAL

1.1 DESCRIPTION

- .1 This section specifies the requirements for the collection, containerization, on-site and off-site transport, and disposal of hazardous waste. General locations of identified hazardous waste are indicated on Drawing CO2 to CO6.
- .2 An inventory of known Hazardous Waste Materials is provided in the Demolition and Debris inventories in Appendix A and B.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 41 23 – Debris Removal.
- .8 Section 02 55 13 – Contaminated Soil
- .9 Section 02 82 00.01 – Asbestos Abatement Minimum Precautions.
- .10 Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions.
- .11 Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

1.3 DEFINITIONS

- .1 Hazardous Waste Materials: Wastes materials that are designated as “hazardous” or “dangerous goods” under Territorial or Federal legislation or guidelines including: the Transportation of Dangerous Goods Act (TDGA) and Regulation (TDGR), and the Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations (EIHWHRMR) under the Canadian Environmental Protection Act (CEPA). The following items, typical of remote Arctic sites, are designated as “hazardous” in accordance with the aforementioned legislation:
 - .1 Asbestos (unbagged)
 - .2 Batteries
 - .3 Solvents
 - .4 Ozone depleting substances (ODS)
 - .5 Mercury switches and thermostats
 - .6 Petroleum, Oil, or Lubricating (POL) materials not meeting incineration criteria, as defined in clause 3.5.7.4 of this Section
 - .7 Tank Sludge
 - .8 PCB-Amended Painted Material, as defined in Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions

- .9 Leachable Lead painted material
- .10 Soil, concrete and paint chips containing PCBs at concentrations in excess of 50 ppm (mg/kg) and/or leachable lead in excess of 5 mg/L.
- .11 Material, including wastewater, groundwater and surface water, identified to be hazardous as the result of testing
- .12 Electrical equipment including, but not necessary limited to, capacitors, transformers, and regulators which contain or are suspected to contain PCBs at concentrations in excess of 50 mg/kg
- .13 Miscellaneous Hazardous Materials defined as those materials not classified as 1 to 12 above but suspected to fall under the definition of Hazardous Wastes and Materials as stated in this Section
- .2 Known and Unknown Debris: As defined in Section 02 41 33 – Debris Removal.
- .3 Processing: The sampling, testing, packaging, and containerization of suspected Hazardous Waste Materials.
- .4 Hazardous Waste Container: A container, of the appropriate type and size necessary to contain the Hazardous Waste Material placed in it, as required by the TDGA.
- .5 Hazardous Material Processing Area: A designated area, accepted by the Departmental Representative, for the consolidation, processing and containerization of hazardous waste materials, including barrel contents.
- .6 Temporary Storage Area: The designated area, approved by Departmental Representative, for the storage of containerized hazardous waste prior to transport off-site. Requirements for the Temporary Storage Area are outlined in this section.
- .7 Contaminated Groundwater: The groundwater encountered during contaminated soil, debris or landfill excavation that contains free product or does not conform to the Wastewater Discharge Criteria of the Water License.
- .8 Free Product: Separated phase liquid petroleum hydrocarbon product.
- .9 Contractor's Designated Hazardous Waste Disposal Facilities: The Licensed Hazardous Waste Disposal Facilities designated by the Contractor and pre-approved by the Departmental Representative, for the disposal of hazardous waste requiring off-site disposal specified under the provisions of this contract. Contractor must provide documentation from the Designated Hazardous Waste Disposal Facilities indicating written acceptance for all hazardous waste accepted from the CAM-E site.
- .10 Lead containing paint: Material that is coated with lead based paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
- .11 PCB amended paint (PAP): Material that is coated with PCB based paint that has been analyzed and determined to contain total PCB concentrations in excess of 50 ppm.
- .12 Known Hazardous Material: Material designated as hazardous in accordance with the definition of hazardous waste in this Section, and which is identified for collection and disposal in the specifications and Drawings.
- .13 Unknown Hazardous Material: Material designated as hazardous in accordance with the definition of Hazardous Waste Material in this Section, and which has not been specifically identified for collection and disposal in specifications and Drawings.

- .14 Hazardous Contaminated Soil: Contaminated Soil classified as hazardous in accordance with the Canadian Environmental Protection Act (CEPA), including CEPA PCB Contaminated Soil and Leachable Soil.
- .15 CEPA PCB Contaminated Soil: Soil containing concentrations of PCBs equal to or in excess of 50 parts per million (mg/kg) is legislated as a hazardous material. Storage, handling, and disposal of PCBs are regulated under the CEPA and the Federal Transportation of Dangerous Goods (TDG) Act. Comply with all applicable regulations.
- .16 Leachable Soil: Soil Containing contaminants that when subject to Toxicity Characteristic Leaching Procedure (TCLP) analysis, leach contaminants at concentrations in excess of those specified in CEPA regulations E1HWHRMR and IMHWR. Handling and disposal are regulated under Federal, Territorial and Provincial Regulations. Comply with all applicable regulations.
- .17 Dangerous Goods: A product, substance, or organism specifically identified or meeting hazard criteria established in Transportation and Dangerous Goods Regulations.
- .18 Calibrated Scale: A scale that has been calibrated using a minimum of 3 known weights to ensure the scale is outputting the correct measurement. Known weights must be within the range of weights of materials being weighed. Calibrated entails placing a known weight on the scale and then the scale is adjusted until it yields a correct corresponding weight measurement.

1.4 REFERENCE STANDARDS

- .1 Canada Labour Code Part II-Occupational Health and Safety (R.S. 1985, c.L-2, amended 2014).
- .2 National Fire Code of Canada, 2010.
- .3 Canada Occupational Health and Safety Regulations (SOR/86-304), including:
 - .1 Part X – Hazardous Substances.
- .4 Canadian Environmental Protection Act, 1999, including:
 - .1 Ozone Depleting Substances Regulations, 1998 (SOR/99-7).
 - .2 PCB Regulations (SOR/2008-273).
 - .3 PCB Waste Export Regulations, 1996 (SOR/97-109).
 - .4 Federal Mobile PCB Treatment and Destruction Regulations, 1989 (SOR/90-5).
 - .5 Export and Import of Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149)
 - .6 Inter-Provincial Movement of Hazardous Waste Regulations (SOR/2002-301).
- .5 Hazardous Products Act (R.S.C., 1985, c. H-3), including:
 - .1 Controlled Products Regulations (SOR/88-66), and amendment SOR/2001-254.
 - .2 Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c.34) a.1999, c.31. including:
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286) a.SOR/2011-60
- .6 Hazardous Waste Worker Training Manual: Canadian LIUNA - Contractors Training Council, 1992.
- .7 Aboriginal Affairs and Northern Development Canada References:

- .1 Abandoned Military Site Remediation Protocol (INAC, 2009).
- .8 National Institute for Occupational Safety and Health (NIOSH):
 - .1 Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115.
- .9 Health Canada:
 - .1 Hazardous Products Act – Workplace Hazardous Materials Information System (WHMIS) Requirements.
- .10 Nunavut Environmental Protection Act (R.S.N.W.T. 1988, c. E-7) a. 1998, c.21, c.24, and related Department of Environment, Government of Nunavut Environmental Guidelines for:
 - .1 Ambient Air Quality (2011).
 - .2 General Management of Hazardous Waste (2010).
 - .3 Mercury Containing Products and Waste Mercury (2010).
 - .4 Ozone Depleting Substances (2011).
 - .5 Used Oil and Waste Fuel (2012).
 - .6 Waste Asbestos (2011).
 - .7 Waste Batteries (2011).
 - .8 Waste Lead and Lead Paint (2014).
 - .9 Waste Paint (2010).
 - .10 Waste Solvent (2011).
- .11 Safety Act (Nunavut) (R.S.N.W.T. 1988,c.S-1), including:
 - .1 General Safety Regulations (R.R.N.W.T. 1990, c.S-1).
 - .2 Work Site Hazardous Materials Information System Regulations.
- .12 Labour Standards Act (Nunavut) (R.S.N.W.T. 1988, c.L-1) amended S.N.W.T 2003, c.15, in force January 2004.

1.5 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide Hazardous Materials Management Plan to Departmental Representative that identifies hazardous materials, their usage, location, personnel protective equipment requirements, disposal procedure and arrangements.
- .3 Submit qualifications and training certificates for all Contractor's personnel performing Work as described under this Section prior to commencing Work.
- .4 Submit the hazardous waste disposal tracking information including final inventories of hazardous waste containers and disposal details to Departmental Representative prior to transportation off-site.
- .5 Hazardous Waste Disposal Tracking Form is provided in Appendix D.
- .6 Submit waste transport manifests, chain of custody documentation and transport documentation for hazardous wastes to the Departmental Representative and to other Authority Having Jurisdiction (AHJ) prior to shipment off-site and in accordance with applicable regulations.
- .7 Submit destruction certificates to the Departmental Representative.

- .8 In the event of an environmental incident or damage to waste containers, notify the Departmental Representative and applicable AHJ.

1.6 QUALIFICATIONS AND PERSONNEL PROTECTION

- .1 Contractor's workers must be thoroughly familiar with and knowledgeable about existing site conditions, scope of work, and requirements of the Specification.
- .2 Submit qualification and training records prior to commencing Work under this Section, for all Contractor's personnel completing Work as described under this Section.
- .3 Follow at all times guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA – Contractors Training Council, 1992.
- .4 Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and can satisfy Federal and Territorial requirements will be permitted to supervise and direct the work of this Section.
- .5 All activities involving the handling of hazardous materials are to be directly supervised by Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program. Contractor's key personnel responsible for the removal of leachable lead coatings are to demonstrate appropriate level of experience in the lead control, removal and abatement industry.
- .6 Contractor's personnel trained as described in this Section are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .7 Provide suitable safety clothing and equipment as required during the course of the work. Supply sufficient quantities of protection equipment to fit all site personnel including Departmental Representative, Departmental Representative's staff, and site visitors.
- .8 Provide workers with protection appropriate to the potential type and level of exposure. Establish specific safety protocols prior to commencing cleanup activities.
- .9 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) and Interprovincial Movement of Hazardous Waste Regulation (IMHWR) documentation and recording requirements.

1.7 MEASUREMMENT FOR PAYMENT

- .1 The supply of Hazardous Waste Containers, including liners, for the containerization of Hazardous Waste will be measured for payment by the functional interior storage volume, in cubic metres, of the container. Supply of Hazardous Waste Containers will be paid under Item 02 61 33-1 as indicated in the Basis of Payment Schedule.
- .2 The collection, containerization and on-site transport to the Temporary Storage Area of all Hazardous Waste derived from Structure Demolition will not be included for payment under this section, but will be included as specified in Section 02 41 16 – Structure Demolition.
- .3 The collection, containerization and on-site transport to the Temporary Storage Area

- of all Hazardous Waste derived from Debris Removal will not be included for payment under this section, but will be included as specified in Section 02 41 23 – Debris Removal.
- .4 The collection and on-site transport of all Hazardous Waste derived from Contaminated Soil Excavation will not be included for payment under this section, but will be included as specified in Section 02 55 13 – Contaminated Soil or Section 31 23 11 – Buried Debris Excavation.
- .5 Include all direct costs for the off-site transport of Hazardous Waste Materials designated for off-site disposal derived from CAM-E to Contractor's Designated Hazardous Disposal Facilities (including a facility approved to accept PCB waste) in the lump sum price for Off-site Transport of Hazardous Waste to Contractor's Designated Hazardous Waste Disposal Facilities, Item 02 61 33-2 in the Basis of Payment Schedule.
- .6 The scope of work for Item 02 61 33-2 - Off-Site Transport of Hazardous Waste Materials to Contractor's Designated Hazardous Waste Disposal Facilities is to include, but not be limited to, the following:
- .1 Any analytical testing of waste required by the Contractor's Designated Hazardous Waste Disposal Facilities.
 - .2 Preparation and submission to the Departmental Representative of waste transport manifests to meet all requirements of the TDG Act and Regulations and Interprovincial Movement of Hazardous Waste Regulation (IMHWR).
 - .3 Preparation and management of an in-transit hazardous materials storage location as required during demobilization activities.
 - .4 Provision of transport for the containerized Hazardous Waste Materials from the in-transit hazardous materials storage location to Contractor's Designated Hazardous Waste Disposal Facilities.
 - .5 Off-loading and disposal costs of the containerized Hazardous Waste Material at Contractor's Designated Hazardous Waste Disposal Facilities.
 - .6 Documentation of acceptance from Contractor's Disposal Facilities and record keeping of hazardous waste via the Hazardous Waste Disposal Tracking form.
 - .7 Acquisition and submission of Certificates of Destruction for all regulated hazardous items.
- .7 Payment for Item 02 61 33-2 will be made upon receipt of the hazardous waste materials at the Contractor's Designated Hazardous Waste Disposal Facilities and submission to the Departmental Representative of the destruction certificates, transportation documents and other information as described in this Section.
- .8 Be responsible for all costs associated with any repackaging of container contents resulting from the failure by the Contractor to properly pack, handle and secure the container and/or contents.
- .9 The development, operation, and closure of the Temporary Storage Area and Hazardous Material Processing and Abatement Areas, including provision of signs and barricades, will not be measured for payment. Include all costs for the Hazardous Material Temporary Storage Area and Processing and Abatement Areas, including signs and barricades in Item BOPC-1, Balance of Project Costs.

- .10 Costs for the processing and containerization of Unknown Hazardous Waste Material will be negotiated with the Departmental Representative using the Contractor's Labour and Equipment Rates provided in the Potential Additional Work Schedule. The scope of work for the processing and containerization of Unknown Hazardous Waste Material includes, but is not limited to the following:
1. Supply and transport of additional containers to the site for Unknown Hazardous Waste Materials.
 2. Equipment and labour for the containerization.
 3. Supply and transport to the site of additional detergents and solvent, required for barrel processing.
 4. Processing of liquid barrel contents from unknown barrels as directed by the Departmental Representative, including on-site incineration of contents meeting incineration criteria, or treatment of water to meet discharge criteria.
 5. Disposal of empty unknown barrels resulting from the collection and consolidation of Unknown Hazardous Waste Materials.
 6. Off-site Transport and Disposal of Unknown Hazardous Waste Material designated for off-site disposal, as directed by the Departmental Representative, to the Contractor's Designated Hazardous Waste Disposal Facilities.
 7. Transport and Disposal of Unknown Hazardous Waste Material acceptable for on-site disposal to the applicable on-site landfill.
 8. Excavation of Hazardous Contaminated Soil in accordance with requirements of Section 02 55 13 – Contaminated Soil including handling and containerization into Hazardous Soil Containers of the contaminated soil, On-site transport and placement of the containers at the Temporary Storage Area, and the supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area.
 9. The supply and transport to the site of containers for Hazardous Contaminated Soil, as defined in Section 02 55 13 - Contaminated Soils, including leakproof liners. Payment will not be made until written approval of containers by Transport Canada has been submitted to the Departmental Representative.
 10. The supply and transport to the site of hydrocarbon resistant liners, as defined in Section 02 55 13 - Contaminated Soils, to be used in containers for Hazardous Contaminated Soil containing hydrocarbon contamination.
- .11 Unknown hazardous material is that material designated as hazardous in accordance with the definition of hazardous waste material in Clause 1.3.1 of this section and which has not been specifically identified for collection or disposal as part of other work components.
- .12 As part of the Potential Additional Work (PAW), Unknown Hazardous Waste Material is to include:
1. Hazardous debris outside of Known Debris Areas identified in Appendices and/or Drawings, or located beyond 50 m of the undisturbed edge of any former or existing access road or water course on the site; Hazardous debris in excess of the volume identified in Appendices in the Known Debris Areas to be removed.
 2. Unknown barrel contents and absorbent management materials resulting from barrel processing activities.
 3. Free product collected during contaminated soil excavation or soil treatment operations
 4. Hazardous material encountered during demolition operations that is not identified in the demolition inventory in the Appendix.

5. Hazardous Contaminated Soil as defined in Section 02 55 13 - Contaminated Soils.
- .13 As part of Potential Additional Work (PAW), Unknown Hazardous Waste Material is not to include:
 1. Materials from facilities to be demolished that are contaminated with PCB-amended paint at PCB concentrations in excess of 50 parts per million.
 2. Asbestos containing materials from facilities to be demolished.
 3. Fuel and fuel residual product from fuel tanks and pipelines to be demolished.
 4. Sewage and sewage sludge from sewage tanks and lines to be demolished.
 5. Any hazardous material identified in the Demolition Inventory in the Appendices, or elsewhere in these Specifications.
- .14 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Description:
 - .1 Bring on site only quantities of hazardous materials required to perform Work, if any.
 - .2 MSDS for suggested hazardous materials are to be approved by the Departmental Representative prior to transporting to site.
 - .3 Upon approval, maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

2.2 PREPARATION

- .1 Develop Temporary Abatement, Processing, and Storage Areas for Hazardous Waste Materials. Details of the Abatement, Processing and Storage Areas are to be provided to the Departmental Representative prior to commencement of remediation activities for approval.
- .2 Prepare the areas with at minimum, the following:
 - .1 Provide easy access to the off-site transport equipment and on-site landfill transport equipment.
 - .2 Allow the containers to be level and evenly distribute the weight of the containers to the supporting surface.
 - .3 The areas are to be free of standing water.
 - .4 Surface water run-on to the area must be minimized. The area must not be subject to flooding, excessive snow drifting, and/or seasonal saturation.
 - .5 Sufficiently compact the area so as to prevent the containers from settling into the soil. Supply, place and compact additional granular fill as required.
 - .6 Size the areas sufficiently so as to accommodate all waste.
- .3 Confirm the location of the Temporary Storage and Processing and Abatement Areas with Departmental Representative at least one (1) week prior to commencing operations to allow for baseline sampling by Departmental Representative if required.

- .4 The Temporary Hazardous Materials Storage and Processing and Abatement Areas are to be located as follows:
 - .1 More than 30 metres away from any water body or drainage course.
 - .2 On stable and compact ground not subject to flooding or seasonal saturation and lined with a 30 mil impermeable geomembrane liner in accordance with Section 31 32 19.02 – Oil Resistant RPE Geomembranes underneath all contents except non-hazardous materials.
 - .3 In an area not routinely accessed or essential to Contractor's workforce or site personnel.
 - .4 More than 30 metres away from flammable materials.
 - .5 In a previously disturbed area if possible.
 - .6 In a location that will not impede other work required.
- .5 Within the Temporary Storage Areas, segregate the various types of containerized materials, as specified in this Section, as follows:
 - .1 Containerized Lead and PCB Material (abated paint).
 - .2 Containerized Hazardous Material.
 - .3 Containerized Barrel Contents.
- .6 Within the Temporary Storage Area, provide access barriers and a single access point for the PCB Storage Area. Erect signage. Signage is to be visible from all sides of the area. The English version of the sign is to read:

CAUTION

PCB STORAGE AREA

TRESPASSING IS PROHIBITED

- .7 Signage must be posted in English and the local Inuit dialect. All lettering is to conform to CAN3- Z321-77, or latest edition thereof. All lettering is to be black, not less than 100 millimetres high, with a 25 mm wide stroke, on a white background.
- .8 Keep PCB storage containers locked or equivalently secured to prevent unauthorized access to stored materials.
 - .1 Permit only authorized personnel to enter the PCB storage area.
 - .2 Make PCB storage containers accessible to authorized inspectors as required by Departmental Representative.
- .9 Place rows of storage containers at a minimum of one (1) metre offset so that Container and labels remain visible.
- .10 Store sufficient sorbent materials or an approved spill kit near the Temporary Storage Areas for an emergency clean-up.
- .11 For storage of Hazardous Waste Material, no stacking of marine containers will be allowed.
- .12 Submit to Departmental Representative a detailed inventory of the Temporary Storage Area indicating the location and contents of each container each month during the construction season.
- .13 Establish Hazardous Material Processing Area for the purpose of:

- .1 Containerization of Hazardous Waste Materials; and,
- .2 Processing of barrels and barrel contents, including consolidation of compatible liquids and sediments, incineration of hydrocarbon liquids meeting incineration criteria, and cleaning of barrels.
- .14 Establish the Hazardous Material Processing Area to:
 - .1 Be of sufficient size and capacity to accommodate the volume of material and number of barrels to be processed at any one time;
 - .2 Provide for the barrel contents and wash water;
 - .3 Minimize the handling of Hazardous Waste Materials;
 - .4 Isolate barrel contents and wash water from other work operations;
 - .5 Provide access for consolidation, packaging, cleaning of barrels, and transporting any containers designated for off-site disposal to the Temporary Storage Area;
 - .6 Be leak-proof and contain all runoff water, spills, and leaks so as not to contaminate the environment;
 - .7 Provide safe working conditions for personnel working in and around these areas.
 - .8 Meet requirements of AHJ's.
- .15 Do not use the Hazardous Material Processing Areas until baseline sampling has been completed by the Departmental Representative.
- .16 Immediately clean up any spills, leaks, or other releases of liquid or sediment from this area using appropriate techniques.

2.3

HAZARDOUS WASTE MATERIAL CONTAINERS

- .1 Hazardous Waste Containers:
 - .1 Containers must satisfy the requirements of the most recent edition of the TDGA and Regulations, and in particular, the requirements for intermediate bulk containers for marine/air/ground transport for hazardous materials.
 - .2 Submit details of the containers to Departmental Representative for review 45 days prior to mobilization. These details are to include written confirmation from Transport Canada that Contractor's proposed containers satisfy TDGA regulatory requirements for marine/air/land transport.
 - .3 With respect to packaging and containerization requirements of hazardous materials, all requirements of the TDGA and Regulations and CEPA Interprovincial Movement of Hazardous Waste must be met.
- .2 Rigid Intermediate Bulk Containers:
 - .1 Containers approved for the storage and transport of PCB containing waste, under the latest edition of the CEPA PCB Regulations, TDGA, and TDGR.
- .3 Provide dunnage, locks, and bracing materials for securing PAP material placed in steel containers.
- .4 For transport by cargo vehicle or vessel, package liquids containing PCBs at concentrations greater than 50 ppm in accordance with TDG Act and Regulations and CEPA regulations (IMHWR and EIHWHRMR) in a combination packaging where the inner package is made of earthenware, plastic or metal, and is leak-proof, and the outer packaging is a drum or box made of steel, aluminium, plywood, fibre or plastic. Provide sufficient absorbent material between the inner and outer packaging to

prevent any liquid from escaping the outer packaging. There is no quantity limit per package for cargo vehicle or vessel transport.

- .5 For packaging and containerization requirements of Hazardous Waste Materials, all requirements of the TDG Act and Regulations, and CEPA Interprovincial Movement of Hazardous Waste must be met.
- .6 Provide access for Departmental Representative to inspect all Hazardous Waste Material Packaging as directed by Departmental Representative.

2.4 SOLVENT (BARREL RINSE)

- .1 Minimum flash point: 60°C. Prior to shipment to the site, submit to Departmental Representative Material Safety Data Sheets (MSDS) as specified in Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites. The solvent shipped to the site is to remain the property of Contractor.

Part 3 Execution

3.1 GENERAL REQUIREMENTS

- .1 Conduct all work in accordance with all appropriate Federal, Territorial and Provincial legislation, and international conventions.
- .2 Individuals shipping and receiving hazardous waste materials are to be licensed under the TDGA and Regulations, and appropriate territorial environmental Acts and regulations.
- .3 Only trained individuals or individuals working under the direct supervision of trained persons are to handle or transport dangerous goods.
- .4 Establish Hazardous Material Processing Areas for the consolidation, incineration, and packaging of barrel liquids and sediments, and for the cleaning of barrels. Provide measures to mitigate release of contaminants to the environment including, but not limited to liners, silt fences, sorbent materials, ditching and grading, etc.
- .5 Establish Temporary Storage Areas as specified in this Section, to provide a secure area for Hazardous Waste Material designated for off-site disposal prior to shipment for disposal as described in this Section.

3.2 PROTECTION

- .1 Complete work in an environmentally acceptable manner. Comply with requirements of Section 01 35 43 - Environmental Procedures, Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions, and Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .2 Avoid releasing any Hazardous Waste Materials into the environment during handling and storage.
- .3 In the event of a spill, invoke the emergency response plan and take appropriate action.
- .4 Provide a full range of cleanup and protective equipment at the site to contain and cleanup spills, and protect personnel, as detailed in the Spill Contingency Plan and specified in Section 01 35 32 – Site Specific Health and Safety Plan.
- .5 When working with PCB-containing materials, lead-containing materials, asbestos, and other contaminants, workers are to wear protective clothing and equipment

- acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees, subcontractors, Departmental Representative, Departmental Representative's staff, and other authorized personnel.
- .6 Handle materials containing asbestos in accordance with Sections 02 82 00.01 and 02 82 00.02 – Asbestos Abatement Precautions.
 - .7 The release of all water resulting from the cleaning of fuel tanks, pipe and barrels is to conform to the Wastewater Discharge Criteria of the Water License. Treat washwater to conform to the Discharge Criteria of the Water License, or dispose of any liquid effluent not conforming to the Water License off-site at Contractor's own cost, in accordance with the requirements of this Section.
 - .8 Departmental Representative is to carry out baseline soil sampling and analyses of the Hazardous Material Processing Area and Temporary Storage Area prior to commencing placement of materials at these areas, and confirmatory sampling following the decommission of the areas. The Contractor is responsible for any soil contamination resulting from the improper storage and handling of contaminated or hazardous materials over the duration of site remediation activities. In the event of such contamination, the Contractor is to submit to Departmental Representative a plan for site remediation in accordance with all Federal and Territorial Regulations to be enacted upon immediately following approval by Departmental Representative. All cleanup costs, including but not limited to excavation and disposal, will be the responsibility of the Contractor.
 - .9 Personnel protective equipment, as per Section 01 35 32, Site Specific Health and Safety for Contaminated Sites, is to include clothing, protective suits, respirators, etc. in accordance with NIOSH Guidelines and to comply with anticipated and potential emergency conditions.
 - .10 Site personnel in the vicinity of the debris removal operations or handling Hazardous Waste Material are required to wear environmental protection equipment in accordance with NIOSH guidelines.

3.3 REMOVAL AND SORTING OF SUSPECTED HAZARDOUS WASTE MATERIALS

- .1 Continually monitor the remediation operation to identify potentially hazardous material.
- .2 Immediately suspend work if suspected hazardous material is identified and allow visual confirmation of the nature of the material or debris to be established.
- .3 Store suspicious material in a secured area or secured containers, if the nature of the material or debris cannot be visually confirmed. Advise Departmental Representative about the findings. Material needs to be secured until the nature of the material is confirmed by Departmental Representative. Testing for classification will be carried out and paid for by Departmental Representative.

3.4 CONTAINERIZATION OF LEAD AND/OR PCB CONTAINING PAINT

- .1 Sort PCB and lead containing paint chips and place in appropriate Hazardous Waste Containers in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .2 Provide a photographic record of the interior of all completed Hazardous Waste Containers prior to closing. Submit the photographic record to Departmental

Representative together with the corresponding inventory of each container upon completion of work. Trained and certified Contractor personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) and Regulations documentation and recording requirements. Departmental Representative will represent the generator of the waste and will sign all documentation as required.

- .3 Clearly mark on all containers the contents in accordance with the requirements of the Canadian Environmental Protection Act for the Storage of PCB Materials (SOR/2008-273), and with the Transportation of Dangerous Goods Regulations.
- .4 Label PCB waste containers in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.
- .5 Follow procedures for abatement, removal, handling, storage, and disposal of lead and/or PCB containing paints in accordance with Section 02 83 10 – Lead and PCB Amended Paint Abatement Precautions.

3.5 BARREL PROCESSING

- .1 Flow diagrams for the methodology for the processing, cleanup and disposal of barrels are shown on Figures 1 and 2 at the end of this Section.
- .2 Submit for review forty-five (45) days prior to mobilization, a detailed description of the proposed barrel processing methodology, including oil/water separation, water treatment, incineration, and containers to be used for the disposal of hydrocarbon absorbent materials and hydrocarbon barrel contents. The description must include product/manufacturer information and specifications for each of the products to be used.
- .3 Inspection:
 - .1 All barrels are to be inspected by Departmental Representative and Contractor. The purpose of the inspection is to identify the process for opening, sampling, testing and handling of the barrels. The inspection is to address the following items as a minimum:
 - .1 Symbols, words, or other marks on the barrel that identify its contents, and/or that its contents are hazardous; e.g. radioactive, explosive, corrosive, toxic, flammable.
 - .2 Symbols, words, or other marks on the barrel that indicate that it contains discarded laboratory chemicals, reagents, or other potentially dangerous materials in small-volume containers.
 - .3 Signs of deterioration such as corrosion, rust, or leaks at seams, rims, and V grooves.
 - .4 Evidence of spills or other contamination on the top and sides of the barrel.
 - .5 Signs that the barrel is under pressure such as bulging and swelling.
 - .4 Test areas around barrels that show evidence of holes, rust points, or openings using a Volatile Organic Compound (VOC) instrument prior to movement. If levels exceed 20 percent Lower Explosive Limit (LEL) as measured by the VOC, conduct all handling, storage, and transportation operations in accordance with the appropriate sections of the National Institute for Occupational Safety and Health (NIOSH) guidelines, National Fire Code of Canada, and the TDGA for flammable and combustible materials.
 - .5 Barrel opening:

- .1 Pressurized barrels are extremely hazardous. Open with extreme caution. Use only non-sparking equipment to open barrels. Provide all personnel responsible for opening barrels with appropriate safety equipment and clothing. Open barrels in accordance with the procedures outlined in the Occupational Safety and Health Administration (OSHA) Code of Federal Regulations Title 29, Part 1910, Section 120 (29 CFR 1910.120) Hazardous Waste Operations and Emergency Response (HAZWOPER).
- .2 If the bungs of a barrel can be readily moved, then open the barrel slowly, allowing time for any pressure in the barrel to be released before the bungs are fully removed.
- .3 If the bungs of a barrel cannot be readily moved, or if barrel inspection suggests that opening of the barrel may present a special hazard, vent the barrels remotely to relieve any internal pressure that may be present prior to opening. Conduct remote barrel venting using a suitable device such as a sharp weighted spear dropped from an appropriate height or released from a tube housing a spring to penetrate the barrel. Drive the spear into the barrel such that the barrel pressure is vented.
- .4 Conduct the remote venting operation at a safe distance from other site operations, and from behind suitable walls or barricades.
- .5 All barrels are to be clearly numbered and cross-referenced to sample numbers.
- .6 Do not transport barrels until it has been determined that they are not pressurized, do not leak, and are sufficiently sound for transport.
- .6 Sampling and testing of barrel contents:
 - .1 Samples of the contents of barrels are to be extracted by Departmental Representative.
 - .2 Combine barrel contents as directed by Departmental Representative.
 - .3 Analyze any remaining solid residue within barrels for leachate.
 - .4 Do not consolidate barrel contents consisting of black oil.
 - .5 Collect barrels and store at the Material Processing Area.
 - .6 Based on the results of the analysis by Departmental Representative, treat barrel contents in accordance with the requirements detailed in Figure 2 at the end of this Section.
- .7 Disposal of barrel contents:
 - .1 Dispose of barrels containing rust and sediment as empty barrels as described below.
 - .2 For small volumes, agitation with oil-absorbent material to remove any organic material, is acceptable.
 - .3 Collect aqueous contents and treat to conform to the Discharge Criteria of the Water License, or dispose of any liquid effluent not conforming to the Water License off-site at Contractor's own cost.
 - .4 Provide a dual chamber, forced air, fuel fired POL incinerator to site to incinerate all waste POL product that meets the following incineration criteria:
 - .1 PCBs < 2 ppm
 - .2 Chlorine < 1000 ppm
 - .3 Cadmium < 2 ppm
 - .4 Chromium < 10 ppm

- .5 Lead < 100 ppm
- .6 Glycol/Alcohol < 2%
- .5 Test used oil and oil-absorbent material to determine treatment and disposal requirements. Incinerate oil and oil-absorbent material meeting the above incineration criteria on-site or package oil and oil absorbent material with contaminants in excess of the above incineration criteria for disposal off-site at Contractor's licensed disposal facilities, in accordance with TDGA Regulations as required.
- .6 A leachate extraction test is to be carried out by Departmental Representative on the solid residual material resulting from the incineration process. The leachate toxicity of the material will be determined in accordance with CEPA EIHWHRM. Dispose of materials found not to be leachate toxic as Tier II contaminated soil as described in Section 02 55 13 - Contaminated Soil. Package leachate toxic material in accordance with EIHWHRM, as required and transport off-site for disposal at Contractor's Designated Hazardous Disposal Facility.
- .8 Cleaning and disposal of barrels:
 - .1 Steam clean empty barrels resulting from the consolidation of barrel contents. Clean to remove oil, sludge, wax, tar and other fuel residue adhering to the surface.
 - .2 If residue remains, apply a manual cleaning method. For heavily oil-soaked surfaces, a second application may be required. Steam clean barrels after detergent application.
 - .3 Only in the event that two-time detergent application proves ineffective, utilize an appropriate solvent rinse for residue removal. Solvent rinsate material is to be tested by Departmental Representative to determine disposal requirements. If the solvent rinsate meets the criteria indicated above, incinerate the material on site. If the solvent rinsate is in excess of the criteria, package the material in accordance with TDGA regulations, as required, for disposal off-site at Contractor's licensed disposal facilities.
 - .4 Recycling of steam cleaning rinsate is permitted. Direct steam cleaning rinsate to an oil-water separator. Removal of oily waste residue by agitation with oil-absorbent material to remove any organic material is permitted.
 - .5 The resulting steam cleaning rinsate is to be tested by Departmental Representative for the Wastewater Discharge Criteria of the Water License. Treat steam cleaning rinsate to conform to the Waste Water Discharge Criteria of the Water License, or dispose of any liquid effluent not conforming to the Water License off-site at Contractor's own cost at Contractor's licensed disposal facilities.
 - .6 Dispose of the used oil-absorbent material and/or oily liquid waste in excess of the concentrations as indicated in this section.
 - .7 Crush all empty cleaned barrels. Crush the barrels in a manner to reduce the total original barrel volume by a minimum of 75%. Dispose of crushed barrels on the on-site Non-Hazardous Waste Landfill.

3.6

CLEANING OF FUEL OIL TANKS AND PIPELINES

- .1 The Contractor is advised that debris to be remediated at this site may consist of fuel tanks and pipelines which may contain fuel.

- .2 Prior to the demolition and removal of fuel tanks and pipelines:
 - .1 Drain and flush all products in connected piping in a manner as to prevent spillage.
 - .2 After initial draining, remove all residual fuel by passing a "Teflon Ring Pig" through the line.
 - .3 Isolate the line to prevent the passage of vapours using a standard plumber's plug on the end of a tee handle.
 - .4 Excavate and cut the pipe for compaction and disposal in the on-site NHW Landfill. Re-grade the area in accordance with Section 31 22 15 – Grading.
 - .5 Incinerate all liquids contained in the tank. Incinerate in a container to prevent ground or water contamination, in an oxygen-rich environment to promote complete combustion, and in accordance with Section 01 35 32 - Specific Health and Safety Plan.
 - .6 Rinse tanks with water to remove any residual product. Filter the wash water through an oil-absorbent material.
 - .7 Test the used oil-absorbent material to determine disposal requirements. Incinerate on-site oil-absorbent material meeting the above incineration criteria or package for disposal off-site at Contractor's licensed disposal facilities.
 - .8 Treat and Discharge remaining waste wash water in accordance with the Wastewater Discharge Criteria of the Water License.
 - .9 Degas all tanks in accordance with the requirements of Report 88-5 (December 1988) of the Petroleum Association for Conservation of the Canadian Environment (PACE). Use nitrogen for degassing, as required, if ventilation and purging methods fail. Monitor area surrounding tanks and pipelines for vapour build up during degassing.
 - .10 Following degassing, interior explosive vapour concentrations are to be less than 20 percent LEL prior to demolition.

3.7 CLEANING OF SEWAGE LINES

- .1 Prior to demolition of sewage lines, rinse lines with wash water. Sample and analyze the liquids, including wash water, in accordance with the Sewage Discharge Criteria and Wastewater discharge criteria of the Water License. Treat water as required to meet Discharge Criteria.
- .2 Analyze sewage in sludge in accordance with the contaminated soil criteria in Section 02 55 13 – Contaminated Soil. Dispose of this material in accordance with the requirements of Section 02 55 13 – Contaminated Soil.

3.8 COLLECTION AND DISPOSAL OF BATTERIES

- .1 Collect and containerize all batteries for off-site shipment.
- .2 Transfer battery containers to the Temporary Storage Area for storage prior to transportation to final disposal site.
- .3 Ship battery containers off-site to Contractor's Designated Hazardous Disposal Facilities

3.9 PACKAGING, LABELLING AND INVENTORY

- .1 Provide a numbering system and maintain an inventory of all containers with Hazardous Waste Materials to be transported and disposed of off-site.

- .2 Package and label each "hazardous material" in accordance with the "Class" and "Packaging Group" as per the TDGA.
- .3 Submit to Departmental Representative, a copy of the inventory of the contents of each container at the end of each construction season.

Figure 1 Barrel Processing Flowchart

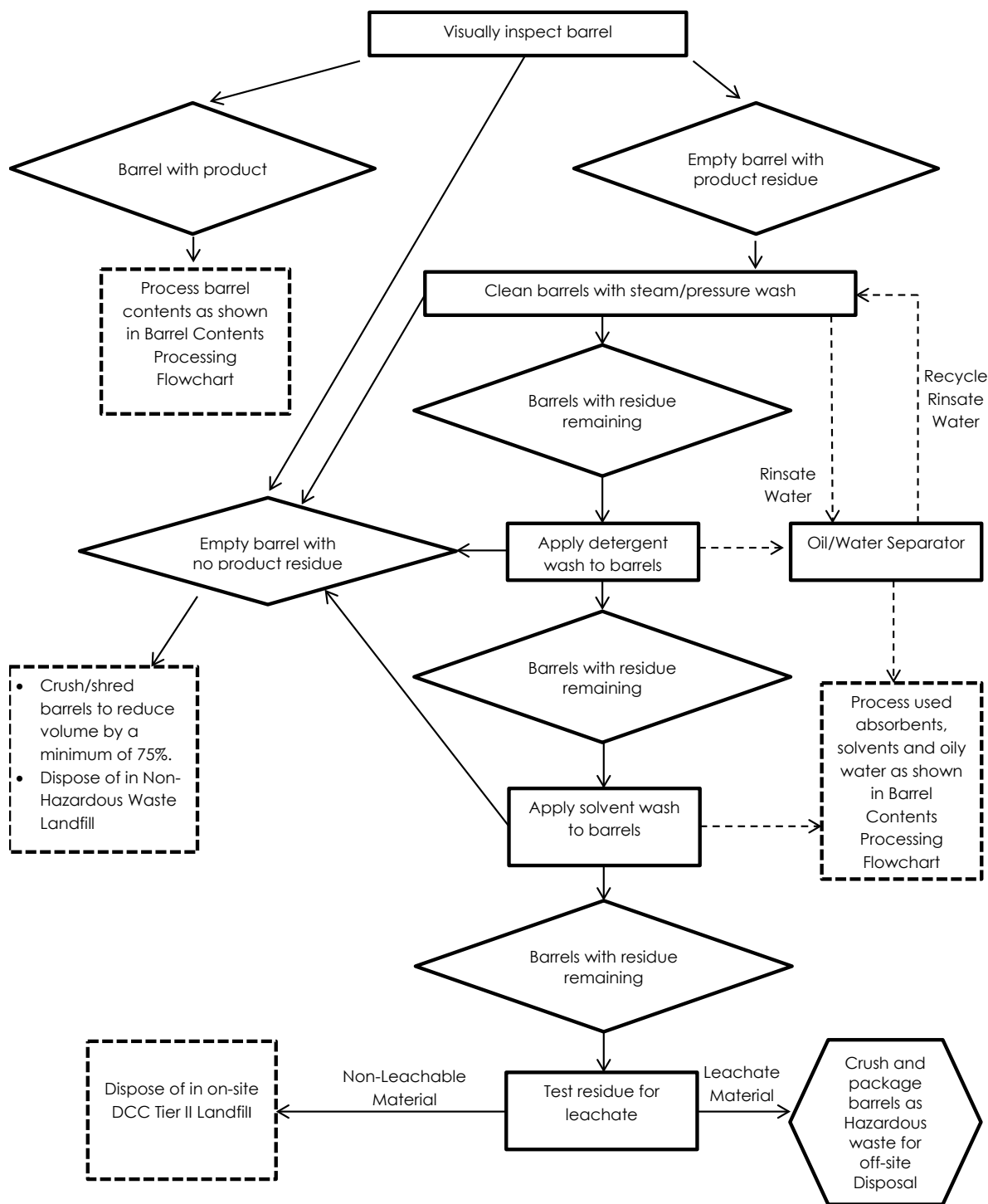
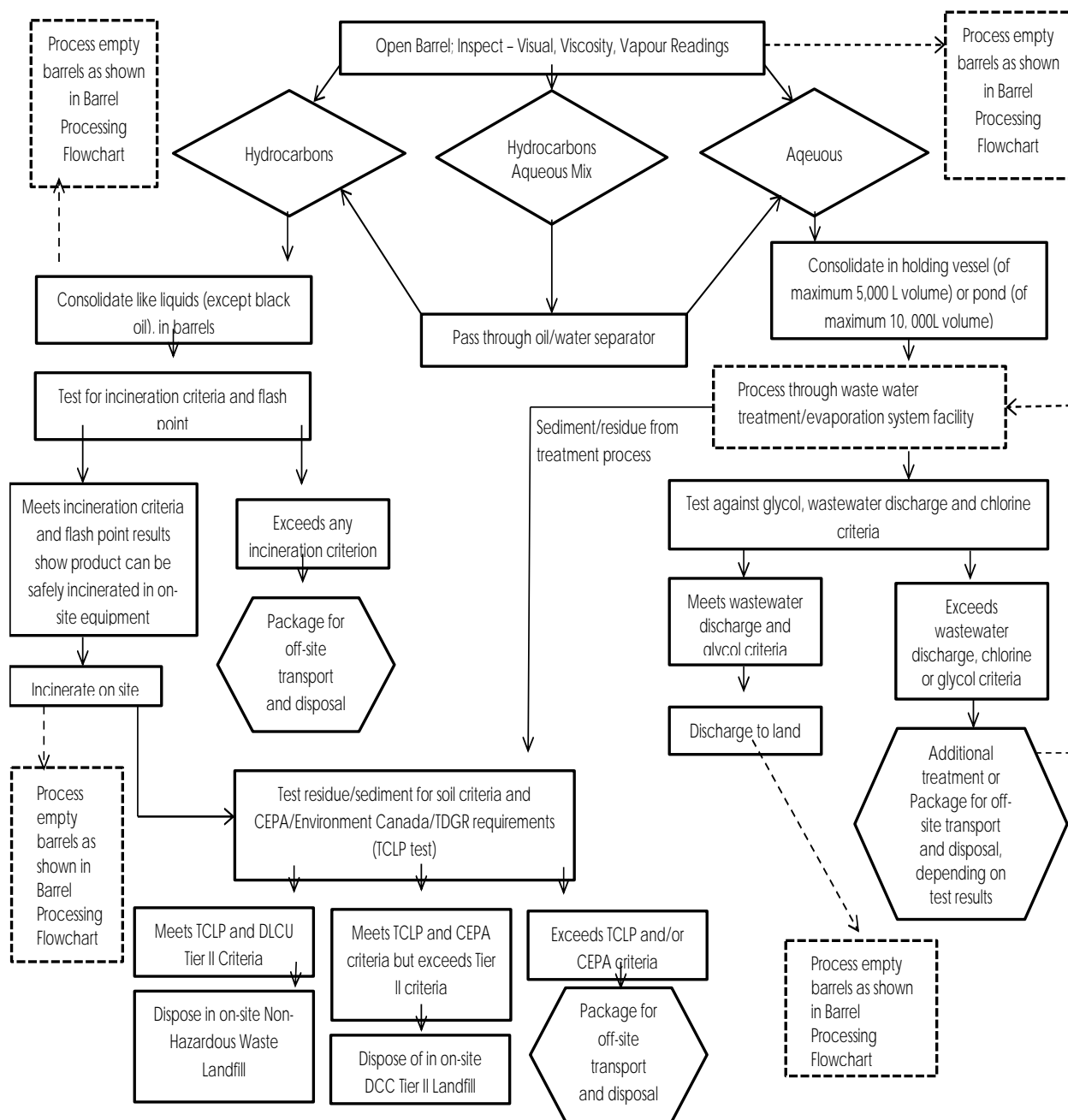


Figure 2 Barrel Contents Processing Flowchart



END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 Comply with requirements of this Section when completing the following work:
 - .1 Removing asbestos containing materials (ACM) as listed in Appendix A and B, with the exception of materials noted in Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions.
 - .2 Cut, shape, grind, drill, scrape or abrade materials mentioned above using hand powered tools, or using power tools equipped with a HEPA filter.
 - .3 General locations of identified asbestos containing materials are indicated on Drawings C02 to C06.
 - .4 These asbestos abatement minimum precautions are applicable for removal of non-friable ACM with a hand tool. Other types of ACM and/or removal techniques to be addressed as per Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions, or as directed by Departmental Representative.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 41 23 – Debris Removal.
- .8 Section 02 61 33 – Hazardous Waste Material.
- .9 Section 02 82 00.02 – Asbestos Abatement Intermediate Precautions.

1.3 REGULATORY REQUIREMENTS

- .1 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .3 Indian and Northern Affairs Canada
 - .1 Abandoned Military Site Remediation Protocol. Volume 1 – Main Report (2009).

1.4 DEFINITIONS

- .1 HEPA Vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 1 percent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Department Representative or designated representatives, and representatives of regulatory agencies.
- .6 Competent Worker: in relation to specific work, means a worker who,
 - .1 Is qualified because of knowledge, training, and experience to perform the work.
 - .2 Is familiar with the referenced provincial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of potential or actual danger to health or safety in the work.
- .7 Friable Material: material that when dry can be crumbled, pulverized or powdered by hand pressure.
- .8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside of the Asbestos Work Area.
- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.
- .12 Supervisor: Contractor's worker able to provide a history of satisfactory experience in the area of asbestos abatement that can satisfy Federal and Territorial requirements and will be permitted to supervise the work of this Section.

1.5 SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .3 Submit proof of Contractor's Asbestos Liability Insurance.
- .4 Submit to Departmental Representative proof that asbestos-containing waste has been properly bagged and disposed of.
- .5 Submit proof that all asbestos workers and/or supervisors have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning, and disposal of respirators and protective clothing.
- .6 Submit proof satisfactory to Departmental Representative that employees have had a medical assessment to determine capability of wearing a respirator, followed by respirator fitting and testing. Workers must be fit tested (irritant smoke test or equal) with respirator that is personally issued.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is completed.
- .2 Health and Safety:
 - .1 Perform construction occupation health and safety in accordance with Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
 - .2 Safety Requirements: Worker Protection:
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Non-powered reusable or replaceable filter-type half-face respirator equipped with HEPA filter cartridges, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Territorial/Provincial Authority having jurisdiction. The respirator is to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator identified to have damaged or deteriorated parts shall be replaced prior to further use. When not in use, respirators to be stored in clean and sanitary location. A worker is not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
 - .2 Eating, drinking, chewing, and smoking not permitted in Asbestos Work Area.
 - .3 Before leaving Asbestos Work Area, dispose of protective clothing as contaminated waste as specified.
 - .4 Facilities for washing hands and face shall be provided adjacent to the work areas. Workers must wash hands and face when leaving Asbestos Work Area.
 - .5 No person required to enter an Asbestos Work Area may have facial hair that affects seal between respirator and face.
 - .6 When there are asbestos-containing materials requiring both minimum and intermediate precautions in the same area; intermediate precautions, including required personal protection and decontamination structures/procedures must be implemented.

1.7 ACM DISPOSAL

- .1 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm thick bag, where required. Label bags with appropriate warning labels.

- .2 Transport bags by approved means to the on-site Non-Hazardous Waste (NHW) Landfill, placed in a marked and recorded location according to the NHW Landfill placement requirements detailed in Section 31 22 15 - Grading. Cover the asbestos waste according to the applicable references.

1.8 EXISTING CONDITIONS

- .1 Information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are provided in Appendix A and B and on Drawings C02 – C06.
- .2 Notify Department Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Department Representative.

1.9 INSTRUCTIONS

- .1 Before beginning Work, provide Department Representative satisfactory written proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

1.10 SIGNS

- .1 Signage: Display signs in all work areas where access to a contaminated area is possible. The English version of the signs is to read:

CAUTION, ASBESTOS HAZARD AREA.
UNAUTHORIZED ENTRY PROHIBITED.
WEAR PROTECTIVE EQUIPMENT.

Post a similar sign in the language of the local dialect.
- .2 Sign letters: all lettering is to be HELVETICA Medium font. The letter size is to be:

English:

| | |
|--------------------------------|-------|
| Caution, Asbestos Hazard Area. | 25 mm |
| Unauthorized entry prohibited: | 19 mm |
| Wear Protective Equipment | 19 mm |

1.11 MEASUREMMENT FOR PAYMENT

- .1 The abatement/removal, separation, packaging and disposal of known asbestos debris will not be measured for payment and shall be included in the applicable bid price for items outlined in Section 02 41 16 – Structure Demolition and Section 02 41 23 – Debris Removal in Basis of Payment Schedule, including, but not limited to the following:

- .1 Supply of all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of asbestos waste containers.
- .2 Construction of temporary enclosures.
- .3 Preparation of asbestos inventory.
- .4 Temporary storage of asbestos as required, prior to transport to on-site NHW Landfill for disposal.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .2 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix preprinted cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

Part 3 Execution

3.1 PROCEDURES

- .1 Complete construction occupational health and safety in accordance with Section 01 35 32 – Site Specific Health and Safety Plan.
- .2 Before beginning Work, isolate and prepare the Asbestos Work Area as follows:
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
- .4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low-velocity fine-mist sprayer.
 - .2 Remove asbestos containing materials from scattered debris. Collect all scattered asbestos debris from ground surface and place in 0.15 mm thick sealable polyethylene waste bag. Place the bag into a second 0.15 mm thick sealable polyethylene waste bag (double-bagging), seal, and label.

- .3 Where asbestos debris is strewn across the surface of the site, collect debris and surficial layer of soil beneath debris for double-bagging and disposal in the on-site NHW Landfill.
- .4 Complete Work to reduce dust creation to lowest levels practicable.
- .5 Work will be subject to visual inspection.
- .6 Contamination of surrounding areas indicated by visual inspection will require clean-up of affected areas.
- .5 Clean-Up:
 - .1 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
 - .3 Seal double bagged asbestos waste material and dispose of in the on-site NHW Landfill, burial in a marked and recorded location. Cover the asbestos waste according to the applicable references.
 - .4 Complete final thorough clean-up of Work areas and adjacent areas affected by Work. Remove all soil with visible asbestos containing materials imbedded within for double-bagging and disposal on the on-site NHW Landfill.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDESs:

- .1 Requirements and procedures for asbestos abatement of chrysotile and amosite asbestos containing materials described as:
 - .1 Scattered thermal insulation (magblock) south of the module train area; and,
 - .2 Pipe insulation and parging material on pipes in garage.
- .2 General locations of identified asbestos containing material are indicated on Drawings C02 to C06. Detailed listing of asbestos containing materials is included in the tables in Appendix A and B.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 41 23 – Debris Removal.
- .8 Section 02 61 33 – Hazardous Waste Material.
- .9 Section 02 82 00.02 – Asbestos Abatement Minimum Precautions.

1.3 REGULATORY REQUIREMENTS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.205-94, Sealer for Application of Asbestos-Fibre Releasing Materials.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Underwriters' Laboratories of Canada (ULC).
- .6 Environmental Protection Service, Department of Sustainable Development, Government of Nunavut
 - .1 Environmental Guideline for Waste Asbestos, 2011.

1.4 DEFINITIONS

- .1 HEPA Vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 1 percent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Department Representative or designated representatives, and representatives of regulatory agencies.
- .6 Competent Worker: in relation to specific work, means a worker who,
 - .1 Is qualified because of knowledge, training, and experience to perform the work.
 - .2 Is familiar with the referenced provincial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of potential or actual danger to health or safety in the work.
- .7 Friable Material: material that when dry can be crumbled, pulverized or powdered by hand pressure.
- .8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside of the Asbestos Work Area.
- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Glove Bag: prefabricated glove bag as follows:
 - .1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
 - .2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
 - .3 Equipped with reversible double-pull double throw zipper on top and at approximately mid-section of the bag.
 - .4 Straps for sealing ends around pipe.
 - .5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.
- .12 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.
- .13 Supervisor: Contractor's worker able to provide a history of satisfactory experience in the area of asbestos abatement that can satisfy Federal and Territorial requirements and will be permitted to supervise the work of this Section.

1.5 SUBMITTALS

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

- .2 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .3 Submit proof of Contractor's Asbestos Liability Insurance.
- .4 Submit to Departmental Representative proof that asbestos-containing waste has been properly bagged and disposed of.
- .5 Submit proof satisfactory to Department Representative that employees have had instruction on hazards of asbestos exposure, respirator use, dress, entry and exit from Asbestos Work Area, and aspects of work procedures and protective measures.
- .6 Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, accepted by Department Representative. Minimum of one supervisor for every ten workers.
- .7 Submit Worker's Safety Compensation Commission (WSCC) status and transcription of insurance prior to commencing asbestos abatement work.
- .8 Submit proof satisfactory to Departmental Representative that employees have had a medical assessment to determine capability of wearing a respirator, followed by respirator fitting and testing. Workers must be fit tested (irritant smoke test or equal) with respirator that is personally issued.
- .9 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 encapsulants;
 - .2 amended water; and,
 - .3 slow-drying sealer.

1.6

QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is completed.
- .2 Health and Safety:
 - .1 Perform construction occupation health and safety in accordance with Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
 - .2 Safety Requirements: Worker Protection:
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Powered air purifying full face respirators (PAPR) with N-100, R-100 or P-100, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Territorial/Provincial Authority having jurisdiction. The respirator is to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator identified to have damaged or deteriorated parts shall be replaced prior to further use. When not in use, respirators to be stored in clean and sanitary location. A worker is not to be assigned to an operation requiring the use of a respirator unless

- he or she is physically able to perform the operation while using the respirator.
- .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
- .2 Eating, drinking, chewing, and smoking not permitted in Asbestos Work Area.
- .3 Before leaving Asbestos Work Area, dispose of protective clothing as contaminated waste as specified.
- .4 Facilities for washing hands and face shall be provided adjacent to the work areas. Workers must wash hands and face when leaving Asbestos Work Area.
- .5 No person required to enter an Asbestos Work Area may have facial hair that affects seal between respirator and face.
- .3 Visitor Protection:
 - .1 Provide protective clothing and accepted respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators, and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

1.7 ACM DISPOSAL

- .1 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm thick bags. Label bags with appropriate warning labels.
- .2 Transport bags by approved means to the on-site Non-Hazardous Waste (NHW) Landfill, placed in a marked and recorded location according to the NHW Landfill placement requirements detailed in Section 31 22 15 - Grading. Cover the asbestos waste according to the applicable references.

1.8 EXISTING CONDITIONS

- .1 Information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are provided in Appendix A and B and on Drawings C02 – C06.
- .2 Notify Department Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Department Representative.

1.9 INSTRUCTIONS

- .1 Before beginning Work, provide Department Representative satisfactory written proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:

- .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

1.10 MEASUREMMENT FOR PAYMENT

- .1 The abatement/removal, separation, packaging and disposal of known asbestos debris will not be measured for payment and shall be included in the applicable bid price for items outlined in Section 02 41 16 – Structure Demolition and Section 02 41 23 – Debris Removal in Basis of Payment Schedule, including, but not limited to the following:
- .1 Supply of all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of asbestos waste containers.
 - .2 Construction of temporary enclosures.
 - .3 Preparation of asbestos inventory.
 - .4 Temporary storage of asbestos waste as required, prior to transport to on-site NHW Landfill.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Drop Sheets:
- .1 Polyethylene: 0.15 mm thick.
 - .2 Flame Retardant (FR) Polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
- .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix preprinted cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.
- .4 Glove Bag:
- .1 Acceptable materials: safe-T-Strip products in configuration suitable for Work.
 - .2 Glove bags intended for use in more than one location must be equipped with reversible, double-pull, double-throw zipper on top and at approximately mid-section of the bag.

- .5 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .1 Sealer: flame spread and smoke developed rating less than 50.
- .6 Tape: fibreglass reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 Execution

3.1 SUPERVISION

- .1 Minimum of one (1) Supervisor for every 10 workers is required.
- .2 Accepted Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

3.2 PREPARATION

- .1 Do construction occupational health and safety in accordance with Section 01 35 32 - Site Specific Health and Safety for Contaminated Sites.
- .2 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages and local Inuit dialect in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 millimetres) / NO UNAUTHORIZED ENTRY (19 millimetres) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 millimetres) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 millimetres)'.
- .3 For amosite asbestos removal of scattered thermal insulation (magblock) and concrete board in the Module Train Area and South of Module Train Area; prepare a Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System includes Equipment and Access Room ("dirty room"), Shower Room, and Clean Room, as follows:
 - .1 Equipment and Access Room: build Equipment Room and Access Room between Shower Room and work areas, with two double curtained doorways, one to Shower Room and one to work areas. Install portable toilet, waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work areas. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him/her sufficient space to undress comfortably.
 - .2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two double curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five workers. Provide constant supply of hot and cold or warm water. Provide piping and connect to water sources and drains. Pump waste water through 5 micrometer filter system acceptable to Departmental Representative before disposing on-site. Sampling of the waste water may be conducted following Government of Nunavut Environmental Guideline for Industrial Waste Discharges, 2002. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.

- .3 Clean Room: build Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosure and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
- .2 Container and Equipment Decontamination Enclosure System:
 - .1 Container and Equipment Decontamination Enclosure System consists of Staging Area within work area, Washroom, Holding Room, and Unloading Room. Purpose of system is to provide means to decontaminate waste containers/bags, spray equipment, shovels, and other tools and equipment for which Worker Decontamination Enclosure System is not suitable.
 - .1 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers/bags, and temporary storage pending removal to Washroom. Equip Staging Area with curtained doorway to Washroom.
 - .2 Washroom: build Washroom between Staging Area and Holding Room with two curtained doorways, one to Staging Area and one to Holding Room. Provide high-pressure low-volume sprays for washing of waste containers/bags and equipment. Pump waste water through 5 micrometer filter system before directing into drains. Provide piping and connect to water sources and drains.
 - .3 Holding Room: build Holding Room between Washroom and Unloading Room, with two curtained doorways, one to Washroom and one to Unloading Room. Build Holding Room sized to accommodate at least two waste containers and largest item of equipment used. The curtain doorway is to be sealed on each site except for when transfer of waste is occurring.
 - .2 Construction of Decontamination Enclosures:
 - .1 Build suitable framing for enclosures and line with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors.
 - .2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through doorway, one or two closures comprising doorways always remains closed.
- .3 Separation of Work Areas from Occupied Areas:
 - .1 Develop perimeter of Work Areas using pylons to indicate boundaries of areas containing amosite asbestos containing materials.
 - .2 Only workers authorized to complete Work associated with amosite asbestos to enter Work Area. Must pass through Worker Decontamination Area each time Work Area access is required.
- .4 Do not begin amosite asbestos abatement work until:
 - .1 Work areas, decontamination areas, and occupied areas have been segregated.
 - .2 Tools, equipment, and waste containers/bags are on hand.
 - .3 Warning signs are displayed where access to contaminated areas is possible.

- .4 Notifications have been completed and other preparatory steps have been taken.

3.3 PROCEDURES

- .1 Pipe Insulation Removal Using Glove Bag:
- .1 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.
 - .1 Use HEPA vacuum or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.
 - .2 Do not use compressed air to clean up or remove dust from any surface.
 - .2 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
 - .3 Remove loose material by HEPA vacuum; thoroughly wet friable material containing asbestos to be removed or disturbed before and during Work unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low - velocity sprayer or airless spray equipment capable of producing mist or fine spray.
 - .2 Complete Work in a manner to reduce dust creation to lowest levels practicable.
 - .4 Place tools necessary to remove insulation in tool pouch. Wrap bag around pipe and close zippers. Seal bag to pipe with cloth straps.
 - .5 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.
 - .6 Insert nozzle of garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.
 - .7 When glove bags are intended for use at more than one location: after wash-down and application of sealer, seal off waste in lower section of bag using zipper at mid- section of bag. Remove air from top section of bag through elasticized valve using HEPA vacuum. Remove bag from pipe, reinstall in new location, and reseal to pipe prior to opening lower section of bag. Repeat stripping operation.
 - .8 If bag is to be moved along pipe, first remove air from top section through elasticized valve using HEPA vacuum. Next loosen straps, move bag, re-seal to pipe using double-pull zipper to pass hangers. Repeat stripping operation.
 - .9 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.
 - .10 After removal of bag the pipe must be made free of residue. Remove residue using HEPA vacuum or wet cloths. Surfaces must be free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow-drying sealer to seal in any residual fibres.
 - .11 Upon completion of Work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.

- .2 Work is subject to visual inspection and air monitoring (pipe insulation removal from garage). Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .3 Amosite Asbestos-Containing Removal (Concrete Board scattered in Module Train Area and Thermal Insulation [magblock] debris scattered south of the Module Train):
 - .1 Remove amosite-asbestos containing materials prior to completing asbestos-abatement documented in Section 02 82 00.01 – Asbestos Abatement Minimum Precautions.
 - .2 Spray asbestos material with water containing specified wetting agent, using airless spray equipment capable of providing “mist” application to prevent release of fibres. Saturate asbestos material sufficiently to wet it to substrate without causing excess dripping. Spray asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.
 - .3 Gather scattered saturated asbestos material in small sections using hands and shovels, including surficial soil below debris that may contain asbestos fibres. Do not allow saturated asbestos to dry out. As it is being removed pack material in sealable plastic bags 0.15 mm minimum thick bags. Place these bags into a second clean bag (double-bag), seal, and label. Clean external surfaces of second bag thoroughly by wet sponging. Remove from immediate working area. Clean external surfaces thoroughly again by wet sponging before moving containers to Decontamination Area. Wash bags thoroughly in Decontamination Area and remove to outside. Ensure that bags are removed by workers who have entered from uncontaminated areas and dressed in clean coveralls.
 - .4 Transport bags by approved means to the on-site NHW Landfill, placed in a marked and recorded location according to the NHW Landfill placement requirements detailed in Section 31 22 15 - Grading.
- .4 Clean-up:
 - .1 Frequently during Work and immediately after completion of work, clean up dust and asbestos-containing waste using HEPA vacuum or by damp mopping.
 - .2 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.
 - .3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.
 - .4 Seal double bagged asbestos waste material and dispose of in the on-site NHW Landfill, burial in a marked and recorded location. Cover the asbestos waste according to the applicable references.
 - .5 Complete final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 Comply with requirements of this Section when completing the following work:
 - .1 Abatement of lead and (PCB) amended paints with a chemical gel or paste, scraping, sanding, or sand blasting using non-powered hand tools, as deemed feasible by the Contractor and as approved by the Departmental Representative.
 - .2 Disposal of lead and PCB amended paint chips and substrate materials.
 - .3 General locations of materials painted with lead and PCB amended paints are identified on Drawings C02- C06 and in Appendix A and B.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 41 23 – Debris Removal.
- .8 Section 02 61 33 – Hazardous Waste Material.

1.3 REGULATORY REQUIREMENTS

- .1 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Government of Nunavut
 - .1 Environmental Guideline for Lead and Lead Paint (2011)
- .3 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II – SOR 86-304 – Occupational Health and Safety Regulations.
- .4 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Indian and Northern Affairs Canada
 - .1 Abandoned Military Site Remediation Protocol. Volume I – Main Report (2009).
 - .2 Abandoned Military Site Remediation Protocol, Volume II – Technical Supporting Documentation (2009).

1.4 DEFINITIONS

- .1 Action Level: Employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as an eight (8) hour time-weighted average (TWA). Maximum precautions for lead

- abatement are based on airborne lead concentrations greater than 1.25 milligrams per cubic metre of air within Work Area.
- .2 Authorized Visitors: Department Representative or designated representatives, and representatives of regulatory agencies.
 - .3 Competent Worker: in relation to specific work, means a worker who,
 - .1 Is qualified because of knowledge, training, and experience to perform the work.
 - .2 Is familiar with the referenced provincial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of potential or actual danger to health or safety in the work.
 - .4 HEPA Vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
 - .5 Lead containing paint: Material that is coated with lead based paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
 - .6 Lead Dust: Dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot by wipe sampling on vertical surfaces and/or horizontal surfaces.
 - .7 Occupied Area: Areas of work site that is outside Work Area and non-protected workers are present.
 - .8 PCB-Amended Paint (PAP) Material: Material that is coated with PCB-amended paint. Paint has been analyzed and PCB levels found to exceed 50 ppm.
 - .9 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
 - .10 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.5

SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written proof satisfactory to Department Representative that suitable arrangements have been made to dispose of lead and/or PCB containing paint waste in accordance with requirements of the Authority Having Jurisdiction.
- .3 Contractor to provide Certificate of Approval for Transportation of PCB Waste and Location of Destruction Facility.
- .4 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .5 Submit proof of Contractor's General and Environmental Liability Insurance.
- .6 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead and PCB amended paint waste and proof that it has been received and properly disposed of.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead and PCB exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.

- .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two (2) days duration, approved by Departmental Representative. Minimum of one (1) supervisor for every ten (10) workers.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to lead and PCB amended paint, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is completed.
- .2 Health and Safety:
 - .1 Perform construction occupation health and safety in accordance with Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
 - .2 Safety Requirements: Worker and Visitor Protection:
 - .1 Protective equipment and clothing to be worn by workers while in Lead and PCB Work Area include:
 - .1 NIOSH approved respirator equipped with filter cartridges with assigned protection factor of fifty (50), acceptable to Authority Having Jurisdiction; suitable for type of lead and PCBs and level of lead/PCB dust exposure in Lead/PCB Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas. Workers to perform work in this Section require medical fit testing to confirm capability to safely wear a respirator.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
 - .2 Requirements for Workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean disposable coveralls and head covers before entering Equipment and Access Rooms, as described in Item 3.2.2 in this Section, or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead/PCB – contaminated materials. Leave reusable items except respirator in Equipment and Access Room. Upon completion of lead/PCB abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from Work Area or from Equipment and Access Room.
 - .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter Work Area. Doorways of transfer room are to remain sealed except when transfer of waste is occurring.

- .3 Eating, drinking, chewing, and smoking not permitted in PCB and/or lead abatement Work area(s).
- .4 Facilities for washing hands and face shall be provided adjacent to the work areas. Workers must wash hands, face, and respirators when leaving Work Area.
- .5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section in three official languages (English, French, and language of local dialect).
- .6 No person required to enter a lead and PCB abatement Work Area may have facial hair that affects seal between respirator and face.
- .7 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors for Work Areas.
 - .2 Instruct Authorized Visitors in use of protective clothing, respirators, and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering and exiting from Work Area.
- .8 When lead and PCB amended paint abatement is to be conducted in an area where asbestos abatement is also to be conducted, most stringent safety requirements (personal protection and decontamination structures/procedures) shall be implemented.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Handle and dispose of hazardous material in accordance with CEPA, TDGA, and Regional and Municipal regulations.
- .2 Consider all abated paint chips to be PCB amended paint waste.
- .3 Disposal of PCB and lead waste generated by removal activities must comply with Federal, Provincial, Territorial, and Municipal regulations:
 - .1 Dispose of paint chips in containers as described in Item 2.1.5 of this Section.
 - .2 Containers must be labelled with appropriate warning labels.
- .4 Owners or operators for storage sites:
 - .1 Provide method for determining concentration of PCBs in paint at request of environment officer or inspector or Departmental Representative.
 - .2 Ensure personnel are familiar with and understand current PCB waste management procedures and use of personal protection equipment.
- .5 Provide manifests describing and listing waste created. Transport containers by approved means to licenced facility for disposal.
- .6 For each container of lead and PCB amended paint waste: identify waste and weight in kilograms of the waste.

1.8 EXISTING CONDITIONS

- .1 Summaries of lead and PCB amended paint materials to be abated and disposed of are presented in Appendix A and B, and included on Drawings C02 – C06.
- .2 Notify Departmental Representative of suspect lead and PCB amended paints discovered during Work and not apparent from drawings, specifications, or tables

pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 SCHEDULING

- .1 Not later than two (2) days before beginning Work on this Project, notify the following in writing, where appropriate:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead and PCB amended painted materials in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.10 MEASUREMENT FOR PAYMENT

- .1 The abatement, separation, packaging, transport, and disposal of lead and PCB amended paint from buildings and structures to be demolished and debris areas are included in the price for demolition of the structures and removal of the debris as described in Section 02 41 16 – Structure Demolition, Section 02 41 23 – Debris Removal, and Section 02 61 33 – Hazardous Waste Material including but not limited to the following:
 - .1 Supply all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of lead and PCB waste containers.
 - .2 Handling, separation, and disposal of lead and PCB amended paint materials from other debris and miscellaneous materials.
 - .3 Preparation of lead and PCB amended paint waste inventories.
 - .4 Transport and off-site disposal of lead and PCB amended paint chips.
 - .5 Transport and on-site disposal within the Tier II Landfill of substrate materials following abatement of lead and PCB amended paints. Placement within the Tier II landfill is to follow the placement requirements under Section 31 22 15 – Grading.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Polyethylene: 0.15 mm unless otherwise specified; in sheet size to minimize joints.
- .2 FR Polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass – reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

- .4 Slow-drying sealer: non-staining, clear, water – dispersible type that remains tacky on surface for at least eight (8) hours and designed for trapping residual paint residue.
- .5 Lead and PCB amended paint waste storage:
 - .1 Drums and containers:
 - .1 Designed with sufficient durability and strength to prevent lead and PCB solids from being released into the environment, affected by weather, or contaminated by external sources.
 - .2 Steel or other material approved by Departmental Representative.
 - .2 Drums
 - .1 Capacity no greater than 205 litres.
 - .2 Steel of minimum 1.2 mm.
 - .3 Ensure removable steel lid securely attached and complete with PCB-resistant gasket.
 - .4 Paint or treat interior and exterior to prevent rusting.
 - .3 Drum liners:
 - .1 6 mil clear polyethylene bag, 914 mm x 1524 mm, with opening at 914 mm end.
 - .4 Securely affix to all Hazardous Waste Containers containing lead and PCB amended paints, a black and white weatherproof label measuring 150 mm by 150 mm in the form illustrated in Figure 1 at the end of this section and translated into the local dialect.
 - .5 Securely affix to a visible side of the Hazardous Waste Container with lead and PCB amended paints, a black and white weatherproof label measuring 76 mm by 76 mm bearing a Registration number. Labels to be provided by Departmental Representative and will be in the form illustrated in Figure 2 at the end of this specification section.
 - .6 Maintain signs and labels in clear and legible condition in English, French and language of local dialect.

Part 3 Execution

3.1 SUPERVISION

- .1 Approved Supervisor must remain within Lead/PCB Work Area during disturbance, removal, or other handling of lead and/or PCB containing paints.

3.2 PREPARATION

- .1 Work Area:
 - .1 Cordon off Work Areas (areas where abatement of lead and PCB amended paint to take place) using temporary measures such as pylons or snow/sand fences.
 - .2 At point of access to Work Areas, install warning signs in three official languages (English, French, and language of local dialect) in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:
 - .1 CAUTION LEAD HAZARD AREA (25 mm)
 - .2 NO UNAUTHORIZED ENTRY (19 mm)

- .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm)
- .4 BEATHINGN LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm)
- .2 Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
 - .1 Equipment and Access Room: construct between exit of enclosure system and work area, with two curtained doorways, one to the clean area of the enclosure and one to the work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.
 - .2 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal.
 - .3 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
 - .2 Construction of Decontamination Enclosures:
 - .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape; apply two layers of FR polyethylene on floor.
 - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closures comprising doorways always remains closed.
 - .3 Maintenance of Enclosures:
 - .1 Maintain enclosures in clean condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each work day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

3.3

ABATEMENT OF LEAD AND PCB AMENDED PAINTED MATERIALS

- .1 Removal of lead and PCB amended painted materials to be performed through the use of a chemical gel or paste, scraping, sanding, or sand blasting using non-powered hand tools. The use of heat to remove paint from substrate is not permitted.
- .2 During demolition and dismantling operations, contain paint particles and dust through the use of polyethylene sheets or other measures. Use drop sheets, as required, to collect paint particles that become removed from surfaces during demolition and dismantling operations. Establish a control area around these activities to provide protection to personnel from airborne paint particles. Construct control area to prevent the escape of paint chips.

- .3 Remove lead and PCB amended paint in small sections and pack as it is being removed in 6 mil clear polyethylene bag as described in item 2.1.5.3.1 of this Section and place in labelled containers for transport.
- .4 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination enclosures. Wash containers thoroughly in decontamination enclosure and move to Clean Room. Ensure containers are removed from the Clean Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .5 The use of heat (e.g. cutting torches) to cut or dismantle facilities containing paint materials is not permitted unless the paint has been removed from the areas to be cut such that excessive heating of the remaining paint does not occur. Notify Departmental Representative prior to torching activities.
- .6 After completion of stripping work, wire brush and wet sponge surface from which lead and PCB amended paint has been removed to remove additional material. During this work keep surfaces wet.
- .7 Collect paint debris and surficial soil impacted by paint chips and containerize as a lead and PCB paint waste. Soils impacted with lead and PCB amended paints to be handled and disposed of as lead and PCB waste.
- .8 After all lead and PCB amended paint has been removed from the substrate materials, paint-free substrate materials to be transported and disposed of in the on-site Tier II Landfill.
- .9 Prior to off-site transportation, store containerized lead and PCB amended paints in Temporary Storage Area, as outlined in Section 02 61 33 – Hazardous Waste Material.
- .10 Dispose of lead and PCB amended paints at Contractor's Designated Hazardous Waste Disposal Facility (approved to accept PCB waste).

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When lead dust leakage from Work Area occurs, Departmental Representative may order Work shutdown.
 - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 FINAL CLEANUP

- .1 Place polyethylene seals, tape, drop sheets, cleaning material, clothing, and other contaminated waste in lead and PCB waste storage containers. Seal and label containers and transport to Temporary Storage Area prior to off-site disposal.

- .2 Collect any remaining soils that have been impacted by loose paint chips. Dispose of soil as lead and PCB waste.
- .3 Clean up Work Areas and Equipment and Access Room.
- .4 Clean up sealed waste containers and equipment used in Work and remove from Work Areas via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .5 Conduct final check to ensure no debris or paint chips remain on surfaces as result of dismantling operations.

FIGURE 1

| ATTENTION | |
|---|---|
| CONTAMINATED WITH PCBs | CONTAMINÉ PAR BPC (BIPHÉNYLES) |
| <p>THE CONTENTS OF THIS EQUIPMENT ARE CONTAMINATED WITH PCBs. A TOXIC SUBSTANCE LISTED IN SCHEDULE I OF THE CANADIAN ENVIRONMENTAL PROTECTION ACT. IN CASE OF AN ACCIDENT OR A SPILL OR FOR DISPOSAL INFORMATION, CONTACT THE NEAREST OFFICE OF ENVIRONMENTAL PROTECTION, ENVIRONMENT CANADA.</p> | <p>LE CONTENU DE CET EQUIPEMENT EST CONTAMINE PAR DES BPC, SUBSTANCE TOXIQUE INSCRITE Á L'ANNEXE I DE LA LOI CANADIENNE SUR LA PROTECTION DE L'ENVIRONNEMENT EN CAS D'ACCIDENT OU DE DEVERSEMENT, OU POUR SAVOIR COMMENT L'ELIMINER, CONTACTER LE BUREAU DE LA PROTECTION DE L'ENVIRONNEMENT, ENVIRONNEMENT CANADA, LE PLUS PROCHE.</p> |
| <p>PCB CONCENTRATION (parts per million) CONCENTRATION DE BPC (parties par million) _____</p> | |
| <p>DATE ANALYSED DATE D'ANALYSE</p> | |
| <p>COMPANY NAME NOM DE LA COMPAGNIE</p> | |
| <p>AUTHORIZED COMPANY OFFICIAL AGENT OFFICIEL AUTORISE</p> | |

FIGURE 2



END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section specifies general requirements for the processing of aggregates to be incorporated into the Work as granular fill.
- .2 It is anticipated that there will be no requirement for crushing of granular materials to satisfy gradation specifications. There will be requirements to select, blend, and/or screen granular materials to satisfy gradation specifications as indicated in this Section. Moisture conditioning of material from borrow sources may be required.

1.2 SOURCE APPROVAL

- .1 Abide by conditions of the Land Use Permit, Water Licence, Quarry Permit and/or other requirements of Authorities Having Jurisdiction (AHJ).
- .2 Source of materials to be incorporated into work requires approval by Departmental Representative.
- .3 Defined borrow areas (Borrow Source 1 through Borrow Source 8) are to be used as indicated on Drawing C01. Approval to excavate borrow material from new areas will be granted by Departmental Representative based on areas that do not require new access roads, areas that have minimal ice-rich permafrost and areas located away from water bodies only when all previously identified sources are depleted or determined by Departmental Representative to be unsuitable.
- .4 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least seven days prior to commencing production. Departmental Representative will conduct confirmatory testing of borrow material, if required, to determine if any contamination is present.
- .5 If, in the opinion of Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .6 Should a change of material source be proposed during work, advise Departmental Representative one (1) week in advance of proposed change to allow sampling and testing.
- .7 Acceptance of a material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- .8 Geotechnical information, including a borrow assessment and the results of laboratory analyses of soil samples obtained from the site, are included in the Phase III Environmental Site Assessment, CAM-E Keith Bay Nunavut, Stantec, December 2013.

1.3 PRODUCTION SAMPLING

- .1 Aggregate will be subject to continual sampling by Departmental Representative during production either at the stockpile or at the place of work. The aggregate is to meet the required specifications regardless of the place of sampling.
- .2 Provide Departmental Representative with ready access to source and processed material for purpose of sampling and testing.
- .3 Samples are to be obtained according to industry acceptable practices.

1.4 MEADUREMENT OF PAYMENT

- .1 Development of borrow sources including stripping, processing, handling, stockpiling, replacement of organics, transport, and any necessary restoration will be considered incidental to the work of Section 31 22 15 – Grading, and will not be measured for payment.
- .2 Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.
- .2 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
- .3 Fine aggregates satisfying requirements of applicable section are to be one (1), or a blend of the following:
 - .1 Natural sand.
 - .2 Screened sand.
- .4 Coarse aggregates satisfying requirements of applicable section are to be composed of naturally formed particles of stone.
- .5 Type 1 Granular Fill:
 - .1 Type 1 Granular Fill is select material obtained from excavations or borrow areas approved by Departmental Representative, generally consisting of pit-run, screened stone, gravel and sand in an unfrozen state and free from rocks larger than 50 mm, waste or other deleterious material.
 - .2 Type 1 Granular Fill is used for cover and regrading requirements.

- .3 Gradations to be within the following limits when tested to ASTM C136 and ASTM C117, sieve sizes to CAN/CGSB-8.2:

| Sieve Designation (millimetres) | % Passing by |
|---------------------------------|--------------|
| Weight | |
| 75 | 100 |
| 50 | 60 to 100 |
| 12 | 40 to 80 |
| 5 | 10 to 50 |
| 0.08 | 0 to 5 |

- .6 Type 2 Granular Fill:

- .1 Type 2 Granular Fill consists of granular pit-run material, with a maximum particle size of 150 mm, and no more than 10% passing an 80 µm sieve, from identified borrow sources and is generally used for:
- .1 regrading low areas as indicated;
 - .2 construction of containment berms
 - .3 backfill for contaminated soil excavations;
 - .4 general site grading requirements.
- .2 Type 2 Granular Fill may be designated by Departmental Representative as a suitable alternative for other material types.
- .3 Materials classified as unsuitable will include:
- .1 Soils with moisture content exceeding optimum moisture by 2% or more.
 - .2 Soils containing organic material, snow, ice or other deleterious material.

- .7 Type 3 Granular Fill:

- .1 Type 3 Granular Fill consists of granular pit-run material, with a maximum particle size of 250 mm, and 10% to 20% passing an 80 µm sieve, from identified borrow sources and is generally used for:
- .1 regrading low areas as indicated;
 - .2 construction of containment berms;
 - .3 backfill for contaminated soil excavations;
 - .4 general site grading requirements.
- .2 Type 3 Granular Fill may be designated by Departmental Representative as a suitable alternative for Type 2 Granular Fill where adequate quantities of Type 2 are unavailable.
- .3 Materials classified as unsuitable will include:
- .1 Soils with moisture content exceeding optimum moisture by 2% or more.
 - .2 Soils containing organic material, snow, ice or other deleterious material.

- .8 Type 4 Granular Fill:

- .1 Type 4 Granular Fill consists of non-plastic granular pit-run material, with more than 20% passing an 80 µm sieve, from identified borrow sources and is generally used for:
- .1 regrading low areas as indicated and approved;
 - .2 backfill for contaminated soil excavations;
 - .3 general site grading requirements where approved.

- .9 Riprap Slope Protection:

- .1 Riprap slope protection consists of screened coarse well graded gravel and cobbles with maximum particle size 250 mm and no more than 10% passing a 25 mm sieve, from identified borrow sources and is generally used for erosion protection on steeper slopes as indicated.

- .10 Sand:
 - .1 Sand consists of screened granular material, with maximum particle size 12 mm and no more than 10% passing a 80 µm sieve, from identified borrow sources and is generally used for a protection layer next to synthetic liners as indicated on the drawings.
- .11 Refer to Section 31 22 15 – Grading for placement, moisture conditioning and compaction of granular fill.

Part 3 Execution

3.1 DEVELOPMENT OF AGGREGATE SOURCE

- .1 Remove any debris (known or unknown) from the area, as described in Section 02 41 23- Debris Removal, prior to excavating borrow materials.
- .2 Any significant deposits of organic material, as determined by Departmental Representative, are to be avoided and left undisturbed during development of an aggregate source, or stripped and stockpiled for replacement to restore borrow area.
- .3 Strip an area ahead of excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

3.2 PROCESSING

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregates if required to obtain gradation requirements specified. Use methods and equipment that are accepted by the Departmental Representative.
- .3 Blending to decrease percentage of flat and elongated particles is permitted.
- .4 When operating in stratified deposits use excavation equipment and methods that will produce uniform, homogeneous aggregate.
- .5 Moisture condition aggregate as required to achieve the specified density and/or degree of saturation.
- .6 Dry aggregate as required to place and compact according to this Specification.
- .7 Do not use frozen aggregate in any areas that require compaction.

3.3 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.4 STOCKPILING

- .1 If required, stockpile aggregates on site in locations indicated or designated by Departmental Representative. Stockpiles are to not be located on undisturbed tundra.
- .2 Stockpiling sites are to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

- .3 Separate aggregate stockpiles of different types sufficiently far apart to prevent intermixing.
- .4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .5 Stockpile materials in uniform layers of one (1) metre maximum thickness.
- .6 Complete each layer over the entire stockpile area before beginning next layer.
- .7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .8 Coning of piles or spilling of material over edges of pile will not be permitted.
- .9 During snowy conditions, prevent ice and snow from becoming mixed into stockpile.

3.5 RECLAMATION OF AGGREGATE SOURCE AND STOCKPILE CLEANUP

- .1 When aggregate source excavation is completed, dress sides of excavation to achieve gentle slopes, maximum of 5H:1V, which fit local topography, and provide swales or ditches as required to prevent surface standing water.
- .2 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .3 Trim, backblade and restore borrow areas to a condition acceptable to Departmental Representative.
- .4 Flatten remaining stockpiles to low piles with sides that have a maximum slope of 5H:1V, or as directed by Departmental Representative.
- .5 Leave stockpile site in a tidy, well drained condition, free of standing surface water with slopes mimicking natural topography. The final condition must meet the satisfaction of Departmental Representative.

END OF SECTION

Part 1 - General

1.1 DESCRIPTION

- .1 This Section specifies requirements for:
 - .1 The earthwork associated with NHW Landfill, Tier II Landfill and Soil Treatment Cell construction, upgrading and maintenance of existing access roads and airstrips, constructing new roads, regrading of site debris areas and depressions created by the removal of debris and contaminated soil and general site areas requiring regrading and reshaping.
 - .2 The supply and placement of granular fill materials.
 - .3 This work includes the regrading of concrete foundation pads (garage foundation, warehouse foundation, and antennae foundations) to match with surrounding topography and placement and regrading of a minimum of 0.75 m of Type 1 Granular Fill material at Class C buried debris areas (BDA1, BDA2, BDA4, BDA5, and BDA7).
- .2 Individual Drawings should be referred to for a description of the designated area(s), design grades, contours, elevations or cover soil thicknesses.

1.2 DEFINITIONS

- .1 Reshaping: The levelling and grading, to a maximum depth of 600 mm, including the movement of boulders, of designated areas to blend in with the natural terrain and provide positive drainage. Reshaping does not require the supply and placement of additional granular fill material. Excavation of the terrain to a depth greater than 600 mm during reshaping operations is to be considered as unclassified excavation.
- .2 Scarifying: The disturbance or loosening of a soil to a minimum depth of 300 mm to allow for compaction or aeration.
- .3 Regrading: The supply and placement of granular fill in designated areas to blend in with the natural terrain and provide positive drainage.
- .4 Unclassified Excavations: Excavation of materials of whatever nature encountered in the work to a depth greater than 600 mm.
- .5 Granular Fill: Type 1, Type 2, and Type 3 material as specified in Section 31 05 17 - Aggregate Materials.
- .6 Berm: Granular fill of type indicated on the Drawings, placed above the original ground and built-up to a design elevation.
- .7 Intermediate Cover: Granular Fill, as designated by the Departmental Representative, used to cover each waste layer and fill void spaces within the landfilled waste.
- .8 Surficial Boulders: visible rocks with a nominal diameter of 300 mm or greater.
- .9 General Fill: Granular fill used for regrading low areas and to backfill contaminated soil excavations.
- .10 Waste Material: Excavated material unsuitable for use in work or surplus to requirements.

- .11 Borrow Material: Material obtained from accepted areas and required for grading work.
- .12 Specific classifications of granular fill materials are described in Section 31 05 17 - Aggregate Materials.
- .13 Truck box: The capacity of the granular fill hauling vehicle that will be measured to the closest 0.1 cubic metre. The vehicle once measured will not be changed without the consent of the Departmental Representative. The box is to be levelled by the Contractor, using a strike-off method prior to measurement. No heaping or mounding of the truck box is allowed. The following bulking factors will be applied to truck box measurements:
- Granular materials: 15%.
 - Debris: 50%.
- .14 Maximum Dry Density is determined by the Standard Proctor Method in accordance with ASTM D698. It is applicable if less than 30% of the material is retained on the ASTM 19 millimetre sieve.
- .15 Corrected maximum dry density is applicable if more than 30% of the material is retained on the ASTM 19 millimetre sieve. It is defined as:
- .1
$$D = \frac{D1 \times D2}{(F1)(D2) + (F2)(D1)}$$
- .2 Where:
- D = corrected maximum dry density kg/m³
- F1 = fraction (decimal) of total field sample passing ASTM 19.0 millimetre sieve F2 = fraction (decimal) of total field sample retained on ASTM 19.0 millimetre sieve (equal to 1.00 - F1)
- D1 = maximum dry density, kg/m³ of material passing ASTM 19.0 millimetre sieve determined in accordance with Method C of ASTM D698 or latest edition thereof.
- D2 = bulk density, kg/m³ of material retained on ASTM 19.0 millimetre sieve, equal to 1,000 G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127-84, or latest edition thereof.

1.3 SITE CONDITIONS

- .1 Suspend grading operations whenever climatic conditions are unsatisfactory for grading Work to conform with this Specification.
- .2 Do not operate equipment in work areas until the material has dried sufficiently to prevent excessive rutting.
- .3 Areas to be graded are to be free from debris and excessive snow, ice or standing water prior to grading work beginning.
- .4 Contractor is advised that soft ground conditions may be prevalent at the site during periods of maximum thaw of the permafrost. Schedule and carry out work to minimize disturbance to permafrost soils.
- .5 Contractor is advised that existing access roads to be used during construction activities will require repair and upgrading including a culvert installation (location indicated on Drawing C01) and general maintenance grading.

1.4 PROTECTION

- .1 Prevent damage to benchmarks, existing buildings, surface or underground service or utility lines which are to remain. Immediately repair any damage to the above or replace the above in the event of damage, at no cost to Departmental Representative.
- .2 Protect all monitoring wells and ground temperature cables (thermistors). Repair or replace, at no cost, any monitoring wells or ground temperature cables damaged by the Contractor's operations.
- .3 Protect archaeological features from damage/disturbance by construction activities and traffic.
- .4 Protect unanticipated archaeological resources encountered during construction. Suspend all activities in that area and notify Departmental Representative immediately.
- .5 Protect survey monuments. Repair or replace, at no cost to the Departmental Representative, any survey monuments damaged by the Contractor's operations.
- .6 Protect and do not disturb spawning beds and breeding grounds during construction.
- .7 Environmental protection measures are to be in accordance with the requirements specified in Section 01 35 43 - Environmental Procedures. Follow the accepted Erosion, Sediment and Drainage Control Plan submitted in accordance with Section 01 35 43 - Environmental Procedures.

1.5 SAMPLES

- .1 Inform Departmental Representative of proposed source of granular fill materials and provide access for sampling. Give a reasonable amount of notice to allow for lab analysis of samples.

1.6 SITE ACCESS UPGRADE PLAN

- .1 Submit the Site Access Upgrade plan for CAM-E to Departmental Representative prior to mobilization, in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Site Access Upgrade plan are to include, but not be limited to, the following:
 - .1 Blasting or scaling requirements
 - .2 Bridge installation/upgrade requirements
 - .3 Drainage improvements
 - .4 Road sections to be built up
 - .5 Estimated quantity of granular material required and borrow sources
 - .6 Passing, pull-out or turn around locations
 - .7 Safety measures to be put in place in narrow and steep road sections

1.7 MEASUREMENT FOR PAYMENT

- .1 For items to be measured for payment by survey, survey the area to receive granular fill either by cross section or by grid, following removal/stripping (if required) of surface material. Survey significant breaks in the original ground surface grade, incorporating at minimum the cross section locations indicated on the Drawings. The maximum distance between cross sections or grid points is to not exceed 20 metres unless otherwise indicated by Departmental Representative. Survey measurements are to be to the nearest 0.01 metre. Following placement of granular fill material, Contractor is to resurvey the cross sections or grid points. The volume measurement of granular

material for payment will be determined by digital terrain model or average end area method, as Departmental Representative deems appropriate for the survey information provided. Preference is to be for quantity determination by digital terrain model.

- .2 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground (for berm and cover construction) at the Non-Hazardous Waste (NHW) Landfill will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid under Item 31 22 15-1 – (Non-Hazardous Waste Landfill Berm/Cover Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the NHW Landfill as specified on Drawing C07 with the exception of any intermediate fill requirements between waste layers if required (refer to Section 31 22 15 Item 1.7.8).
- .3 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground (for berm, bedding, and cover construction) at the Tier II Landfill will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid under Item 31 22 15-2 (Tier II Landfill Berm/Bedding/Cover Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the Tier II landfill as specified on Drawing C08 with the exception of any intermediate fill requirements between waste layers if required (refer to Section 31 22 15 Item 1.7.9).
- .4 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground for berm and bedding construction at the Soil Treatment Cell will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid for under Item 31 22 15-3 (Soil Treatment Cell Berm/Bedding Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the Soil Treatment Cell as specified on Drawing C09.
- .5 The excavation and granular backfill of the trench at the perimeter of the Tier II Landfill will be measured for payment by the lineal metre of excavation as measured by survey and paid under Item 31 22 15-4 (Tier II Landfill Key Trench Excavation) of the Basis of Payment Schedule based on a 0.5 metre deep and 4 metre wide excavation. For excavation depths less than or greater than 0.5 m by more than 0.1 m, as directed by the Departmental Representative, the Unit Cost for trench excavation will be multiplied by a factor dependent on the actual depth of excavation. The multiplication factor will be negotiated with the Departmental Representative.
- .6 The scope of work for Payment Items 31 22 15-5 (Trench Excavation for Liner Installation – Tier II Landfill) and 31 22 15-6 (Trench Excavation for Liner Installation – Soil Treatment Cell) shall include:
 - .1 Excavation of anchor trench and installing and anchoring the geotextile and geomembrane below ground surface to the depth of excavation as indicated on the Drawings, or as directed by the Departmental Representative.
 - .2 Disposal of the excavated material in a location as directed by the Departmental Representative.
 - .3 Supply, placement, and compaction of granular fill to the specified depth as indicated on the Drawings.
 - .4 No extra payment will be made for soil excavated from beyond the specified limits of the trench excavation, unless such removal has been specifically directed by the Departmental Representative.

- .7 The supply, placement and compaction of granular fill for the following work items will be measured for payment by the cubic metre as determined by the average end area survey method or digital terrain analysis. Granular fill will be paid for under Payment Item 31 22 15-7 (Regrading of Class C Buried Debris Areas and Concrete Foundation Pads) of the Basis of Payment Schedule for the following areas:
 - .1 Class C Buried Debris Areas – capping/regrading at BDA1, BDA2, BDA4, BDA5, and BDA7 (minimum of 0.75 thick layer Type 1 Granular Fill).
 - .2 Concrete Foundation Pads – Regrading to match with surrounding topography at garage foundation, warehouse foundation, and antennae foundations.
- .8 Tier I and/or Type A PHC contaminated soil shall be used as intermediate fill in the NHW Landfill as directed by the Departmental Representative where available. If additional intermediate fill is required (i.e. insufficient volume and/or quality of Tier I and/or Type A PHC contaminated soil) then Type 3 Granular Fill shall be used as directed by Departmental Representative and will be paid under Item 31 22 15-8 (Intermediate Fill – NHW Landfill) of the Basis of Payment Schedule. The processing, loading, hauling, placement and compaction of intermediate granular fill for the NHW Landfill will be measured for payment by truck box as described in Article 1.2 - Definitions of this Section. The capacity of the truck box will not be changed without consent of the Departmental Representative. The Departmental Representative may, at their own discretion, determine the granular material volume without enforcing the strike-off method. Truck boxes are to be thoroughly cleaned when unloading.
- .9 Type 3 Granular Fill shall be used as directed by Departmental Representative as intermediate fill in the Tier II Landfill if required. Intermediate fill is only required in conditions of highly organic or wet Tier II contaminated soil and will be paid under Item 31 22 15-9 (Intermediate Fill – Tier II Landfill) of the Basis of Payment Schedule. The processing, loading, hauling, placement and compaction of intermediate granular fill for the Tier II Landfill will be measured for payment by truck box as described in Article 1.2 - Definitions of this Section. The capacity of the truck box will not be changed without consent of the Departmental Representative. The Departmental Representative may, at their own discretion, determine the granular material volume without enforcing the strike-off method. Truck boxes are to be thoroughly cleaned when unloading.
- .10 Include all direct costs for the upgrading, construction and maintenance of site access roads and airstrips, including placement of granular material, and installation of culverts including at the identified location on the main site access road indicated on Drawing C01, in the lump sum price for Access Road Upgrading and Maintenance, Item 31 22 15-10 in Basis of Payment Schedule.
- .11 The following work items will be incidental to the work described in this Section, and will not be measured separately:
 - .1 Stripping, stockpiling and replacement or placement to a new location of organic material from the borrow areas as directed by Departmental Representative, and where required from construction areas upon where granular material is to be placed.
 - .2 Disposal of waste material from the borrow areas.
 - .3 Removal of surficial boulders over 300 mm in diameter from construction areas.
 - .4 Excavating, separating, processing, screening, and stockpiling of borrow materials.

- .5 Reshaping of areas with ponded water (standing water covering over five (5) square metres and more than 0.2 metres deep) and rutting (ruts more than 0.1 metres deep) caused by contractor's construction activities.
- .6 Grading of borrow areas to approximate the before-construction condition upon completion.
- .7 Loading, hauling and haul road construction, maintenance and rehabilitation.
- .8 Water for moisture conditioning, compaction and dust control.
- .9 Removal and disposal or burial of utility lines exposed by the Contractor during the excavation of granular materials.
- .10 All construction surveying, including layout of facilities, slope staking, and supply and installation of witness grade stakes to monitor the depth of granular material placement.
- .11 Surveying and calculation of granular material quantities for progress payment purposes.
- .12 Reshaping and regrading of Contractor's laydown areas including the supply, placement and compaction of granular material.
- .13 Draining of wet areas prior to regrading operations.
- .14 Work undertaken to drain borrow areas prior to excavation.
- .12 No measurement for payment will be made for:
 - .1 Rejected material.
 - .2 Surplus material.
 - .3 Excavation, and stripping and replacement of organic material beyond specified limits.
 - .4 Excavation to investigate borrow sources.
 - .5 Placement of granular fill beyond the limits and depths specified, unless specifically authorized by Departmental Representative.
- .13 Decommissioning of the Soil Treatment Cell will not be considered for payment under this Section, but is to be considered as part of the unit price bid for Item 02 61 00-1 – Treatment of Type B PHC Contaminated Soil in the Basis of Payment Schedule.
- .14 The placement in layers and compaction of contaminated soils and non- hazardous waste into the on-site landfills will be measured separately under one of the following sections:
 - .1 Section 02 41 16 – Structure Demolition.
 - .2 Section 02 41 16 – Debris Removal.
 - .3 Section 02 55 13 - Contaminated Soil.
 - .4 Section 31 23 11 - Buried Debris Excavation.
- .15 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Granular fill materials in accordance with Section 31 05 17 - Aggregate Materials

- .2 Fill materials require the approval of the Departmental Representative.
- .3 Fill materials shall be pit-run or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material, snow, ice and other deleterious materials.
- .4 There is a requirement to selectively acquire, blend and/or screen granular materials to satisfy gradation specifications as indicated in Section 31 05 17 - Aggregate Materials.

2.2 LINER MATERIALS

- .1 Geotextile as per Section 31 32 19.01 – Geotextile
- .2 Geomembrane as per Section 31 32 19.02 – Oil Resistant RPE Geomembrane
- .3 Geomembrane as per Section 31 32 19.03 – Textured HDPE Geomembrane

Part 3 Execution

3.1 SITE PREPARATION

- .1 Unless specifically indicated, do not remove existing topsoil or organic materials from embankment construction areas. Remove exposed surface boulders over 300 mm in diameter that are located in areas to receive granular fill. Dispose of boulders by placing on embankment side slopes.
- .2 Borrow Excavation:
 - .1 Obtain from potential borrow areas as indicated, or provide from own sources, all required granular fill material.
 - .2 The existing operational pads and roadways at the site are not to be used as granular material borrow sources unless specifically authorized by Departmental Representative.
 - .3 Advise Departmental Representative of selected borrow areas seven days in advance of excavation operations for appropriate testing to be completed.
 - .4 Notify Departmental Representative whenever unsuitable materials are encountered in borrow areas.
 - .5 Borrow material cannot be obtained from existing granular pads beneath facilities to be demolished, unless authorized in writing by Departmental Representative.
 - .6 Remove and dispose of any abandoned utility lines in these areas in accordance with Section 02 41 16 - Structure Demolition.
 - .7 Stripping, stockpiling and replacement or placement to a new location of organic material and stripping and disposal of waste material found when excavating existing granular material to be as directed by Departmental Representative.
 - .8 Upon completion of final grading, leave all slopes in a stable condition and spread all stripped organics.
 - .9 Final grading of borrow area upon completion to be tidy, in a well drained condition, free of standing water to the satisfaction of the Departmental Representative.

- .10 Transport aggregate from borrow areas to the work areas via existing access routes where available. Maintain and provide for dust control on the access route between the borrow area and the work areas.

3.2 PROTECTION OF EXISTING UTILITIES

- .1 Pay for all costs of repairs or replacement of buried culverts, utilities or surface utilities that are to remain and which were damaged by the Contractor's work.

3.3 CULVERT INSTALLATION AND REMOVAL

- .1 Submittal of "Culvert Installation and Removal Plan" to Departmental Representative for review and approval. Submittals in accordance to Section 01 33 00 Submittal Procedures.
- .2 Following completion of all required Work, all watercourse/drainage course crossing infrastructure will be decommissioned.
- .3 The Contractor to remove all fill materials that were placed on top of the culverts. Place and blend fill materials into the surrounding terrain.
- .4 Following removal of surficial fill from the top of the culverts, remove and dispose of all the culverts placed within the watercourse/drainage course crossing location.
- .5 Following culvert removal, trim back slopes of excavation to a maximum slope of 10H:1V, or as directed by Departmental Representative, to provide a stable channel for drainage flow.
- .6 Install appropriate sediment and erosion control measures to ensure deleterious materials do not enter watercourses while removing fill materials or culverts.

3.4 PLACEMENT, MOISTURE CONDITIONING, AND COMPACTION OF GRANULAR FILL MATERIAL

- .1 Set grades and lay out work in detail from control points in areas of granular fill placement.
- .2 Verify the original ground topography by survey.
- .3 Haul granular fill material from borrow sites to designated areas.
- .4 Place granular fill material to the lines, grades, elevations and dimensions indicated on the Drawings, or agreed to with Departmental Representative.
- .5 Do not place granular fill on snow or surface ice.
- .6 Maintain natural drainage patterns, unless otherwise directed, and fill depressions to avoid any ponding of water adjacent to embankments.
- .7 All fill material shall be placed in an unfrozen state. Granular fill material to be free from debris, snow and ice. Do not place granular fill if the outside air temperature is below zero degrees Celsius, unless otherwise directed by Departmental Representative.
- .8 Maintain a crowned surface during construction to provide ready runoff of surface water. Do not place material in free standing water. Drain low areas, before placing material.
- .9 Do not dump granular fill material over the side slopes of berms.
- .10 Place and compact granular fill material in horizontal or near horizontal lifts.

- .11 Cease construction at any sign of movement or bulging in the embankments to allow assessment by Departmental Representative.
- .12 For fill depths greater than 500 mm, place granular material in lifts not exceeding 250 mm in loose thickness. For fill depths greater than 200 mm and less than 500 mm, place material in two lifts of equal depth. For fill depths less than 200 mm, place material in one lift.
- .13 Moisture condition fill as required to meet compaction requirements. Provide a water truck capable of efficiently placing water on granular fill. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .14 Compact Granular Fill material to a minimum of 95% of Maximum Dry Density determined in accordance with ASTM D698 or as determined from a Control Strip Density. The method for determining the maximum dry density will be established by the Departmental Representative.
- .15 Control Strip Density:
 - .1 A Control Strip is a lift of granular material placed over a minimum 300 square metres area that requires regrading.
 - .2 To determine the Control Density, moisture and density readings are to be taken by Departmental Representative during the compaction process until a maximum dry density is attained.
 - .3 The density and moisture content of the Control Strip are to be measured by Departmental Representative after each pass of the compaction equipment to determine the type of equipment and number of passes required to obtain the specified density.
 - .4 A new Control Strip will be required if, as established by Departmental Representative, the material type, moisture content, or subgrade of the area to be regraded is significantly different than that of the Control Strip.
 - .5 Proofroll areas compacted in accordance with the Control Strip Density upon completion of grading and compaction or as requested by Departmental Representative.
 - .6 Use a fully loaded haul truck for the proofrolling operation. The speed of the vehicle is not to exceed 4 km per hour during proof rolling. Departmental Representative may authorize the use of alternative proofrolling equipment.
 - .7 Make sufficient passes with the proofrolling equipment to subject every point on the surface to three separate passes of a loaded tire.
 - .8 Where proof rolling reveals areas of defective granular fill, remove and recompact the granular fill, and modify the compaction process, as required.
 - .9 The Control Strip Density method for compaction is not intended to relax the specified compaction requirements, but to reduce compaction testing requirements.
- .16 Compaction equipment must be capable of obtaining required densities uniformly in materials on project. Hand equipment must be available for compaction in areas where large equipment cannot access. Tracked or tired equipment may be substituted for dedicated compaction equipment, provided it can demonstrate satisfactory compactive effort.
- .17 Following compaction of granular fill material placed on slopes, travel in a direction parallel to the slope direction with a cat-track to create small ridges in the slope. In soft ground, travel in a direction parallel to the toe of the slope

with a cat track.

- .18 Shape finished surface to required cross-section and grade, or as directed by Departmental Representative.

3.5 REGRADING

- .1 Supply, place, blade and trim designated Granular Fill material to elevation, grades, and cross- section dimensions indicated on Drawings or as directed by Departmental Representative.
- .2 Supply and install witness grade stakes in areas to be regraded to monitor the depth of granular material. The grade stakes are to be placed on a grid spacing accepted by Departmental Representative for each specific regrade area. Immediately replace all grade stakes that are damaged or displaced by Contractor operations.
- .3 Compact and moisture condition Granular Fill material as necessary to obtain specified density in accordance to Clause 3.4 of this Section.

3.6 RESHAPING

- .1 Obtain authorization from Departmental Representative prior to beginning reshaping operations.
- .2 Blade and trim material to elevation, grades, and cross-section dimensions indicated or directed by Departmental Representative.
- .3 Make use of material within the area designated for reshaping to provide a surface that is smooth and compact with firm slopes.
- .4 Remove or cover debris exposed during reshaping with a minimum depth of Granular Fill as directed by Departmental Representative.
- .5 Grade excavation side-slopes from culvert removal at 10H:1V, or as directed by Departmental Representative, to provide a stable channel for drainage and to allow for vehicle passage.
- .6 Blend the final reshaped surface with the natural terrain and provide positive drainage.

3.7 EXCAVATING

- .1 Lay out work in detail from control points in areas of excavation. Verify the original ground topography by survey. If survey verification is not completed, original ground is to be as shown on the Drawings.
- .2 Excavate to lines, grades, elevations and dimensions as indicated on the Drawings or designated by Departmental Representative.
- .3 Keep excavations sufficiently free of water to complete work. Protect open excavations against flooding and damage due to surface run-on. Dispose of water in a manner not detrimental to work completed or under construction. The release of all water resulting from the dewatering of open excavations is to conform to the Water License Discharge Criteria outlined in Section 01 35 15 - Special Project Procedures for Contaminated Sites, and may require temporary storage or treatment prior to discharge.
- .4 Dispose of excavated material at approved locations. Do not obstruct flow of

surface drainage or natural watercourses. Use suitable excavated material from within the key trench area of the Tier II Disposal Facility for construction of the Tier II Disposal Facility berms.

- .5 Where required due to unauthorized over-excavation, fill areas with Granular Fill, as directed by Departmental Representative, and compact to a minimum 95% of Maximum Dry Density in accordance with ASTM D698.

3.8 BACKFILLING

- .1 For backfilling operations, use compaction equipment capable of obtaining required densities for the full lift thickness.
- .2 Do not proceed with backfilling operations until Departmental Representative has inspected and accepted excavation.
- .3 Areas to be backfilled are to be free from debris, snow, and ice, and sufficiently free of water so as to allow backfilling to proceed without displacement of water outside of excavation, and to allow for compaction of backfill material.
- .4 Commence backfilling of excavated soil areas within 1 day of receipt of confirmatory sampling results indicating no further excavation in the area is required. Costs for any extra work caused as a result of leaving excavations open longer will be the responsibility of Contractor.
- .5 Place specified backfill material in uniform horizontal layers in depths that are compatible with the compaction equipment and to grades indicated. Compact each layer before placing succeeding layer.
- .6 No trenches or excavations are to be left open during the winter.

3.9 LANDFILL/SOIL TREATMENT CELL CONSTRUCTION

- .1 Construction details for the NHW Landfill, Tier II Landfill, and Soil Treatment Cell are provided on Drawings C07 to C09, respectively.
- .2 Lay out work in detail from survey control points. Advise Departmental Representative one week in advance of any excavation and/or granular fill placement to allow ground surface cross-sections to be surveyed and verified.
- .3 Where indicated on the Drawings, excavate a key trench for placement of granular fill in accordance with Clause 3.7 of this section.
- .4 Construct perimeter berms of Type 2 and/or Type 3 granular fill to the dimensions as shown on the Drawings in accordance with Clause 3.4 of this Section.
- .5 Liner Systems
 - .1 Where installation of a geomembrane/geotextile lining system is indicated on the Drawings, place layers of sand fill to the depths as indicated on the Drawings in accordance with Clause 3.4 of this Section, and compact to a minimum of 95% of Maximum Dry Density.
 - .2 Notify Departmental Representative when base layer preparations are complete. Do not begin installation of the geomembrane/geotextile lining system until Departmental Representative's approval has been obtained.
 - .3 Install liners as indicated on the Drawings and in accordance with Sections 31 32 19.01 – Geotextile, 31 32 19.02 – Oil Resistant RPE Geomembrane, and 31 32 19.03 – Textured HDPE Geomembrane.

- .4 Place fill over the liner system as indicated on the Drawings.
- .5 The first lift of fill immediately over the liner system shall be 300 mm in thickness. Carry out granular fill placement using low ground pressure equipment acceptable for a fill thickness less than or equal to 300 mm over a liner system.
- .6 Prevent damage to the liner during granular fill placement. The following are provided as guidelines for equipment traffic.

| Backfill Thickness over Liner | Allowable Ground Pressures/ Placement Equipment |
|-------------------------------|--|
| No Backfill | Foot Traffic or ATV only |
| 150 mm or less | Hand Placement |
| 200 mm to 300 mm | 28.7 kPa to 29.0 kPa (D3-D4 Cat Track Loaders B Low Ground Pressure) |
| Greater than 300 mm | 29.0 kPa to 59.9 kPa (D4 to D6 Style CAT) |
| 600 mm | 72.8 kPa to 109 kPa (D7 to D9 Style CAT) |
| 900 mm | Loaded Scrapers, Motor Graders |
| 900 to 1,200 mm | Loaded Tandem Axle Trucks |

- .6 Landfilling Non-Hazardous Wastes at NHW Landfill
 - .1 Install groundwater monitoring wells at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 – Instrumentation prior to placement of any waste or contaminated soil in the NHW Landfill.
 - .2 Place non-hazardous material in the designated area(s) in uniform, horizontal lifts between and against the berm as shown on the Drawings. The thickness of each waste lift shall be such that all voids within the waste can be filled with intermediate cover. The maximum thickness of each waste lift shall not exceed 0.5 metre.
 - .3 Compact waste during placement with a double steel drum compactor or approved alternative during placing and spreading of the waste material. The equipment must be capable of crushing demolition debris.
 - .4 For placement in landfills, cut all demolition material and debris as required:
 - .1 to minimize displacement and lifting of landfilled materials resulting from landfill compaction operations;
 - .2 so that the maximum depth of any one material component within the landfill does not exceed 0.5 metre; and
 - .3 to satisfy the overall landfill dimension requirements as indicated on the Drawings.
 - .4 Cut structural steel materials into separate members prior to placement in landfills. Place large materials including structural steel members, timbers, communication dishes, etc. on the base of the landfill or on the base of an intermediate cover layer so that the materials lay on a

compacted, flat surface. Cut hollow components or objects, such as tanks, as required, to allow for nesting of materials. As a minimum, hollow components are to be cut in half parallel to the lengthwise axis. Within the landfill, support the underside of nested materials with intermediate cover or other debris material to minimize displacement and lifting of materials.

- .5 Segregate all metal demolition material and debris from other material when placed in the landfill. The proposed location of the metal waste area within the landfill shall be reviewed by the Departmental Representative. Record the specific location and depth of this material on the project Record Drawings.
- .6 Segregate all asbestos material from other material, and consolidate in one single location within the landfill. The proposed location of the asbestos waste within the landfill shall be reviewed by the Departmental Representative. Record the specific location and depth of this material on the Project Record Drawings.
- .7 Hand place double bagged asbestos in the landfill. Provide daily intermediate cover of minimum 150 mm Type 3 granular fill on asbestos waste. Do not operate equipment directly on asbestos waste containers. Replace ripped or torn asbestos waste bags.
- .8 Crush, cut or shred barrels to be landfilled on site to reduce the total original barrel volume by a minimum of 75 percent.
- .9 Place Type A PHC and Tier I contaminated soil or Type 3 granular fill as intermediate cover to a maximum loose thickness of 150 mm over each layer of non-hazardous material or as required to infill voids within the waste layer, and compact with the random action of tracked equipment. Make sufficient passes with the tracked equipment to subject every point on the surface to a minimum of three separate passes.
- .10 The use of Type 3 Granular Fill as intermediate cover shall be authorized by the Departmental Representative only when all of the Tier I or Type A PHC contaminated soil has been used, or has been determined by the Departmental Representative to be unsuitable for use as intermediate cover. Tier I soil co-contaminated with Total Petroleum Hydrocarbons (TPH) with concentrations of TPH in excess of CWS PHC and in which the primary hydrocarbon component consists of fuel oil, and/or diesel, and/or gasoline cannot be used as intermediate cover material.
- .11 The number of layers of 150 mm deep intermediate cover to be placed within the landfill is dependent on the total depth of waste material to be placed as follows:

| <u>Total Waste Material Depth</u> | <u>Number of Intermediate Cover Layers</u> |
|---------------------------------------|--|
| <0.5 | 1 |
| ≥ 0.5 metre, < 1.0 metre | 2 |
| ≥ 1.0 metre, < 1.5 metres | 3 |
| ≥ 1.5 metres, < 2.0 metres | 4 |
| ≥ 2.0 metres, < 2.5 metres | 5 |
| ≥ 2.5 metres, < 3.0 metres | 6 |

- .12 Stockpile Type 3 - Intermediate Fill adjacent to landfilling operations. Ensure that a stockpile is continuously maintained.
- .13 Place and compact to a minimum of 95 percent of Maximum Dry Density, additional intermediate cover material, as required, to completely infill voids within the waste layer prior to proceeding with the placement of the next overlying waste layer and prior to placement of final cover.
- .14 Take special care to place and compact intermediate cover material against exposed rock faces and areas inaccessible to tracked compaction equipment to specified requirements.
- .5 Do not place final cover, until Departmental Representative has determined that there is sufficient Type 3 intermediate cover.
- .6 Construct final cover over landfill to the specified thicknesses and grades as indicated on the Drawings.
- .7 Landfilling Tier II Contaminated Soil and Tier II Waste
 - .1 Install groundwater monitoring wells at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 – Instrumentation prior to placement of any contaminated soil or waste in the Tier II Landfill.
 - .2 Place Tier II contaminated soil in the landfill in lifts not exceeding 300 mm in thickness. Compact with the random action of tracked equipment or compactor.
 - .3 Place Tier II waste (material with PCB and/or lead amended paint following abatement) in the landfill in accordance with landfilling requirements for waste detailed in Clause 3.9.6.
 - .4 Place Type 3 granular fill as intermediate fill to a typical thickness of 150 mm over each layer of highly organic or wet Tier II contaminated soil, if required. Compact Type 3 granular fill with a compactor to subject every point on the surface to a minimum of three separate passes.
 - .5 Place Type I granular fill above final waste layer if required (in conditions of wet or highly organic Tier II contaminated soil for surface stabilization) to a typical thickness of 300 mm.
 - .6 Construct the final cover over the landfill to the specified thicknesses and grades, including the installation of geomembrane lining systems as indicated on the Drawings and in accordance with Sections 31 32 19.01 - Geotextile and 31 32 19.03 – Textured HDPE Geomembrane
 - .7 Install ground temperature cables at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 - Instrumentation.
- .8 Soil Treatment Cell Operation is covered in Section 02 61 00 – Hydrocarbon Soil Treatment.
 - 1. Install groundwater monitoring wells at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 – Instrumentation prior to placement of any contaminated soil in the Soil Treatment Cell.
 - 2. Install geomembrane lining system as indicated on the Drawings and in accordance with Sections 31 32 19.01 - Geotextile and 31 32 19.02 – Oil Resistant RPE Geomembrane.

3.10 TESTING

- .1 Testing of materials and compaction testing will be carried out and paid for by Departmental Representative.
- .2 Frequency of testing will be determined by Departmental Representative.

3.11 FINISHING AND TOLERANCES

- .1 All areas to be covered with granular material are to be uniform without projections or depressions exceeding 100 mm in three (3) metres.
- .2 Granular fill surfaces to be within 100 mm of design elevations but not uniformly high or low.
- .3 Finished surfaces are to be graded to promote positive drainage and minimize standing water.

3.12 MAINTENENCE

- .1 Maintain finished surfaces in a condition in accordance with this Section until succeeding material is applied or until acceptance.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 23 – Debris Removal.
- .2 Section 02 61 33 – Hazardous Waste Material.
- .3 Section 02 55 13 – Contaminated Soil.
- .4 Section 02 61 00.01 – Hydrocarbon Soil Treatment.
- .5 Section 31 05 17 – Aggregate Materials.
- .6 Section 31 22 15 – Grading.

1.2 DESCRIPTION

- .1 This Section specifies the requirements for the excavation, sorting and disposal of hazardous and non-hazardous waste material from Class A/B buried debris areas identified as BDA 3 and BDA 8 on Drawings C02 and C06, respectively.
- .2 This Section does not include removal of surface debris located in areas identified as Buried Debris Areas (BDAs). Removal of surface debris is included under Section 02 41 23 – Debris Removal.
- .3 This section does not include capping of Class C BDAs (BDA1, BDA2, BDA4, BDA5, and BDA7). The capping of Class C BDAs including placement of 0.75 m of granular fill material and regrading is included under Section 31 22 15 – Grading.
- .4 The specific type and quantity of hazardous and non-hazardous waste material contained within the buried debris areas (BDAs) to be excavated is unknown; however, debris and contaminated soil excavation and disposal requirements will include the following:
 - .1 Excavation of buried debris material and soil.
 - .2 Removal, sorting and segregation of all debris from excavated soils.
 - .3 Sampling and testing of contaminated soil and waste for determination of disposal requirements.
 - .4 On-site transport of contaminated soil and waste to NHW Landfill, Soil Treatment Cell or Tier II Landfill as determined by sampling analytical results.

1.3 DEFINITION

- .1 Class A BDA: Buried Debris Area (BDA) located in an unstable, high erosion location requiring relocation to a properly engineered landfill.
- .2 Class B BDA: BDA located in a suitable, stable location, but with evidence of contaminant migration requiring relocation to a properly engineered landfill.
- .3 Class C BDA: BDA located in a suitable, stable location, with no evidence of contaminant migration, that may be left in place with the addition of granular fill placement to ensure erosion protection and proper drainage, as required.
- .4 Buried debris excavation: Excavation of all materials from the BDA 3 and BDA 8 indicated on Drawings C02 and C06, respectively. The depth of buried debris excavation is to extend to the depth where debris is not visible or as directed by Departmental Representative. Assumed depths for each BDA are provided on the Drawings for design purposes.

- .5 Buried debris is debris that is not visible from the surface prior to excavation. Surface debris and partially buried debris (debris that is partially visible from the surface prior to excavation) are covered under Specification 02 41 23 Debris Removal.
- .6 Hazardous Materials Specialist: Contractor representative responsible for supervising all hazardous waste activities as well as coordinating required submittal and reporting requirements.

1.4 QUALIFICATIONS

- .1 Be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the specification.
- .2 Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and can satisfy Federal and Territorial requirements will be permitted to supervise and direct the Work. Contractor's superintendent responsible for the work of this section is to have appropriate level of experience in the area of hazardous waste management.
- .3 Contractor's supervisors are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .4 Provide all workers with suitable safety clothing, equipment and protection appropriate to the potential types and levels of exposure encountered.
- .5 Trained and certified personnel are required to complete all TDGA documentation and recording requirements.

1.5 ENVIRONMENTAL AND PERSONNEL PROTECTION

- .1 Environmental protection measures to be implemented as per Section 01 35 43 - Environmental Procedures.
- .2 Suspend operations whenever climatic conditions are unsatisfactory for excavation or grading to conform with this specification.
- .3 Some areas designated for cleanup under this contract involve soils and hazardous materials which may contain Polychlorinated biphenyls (PCBs), inorganic elements, asbestos and other contaminants which are considered hazardous to human health.
- .4 PCBs are considered to be hazardous substances. Storage, handling and disposal of PCBs are regulated under the Canadian Environmental Protection Act and the Federal TDGA. Comply with all applicable regulations.
- .5 When working with inorganic elements, PCB containing materials, and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and subcontractor, Departmental Representative and Departmental Representative's Authorized Personnel.
- .6 Supply sufficient quantities of designated protection equipment to fit all site personnel including Departmental Representative and authorized visitors. Workers are to also be educated as to risks, and be trained in safe work practices.
- .7 Unless otherwise specified, carry out buried debris excavation work in accordance with Section 01 35 32 - Specific Health and Safety Plan.

- .8 Notify Departmental Representative of the schedule for buried debris excavation at least two weeks prior to commencement of excavation.

1.6 MEASUREMENT FOR PAYMENT

- .1 The excavation of buried debris areas will be measured for payment by the cubic metre excavated as determined by survey. Buried Debris Excavation will be paid under Item 31 23 11-1, in the Basis of Payment Schedule.
- .2 The following work items will be incidental to the work described in this Section and will not be measured separately:
- .1 Buried debris excavation, including within permafrost-impacted zones.
 - .2 Installation and maintenance of erosion, drainage and sediment control, as required.
 - .3 The development, operation, and decommissioning of a Buried Debris Material Processing Area.
 - .4 Transport of all excavated buried debris to the Buried Debris Material Processing Area.
 - .5 Sorting of all buried debris into hazardous and non-hazardous components, in piles separate from the soil.
 - .6 On-site transport and placement of non-hazardous waste including double bagged asbestos into the NHW Landfill as specified in Section 31 22 15 - Grading.
 - .7 On-site transport and placement of Tier I impacted soil and Type A PHC impacted soil into the NHW Landfill as specified in Section 31 22 15 - Grading.
 - .8 On-site transport and placement of Tier II impacted soil into the Tier II Landfill as specified in Section 31 22 15 - Grading.
 - .9 On-site transport and placement of Type B PHC impacted soil into the Soil Treatment Cell as specified in Section 02 61 00 – Hydrocarbon Soil Treatment.
 - .10 Removal and storage for testing of melt water, groundwater and leachate from the area of excavation as required.
 - .11 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area as directed by Departmental Representative.
 - .12 Record keeping documents for Items listed above.
- .3 Costs for the processing and containerization of unknown hazardous waste material identified during the buried debris excavation will be negotiated with the departmental representative using the Contractor's labour and equipment rates provided in the Potential Additional Work schedule under Section 02 61 33 - Hazardous Waste Material.
- .4 Removal of surficial debris within the Buried Debris Area limits will not be considered for payment under Item 31 23 11-1 of the Basis of Payment, but is to be considered as part of the Lump Sum bid for Item 02 41 23-1 – Debris Removal in the Basis of Payment Schedule.
- .5 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this work as a separate line item

in the cost breakdown specified in Section 01 32 18 - Construction Progress
Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Containers for hazardous debris as described in previous Sections.
- .2 Environmental Protection Supplies as per Section 01 35 43 – Environmental Procedures.

Part 3 Execution

3.1 EXCAVATION AND REMOVAL OF WASTE

- .1 Remove all surface debris in accordance with Section 02 41 23 – Debris Removal. Advise Departmental Representative when all surficial debris has been removed.
- .2 Prior to buried debris excavation, remove all surface snow or ice and direct surface water run-off around the buried debris excavation.
- .3 Do not commence excavation operations until the Buried Debris Excavation Limits have been reviewed with Departmental Representative.
- .4 In conjunction with Departmental Representative, examine the area to be excavated to assess the types of materials present.
- .5 Excavate within the buried debris excavation area to minimize further contamination of melt water, groundwater or leachate.
- .6 When excavating in the vicinity of a drainage course erect silt fences or containment berms to prevent the release of sediment or deleterious materials into the water.
- .7 Collect melt water/groundwater/leachate at the low point of the excavation and provide for settling of sediments and testing of water prior to discharge to the environment. Carry out testing of melt water/groundwater. Release of water is to conform to the Wastewater Discharge Criteria described in Section 01 35 15 – Special Project Procedures for Contaminated Sites. Submit results of testing to Departmental Representative.
- .8 The Contractor's designated Hazardous Waste Specialist is to examine the site continuously during excavation operations, and is to be in direct visual contact with the excavation equipment operator.
- .9 Use a volatile organic compound (VOC) instrument to continuously measure the concentrations of VOC during buried debris excavation operations, and prior to the removal of barrels from the buried debris area. When the concentrations of VOC exceed 20% LEL, temporarily halt work until ventilation (natural or induced) reduces the concentration levels to a safe working level.
- .10 Excavate within the buried debris excavation area in "wide valleys" as opposed to "pits" to ensure good and thorough ventilation of the excavated area at all times.
- .11 Keep thoroughly wet or frozen during excavation and transportation, all asbestos containing material encountered during buried debris excavation. Once excavated, immediately containerize the asbestos material. Keep asbestos materials thoroughly wet or frozen until the container is sealed. All workers are to wear protective clothing

and respirators appropriate for the type of asbestos to be removed in accordance with the requirements of the Asbestos Abatement Sections 02 82 00.01 and 02 82 00.02.

- .12 All workers are to be familiarized with PCB/lead based paints and other hazardous waste that could potentially be found in the debris area. Proper personal protective equipment to be worn at all times when excavating buried debris in accordance with Section 02 83 10 – Lead and PBC Amended Paint Abatement Precautions.

3.2 BURIED DEBRIS MATERIAL PROCESSING AREA

- .1 Establish a Buried Debris Material Processing Area near the buried debris excavation area for the sorting, inspection, testing, and classification of materials excavated from the buried debris excavation.
- .2 The specific location for the Buried Debris Material Processing Area is to be determined by Contractor and reviewed by Departmental Representative. Locate the Buried Debris Material Processing Area so as to:
 - .1 Minimize the requirement for the transportation of hazardous materials from the buried debris excavation area;
 - .2 Provide suitable access for materials handling, testing, and packaging;
 - .3 Be sufficiently large to accommodate the operations for the processing of excavated materials;
 - .4 Minimize impact on the environment; and
 - .5 Provide safe working conditions for personnel working in and around these areas.
- .3 Do not locate Buried Debris Material Processing Area over buried debris area to be excavated.
- .4 The Buried Debris Material Processing Area is not to be used until baseline sampling has been completed by Departmental Representative's Authorized Representative.
- .5 Include a containment system lined with a 30 mil impermeable geomembrane liner in accordance with Section 31 32 19.02 Oil Resistant RPE Geomembranes to contain and collect run-off, melt water, spills, leaks and/or leachate emanating from the excavated materials.
- .6 Immediately clean up any spills, leaks, or other releases of liquid or sediment from this area using appropriate techniques.
- .7 Submit the details of the Buried Debris Material Processing Area to the Department Representative. Do not commence development of Buried Debris Material Processing Area until the details have been reviewed by Departmental Representative.

3.3 HANDLING AND PROCESSING OF EXCAVATED MATERIALS

- .1 Place materials excavated from the BDA in stockpiles or windrows within the Buried Debris Material Processing Area. Individual stockpiles may be placed adjacent to one another to form windrows.
- .2 Separate all debris from excavated soil. Segregate excavated materials into stockpiles of similar material type components as follows:
 - .1 Barrels;
 - .2 Asbestos-containing materials;

- .3 Creosote-treated timbers;
 - .4 Non-hazardous debris;
 - .5 Hazardous and potentially hazardous debris;
 - .6 Stained or potentially contaminated soil including soil excavated from within one metre of hazardous buried debris material; and
 - .7 Other soil.
- .3 Limit soil stockpiles to 20 cubic metres in volume, or alternatively mark windrows indicating 20 cubic metre increments. Do not place stained or obviously contaminated soil with other soil.
- .4 Throughout the buried debris excavation process, testing and collection of samples will be carried out at the Buried Debris Material Processing Areas to classify soil and other materials. Departmental Representative will not carry out testing and classification at the face of the excavation. Provide Departmental Representative ready access to the Buried Debris Material Processing Areas for sampling and investigation. The results of the material testing and classification process will be available within 14 calendar days from the date that material samples are transported from the site for laboratory analysis. No payment will be made to Contractor for equipment transport or standby time during this investigation period.
- .5 Based on the results of the testing, stockpiled/windrow materials will be classified for disposal, treatment and/or containerization requirements. Work closely and cooperate with Departmental Representative during the material testing and classification process.
- .6 Separate any remaining debris from soil. Dispose of, stockpile for on-site treatment, or containerize contaminated soil based on the results of analyses in accordance with Section 02 55 13 – Contaminated Soil and Section 02 61 00- Hydrocarbon Soil Treatment.
- .7 Place excavated intact barrels in overpacks at the Buried Debris Material Processing Area and move the overpacks to the Hazardous Material Processing Area described in Section 02 81 01 - Hazardous Materials, for inspection and classification. Barrel contents will be classified and tested as described in Section 02 81 01 - Hazardous Materials.
- .8 Replace excavated stockpiles classified as clean back into the excavation. Supply, place and compact granular fill to replace the excavated contaminated soil to original grade, and reshape the area to prevent ponding and blend into the surrounding terrain.
- .9 Containerize hazardous materials in accordance with Section 02 81 01 – Hazardous Materials in conjunction with work under this section. Do not allow hazardous materials to remain exposed to elements.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies the requirements for the supply and installation of non- woven geotextiles for the Tier II Landfill (Drawing C08) and Soil Treatment Cell (Drawing C09) in conjunction with geomembrane liners.

1.2 REGULATORY REQUIREMENTS

- .1 CAN/CGSB-4.2-M88, Textile Test Methods.
- .2 CAN/CGSB-148.1-M85, Methods of Testing Geotextiles and Geomembranes.
- .3 ASTM D4751-87, Test Method for Determining the Apparent Opening Size of a Geotextile.
- .4 ASTM D4632 - Elongation at Failure.
- .5 ASTM D6241 – Standard Test Method for Puncture Strength of Geotextiles and Geotextile Related Products Using a 50 mm Probe.
- .6 ASTM D4533 - Trapezoid Tear Strength.
- .7 ASTM D5199 - .Standard Test Method for the Nominal Thickness of Geosynthetics
- .8 ASTM D5261-Standard Test Method for Measuring Mass per Unit Area of Geotextile.

1.3 MANUFACTURER'S CERTIFICATION WARRANTY

- .1 Provide to the Departmental Representative, prior to shipment of the material to site, a signed manufacturer's certification that the material to be shipped to the site has test values for each property listed in Clauses 2.1.1.1 to 2.1.1.7 of this section, that meet or exceed the property values specified for that material.
- .2 These certificates shall be signed by the Manufacturer's Product Manager or Quality Control Manager.
- .3 Provide a written warranty from the geotextile manufacturer against defects or deficiencies in the quality of the geotextile material supplied.

1.4 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the supply, transport to the site, on-site storage and transport of Non-Woven Geotextile in the lump sum price for Non-Woven Geotextile Supply, Item 31 32 19.01-1, as indicated in the Basis of Payment Schedule. The total area of Non-Woven geotextile to be supplied is 42,400 square metres. This area excludes any allowance for material overlap requirements.
- .2 All indirect costs associated with work described in this section, including supervision, overhead, profit, etc., as well as fixed camp costs shall be included in the Basis of Payment Schedule, Balance of Project Complete.
- .3 The unit of measurement for the installation of Non-Woven Geotextile to the lines and dimensions indicated on the Drawings and including all labour, materials, tools, supervision, and on-site transport will be measured for payment by the square metre of non-woven geotextile installed. No extra payment shall be made for material overlap requirements or for patches over damaged material. The installation of Non-

Woven Geotextile will be paid under Item 31 32 19.01-2 of the Basis of Payment Schedule.

- .4 Excavating and backfilling necessary to install and anchor the geotextile beneath the original ground surface will be measured for payment as indicated in Section 31 22 15 - Grading.
- .5 Unused geotextile remains the property of the Department Representative until completion of the project. The Contractor will transport and dispose of unused geotextile off-site upon completion of the project.

Part 2 Products

2.1 MATERIALS

- .1 Non-Woven Geotextile: The geotextile shall be a non-woven fabric consisting only of continuous chain polymeric filaments or yarns of polyester, formed into a stable network by needle punching. The fabric shall be inert to commonly encountered chemicals, hydrocarbons, mildew and rot resistant, resistant to ultraviolet light exposure, insect and rodent resistant, and conform to the properties listed below. The minimum average roll value (weakest principal direction) for strength properties of any individual roll tested from the manufacturing lot or lots of a particular shipment shall be in excess of the minimum average roll value (weakest principal direction) stipulated below.
 - .1 Thickness – Typical (ASTM D5199) 4.0 mm
 - .2 Grab Tensile Strength (ASTM D4632): 1650 N.
 - .3 Elongation at Failure (ASTM D4632): 50 %.
 - .4 Trapezoidal Tear Strength (ASTM D4533): 640 N.
 - .5 Apparent Opening Size (ASTM D4751) 150 microns
 - .6 Puncture (ASTM D6241): 1060 N.
 - .7 Weight – Typical (ASTM D5261): 540 g/m2
- .2 Seams: overlapped in accordance with manufacturer's recommendations.
- .3 Geomembrane:
 - .1 Oil Resistant RPE Geomembrane as per Section 31 32 19.02.
 - .2 Textured HDPE Geomembrane as per Section 31 32 19.03.

2.2 SHIPPING, HANDLING AND STORAGE

- .1 Provide the geotextile in rolls wrapped with protective covering to protect the fabric from mud, dirt, dust, and debris. The fabric shall be free of defects or flaws which significantly affect its physical properties. Label each roll of fabric in the shipment with a number or symbol to identify that production run.
- .2 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris, rodents and water.

2.3 CONFORMANCE TESTING

- .1 Conformance testing of the geotextile is not required; verification of the manufacturing quality control documentation for the production run, as per Clause 1.3 of this Section, will be sufficient for determination of material conformance.

Part 3 Execution

3.1 QUALITY ASSURANCE

- .1 All materials, procedures, operations, and methods shall be in strict conformance with the Drawings and Specifications and shall be subjected to strict quality assurance monitoring as detailed herein. The installed systems shall conform to the Drawings and Specifications, except as otherwise authorized in writing by the Departmental Representative.

3.2 UNDERLYING SURFACE PREPARATION

- .1 Ensure that the surface underlying the geotextile is graded smooth and is free from angular rocks, debris and protrusions.

3.3 DEPLOYMENT

- .1 Do not begin installation of geotextile until the base has been approved by the Departmental Representative.
- .2 Deploy the geotextile by unrolling onto the prepared surface in orientation, manner and locations indicated. No securing pins are permitted to secure non- woven geotextiles.
- .3 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .4 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .5 Overlap each successive strip of geotextile a minimum of 600 mm over previously laid strip. Do not use securing pins when placing geotextile material over geomembrane material.
- .6 Employ sufficient temporary anchorage to hold geotextile in place during placement of other elements of the liner system or during backfilling.
- .7 Heat track or glue geotextile overlaps prior to placing granular fill cover to prevent lifting or separation of overlap.
- .8 Protect installed geotextile material from displacement and damage until, during and after placement of additional material layers.
- .9 Repair rips or tears with a patch to cover a minimum of 1 metre on each side of the rip or tear.

3.4 ANCHORAGE

- .1 Anchor the geotextile at the perimeter of the landfill as indicated on the Drawings. Temporary anchorage can be provided by sandbags.
- .2 If a key trench is used for anchorage, place the geotextile into the trench extending down the inside face and across the bottom of the trench.
- .3 Place the geotextile into this trench extending down the inside face and across the bottom of the trench.
- .4 Secure the geotextile by placing uniform lifts of granular fill material as shown on the Drawings, not exceeding 200 mm in loose thickness, and compact to 95 percent of Maximum Dry Density in accordance with ASTM D698. Compact backfill in such a manner as to not damage the geotextile/liner system.

3.5 PROTECTION

- .1 Do no permit passage of any vehicle directly on geotextile at any time.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the supply and installation Oil Resistant RPE Geomembrane Liner to be installed at the Soil Treatment Cell as detailed on Drawing C09 and for use under Contaminated Soil Stockpiles, buried debris processing areas and hazardous debris processing and storage areas.

1.2 REFERENCES

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM 5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
 - .2 ASTM D5034-09 Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).
 - .3 ASTM D751-06(2011) Standard Test Methods for Coated Fabrics (Elongation).
 - .4 ASTM D3785 / D3786 Standard Test Method for Bursting Strength of Textile Fabrics Diaphragm Bursting Strength Tester Method (Burst Strength).
 - .5 ASTM G151-10 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources (UV Resistance, strength retained).
 - .6 ASTM D6392-12 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrance Seams Produced Using Thermo Fusion Methods (Heat Bonded Seam Strength and Heat Bonded Adhesion Strength).
 - .7 ASTM D5641-94(2011) Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber (Heat Bonded Seam Strength, Peel Adhesion Strength).

1.3 ACTIONS AND INFORMATIONAL SUBMITTALS

- .1 Obtain written acceptance of geomembrane product from Departmental Representative.
- .2 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geomembranes and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Nunavut or Northwest Territories, Canada.
 - .2 Submit shop drawings and indicate installation layout, dimensions and details, including fabricated and field seams, anchor trenches and protrusion details.
- .5 Samples:

- .1 Submit following samples 4 weeks minimum before beginning Work:
 - .1 Minimum 2 m length of standard width membrane.
 - .2 Minimum of 1 m seam with at least 300 mm of membrane on both sides of seam.
- .6 Certificates:
 - .1 Submit 3 copies of manufacturer's mill test data 4 weeks minimum before beginning Work.
 - .2 Submit certificates, including test results 2 weeks before delivery to job site.

1.4 QUALITY ASSURANCE

- .1 Test quality of resin and membrane to ensure consistency of raw material and geomembrane quality in accordance with manufacturer's recommendations.
- .2 Test seams in strength and peel at beginning of each seaming period, and at least once every 4 hours if seaming operation is interrupted, for each seaming apparatus and seamer used that day.
 - .1 Also test at least two samples from each panel, with samples taken from extra material, such that panel is not damaged and blanket geometry is not altered.
- .3 If seam test specimen fails in seam, repeat on new specimen.
 - .1 If new specimen fails in seam, material will not be used for seaming until deficiencies are corrected and two consecutive successful test seams are achieved.
- .4 Test seams by non-destructive methods over their full length, using vacuum test unit, air pressure test or thermo-fusion methods as specified in the ASTM test methods.
- .5 Provide test results to Departmental Representative, for each day's production, including documentation of non-destructive testing and repairs at end of each shift.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Contractor to supply and deliver all geomembranes to the site in sufficient quantities to cover the area designated in the Contract Documents and as requested by Departmental Representative.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 During delivery and storage, protect geo-membranes from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .5 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.6 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the supply, transport to the site and on-site storage of Oil Resistant RPE Geomembrane Liner, including all tools in the lump sum price for Oil

Resistant RPE Geomembrane, Item 31 32 19.02-1, as indicated in the Basis of Payment Schedule.

- .1 The total area of Oil Resistant RPE Geomembrane to be supplied for the construction of the Soil Treatment Cell is 4,200 square metres. This area excludes any allowance for material overlap requirements.
- .2 The installation of Oil Resistant RPE Geomembrane at the Soil Treatment Cell to the lines and dimensions indicated, including all labour, materials, tools and supervision, will be measured for payment by the square metre of Oil Resistant RPE Geomembrane Installed and will be paid under Item 31 32 19.02-2 of the Basis of Payment Schedule. No extra payment shall be made for material overlay requirements or for patches over damaged or failed material.
- .3 Excavating and backfilling necessary to install the Oil Resistant RPE Geomembrane beneath the original ground surface will be measured for payment as indicated in Section 31 22 15 - Grading.
- .4 Provision of liner for other general site usage including but not limited to under contaminated soil stockpiles, and for under hazardous materials processing and storage areas will not be measured for payment. Include all costs for additional liner requirements in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule.
- .5 Unused geomembrane remains the property of the Departmental Representative until the completion of the project. Store geomembrane in accordance with Clause 1.5 of this section. The Contractor will transport and dispose of unused geomembrane off-site upon completion of the project.
- .6 No separate payment will be made for repairs to damaged geomembranes.
- .7 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Oil Resistant RPE Geomembrane
 - .1 Supplied in sufficient quantify for the Work required. The geomembrane will be manufactured for its intended purpose and will be manufactured from new, first quality resin.
 - .2 Composed of minimum 30 mil (.75 mm) reinforced polyethylene resin with inhibitors added to resist deterioration by chemicals, hydrocarbons, ultra-violet, and heat exposure.
 - .3 Manufacturer will acquire enough resin to produce the required amount of geomembrane to ensure uniform composition of all the panels require for the Work.
 - .4 Minimum Physical Properties (or equivalent as approved by the Department Representative)
 - .1 Nominal Thickness (ASTM 5199): 0.75 mm.
 - .2 Coating Thickness (nominal): 0.164 mm

- .3 Tensile Strength (MD/CD) (ASTM D5034): 1,776 N.
 - .4 Elongation at Failure (ASTM D751): 15%.
 - .5 Burst Strength (ASTM D3786): 5512 kPa
 - .6 UV Resistance (ASTM G151-00): > 90% (for a black coloured liner)
 - .7 Required physical properties may vary with type of geomembrane material as approved by the departmental representative.
- .2 Seams: welded in accordance with manufactures recommendations.
- .1 Physical properties for resin used for seams are same as those used for resin used in manufacture of geomenbrane.
 - .2 Seam strength (ASTM D6392 and/or D5641-94(2011): 35 n/mm.
 - .3 Peel Adhesion Strength (ASTM D6392 and/or D5641-94(2011): FTB AD-DEL
- .3 Geotextiles
- .1 Non-woven geotextiles as per Section 31 32 19.01 – Geotextiles.

Part 3 Execution

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Geotextile fabric shall be installed in accordance with Section 31 32 19.01 – Geotextiles prior to geomembrane installation.
- .2 A certificate of subgrade acceptance will be prepared by the geomembrane installation contractor prior to membrane installation.

3.3 INSTALLATION

- .1 Maintain area of installation free of water, deleterious materials and snow accumulations.
- .2 Prepare excessively soft supporting material as directed by Departmental Representative.
- .3 Do not proceed with panel placement and seaming when ambient temperatures are below minus 5 degrees C or above 40 degrees C, during precipitation, in presence of excessive moisture (i.e., fog, dew).
- .4 Installation of the membrane in winds above 20 km/hr can proceed only if the installer can demonstrate that the liner will not be at risk of damage.

- .5 Do not install in any weather conditions that may be detrimental to the function of the membrane.
- .6 Ensure all personnel working on the geomembrane do not use damaging footwear.
- .7 Place and seam panels in accordance with manufacturer's recommendations on graded surface in orientation and locations indicated. Minimize wrinkles, avoid scratches and crimps to geomembranes and avoid damage to supporting material.
- .8 Protect installed membrane from displacement, damage or deterioration before, during and after placement of material layers.
- .9 Replace damaged, torn or permanently twisted panels to approval of Departmental Representative. Remove rejected damaged panels from site.
- .10 Keep field seaming to minimum. Locate field seams up and down slopes, with no horizontal field seam less than 1.5 m beyond toe of slope.
- .11 Keep seam area clean and free of moisture, dust, dirt, debris and foreign material.
- .12 Make field seam samples in accordance with tender specifications on fragment pieces of geo-membrane and test to verify that seaming conditions are adequate.
- .13 Test field seams as seaming work progresses by non-destructive methods over their full length. Repair seams which do not pass non-destructive test. Reconstruct seam between failed location and any passed test location, until non-destructive testing is successful.

3.4 SECTIONS REPAIR

- .1 Inspect seams and non-seam areas for holes, tears or other defects.
- .2 Repair minor tears and pinholes by patching until non-destructive testing is successful.
- .3 Patches to be round or oval in shape, made of same geomembrane material, and extend minimum of 75 mm beyond edge of defect.
- .4 Verifications of repairs: All repair to be visually inspected.
- .5 Keep records of all repairs and the results of inspections.

3.5 PROTECTION

- .1 Protect panels from damage.
- .2 Handle carefully to avoid damaging the geomembrane.
- .3 Do not permit vehicular traffic directly on membrane.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the supply and installation of Textured (both sides) HDPE Geomembrane Liner to be installed at the Tier II Landfill as detailed on Drawing C08.

1.2 REGULATORY REQUIREMENTS

- .1 ASTM D4437-08 Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
- .2 ASTM D6693-10 Standard Test Method for Determining Tensile Properties of Non-reinforced Flexible Polypropylene Geomembranes
- .3 CGSB 148.1, No. 112 (Draft), Air Pressure Test.
- .4 ASTM D5199-11 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.
- .5 ASTM D5994-10 Standard Test Method for Measuring Core Thickness of Textured Geomembrane.
- .6 ASTM D6693-10 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
- .7 ASTM D1004-13 Standard Test Method for Tear Resistance of Plastic Film and Sheeting.
- .8 ASTM D4833-07(2013)e1 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
- .9 ASTM D1603-14 Standard Test Method for Carbon Black Content in Olefin Plastics.
- .10 ASTM D5397-07 Standard Test Method for Evaluation of Stress Check Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
- .11 ASTM D746-13 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
- .12 ASTM D5321-14 Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear

1.3 MANUFACTURER'S CERTIFICATION WARRANTY

- .1 The geomembrane manufacturer shall have at least two years of continuous experience in the manufacture of textured HDPE geomembrane rolls and/or experience totalling 4,000,000 square metres of manufactured textured HDPE geomembrane.
- .2 Provide to the Departmental Representative, prior to shipment of materials to the site, the following:
 - .1 Name of the manufacturer and information on the manufacturer's factory size, equipment, personnel, number of shifts per day and capacity per shift.
 - .2 Manufacturer's quality control program and manual, or descriptive documentation.

- .3 List of material properties and liner samples.
- .4 A signed manufacturing certification that the materials to be shipped to the site have test values for each property listed in 2.0 - Products in this section that meet or exceed the property values specified for that material. These certificates shall be signed by the Product Manager or Quality Control Manager of the geomembrane manufacturer.
- .5 Resume of the qualifications of the Installation Supervisor and Master Seamer to be assigned to the project.
- .3 Provide a written 20 year warranty against defects or deficiencies in the quality of the HDPE liner material supplied.

1.4

GEOMEMBRANE INSTALLER

- .1 The geomembrane shall be installed by an approved Geomembrane Installer trained and licensed by the geomembrane manufacturer to install the manufacturer's geomembrane. Installation shall be performed under the constant direction of the Contractor's field Installation Supervisor who shall remain on site and be responsible, throughout the liner installation, for liner activities by the Installer. This Installation Supervisor shall have installed or supervised the installation and seaming of a minimum of 3,000,000 square metres of HDPE geomembrane. The Installation Supervisor shall remain on site until all Type 5 cover material has been placed over the entire geomembrane.
- .2 Actual seaming shall be performed under the direction of a Master Seamer who has seamed a minimum of 3,000,000 square metres of HDPE geomembrane. The Master Seamer, who may also be the Installation Supervisor, shall be present whenever seaming is performed.
- .3 Provide as part of the bid document the following information regarding the Geomembrane Installer:
 - .1 Brief historical background.
 - .2 Insurance coverage.
 - .3 Welding procedures.
 - .4 Information on equipment and personnel.
- .4 Provide adequate proof of qualification of the Installation Supervisor, including a list of at least five completed facilities, totalling a minimum of 200,000 square metres for which the Supervisor has installed or supervised the installation of HDPE geomembrane. For each installation, the following information shall be provided:
 - .1 Name and purpose of facility, its location and date of installation.
 - .2 Name of Owner and Design Engineer.
 - .3 Thickness of geomembrane and surface area of the installed geomembrane.
 - .4 Type of seaming, patching and tacking equipment.
- .5 Provide prior to liner installation:
 - .1 Proposed installation panel layout identifying seams and details. The drawings shall conform to the requirements specified in Section 01330 – Submittal Procedures . The drawings shall indicate roll number, sizes, and position of rolls and shall be subject to the approval of the Departmental Representative.
 - .2 Any proposed variance or deviation from the specified guidelines. Submit changes in writing to the Departmental Representative a minimum of seven

working days prior to the scheduled start of geomembrane installation.
Acceptance or rejection by the Departmental Representative shall be provided prior to the start of installation activities.

1.5 GEOMEMBRANE ACCEPTANCE

- .1 Retain ownership and responsibility for the geomembrane until acceptance by the Departmental Representative.
- .2 The geomembrane liner shall be accepted by the Departmental Representative when all of the following conditions are met:
 - .1 Installation of the entire liner is finished.
 - .2 Verification of the adequacy of all field seams and repairs, including associated testing, is complete.
 - .3 Certification, as described in this Section and including record drawings, is provided by the Contractor to the Departmental Representative.

1.6 WORKMANSHIP WARRANTY

- .1 Warranty the liner installation to be free of defects in materials and workmanship for a period of 2 years following the date of acceptance by the Departmental Representative or its representative.
- .2 Make any repairs or replacements made necessary by defects in materials or workmanship in the work that became evident within said warranty period. No additional reimbursement will be made for these repairs.
- .3 Make repairs and replacements promptly upon receipt of written order from the Departmental Representative. If the Contractor fails to make repairs and replacements promptly, the Departmental Representative may do so and the Contractor is responsible for the cost of such repairs and replacements.

1.7 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the supply, transport to the site and on-site storage of Textured Geomembrane Liner, including all tools in the lump sum price for Textured Geomembrane, Item 31 32 19.03-1, as indicated in the Basis of Payment Schedule.
 - .1 The total area of Textured Geomembrane to be supplied for the construction of the Tier II Landfill is 17,000 square metres. This area excludes any allowance for material overlap requirements.
- .2 The installation of Textured Geomembrane liner at the Tier II Landfill to the lines and dimensions indicated, including all labour, materials, tools and supervision, will be measured for payment by the square metre of Textured Geomembrane Installed and will be paid under Item 31 32 19.03-2 of the Basis of Payment Schedule. No extra payment shall be made for material overlay requirements or for patches over damaged or failed material.
- .3 Excavating and backfilling necessary to install the Textured Geomembrane Liner beneath the original ground surface will be measured for payment as indicated in Section 31 22 15 - Grading.
- .4 Excavating and backfilling necessary to install the Geomembrane beneath the original ground surface will be measured for payment as indicated in Section 31 22 15 - Grading.

- .5 Unused geomembrane remains the property of the Departmental Representative until the completion of the project. Store geomembrane in accordance with Clause 2.3 of this section. The Contractor will transport and dispose of unused geomembrane off-site upon completion of the project.
- .6 Except as indicated above, work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in Basis of Payment Schedule. Indicate the cost of this work as a separate line item in the cost breakdown specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

Part 2 Products

2.1 MATERIALS

- .1 Textured Geomembrane Liner
 - .1 The physical properties of the Textured (both sides) HDPE Geomembrane shall be in accordance with ASTM D1248 where applicable. The material shall have the minimum properties specified as follows:

| | | |
|-----|---|--------------------|
| .1 | Thickness – Typical (ASTM D5994) | 1.42 mm (57 mil) |
| .2 | Tensile Strength – Stress at Break (ASTM D6693 - Modified Type IV Die): | 15.8 kN/m (90 ppi) |
| .3 | Tensile Strength – Stress at Yield (ASTM D6693 - Modified Type IV Die): | 22 kN/m (126 ppi) |
| .4 | Tensile Strength – Strain at Break – 50 mm gauge (ASTM D6693 - Modified Type IV Die): | 100% |
| .5 | Tensile Strength – Strain at Yield – 33 mm gauge (ASTM D6693 - Modified Type IV Die): | 12% |
| .6 | Tear Resistance (ASTM D1004): | 187 N (42 lbs) |
| .7 | Puncture Resistance (ASTM D4833): | 375 N (84 lbs) |
| .8 | Carbon Black Content ASTM D1603; D4218): | 2% |
| .9 | Notched Constant Load - ESCR (ASTM D5397): | 200 hr. |
| .10 | Low Temperature (ASTM D746): | <-60°C (<-76°F) |
| .11 | Asperity Height (ASTM D7466) | 0.25 mm |
| .12 | Coefficient of Friction (Peak and Residual) Geomembrane and Non-Woven Geotextile (ASTM 5321): | 18 Degrees |
 - .2 The HDPE geomembrane shall be formulated from resin incorporating a flexible modifier, and consisting of approximately 98% polyethylene, 2.0% carbon black, and trace amounts of antioxidants and heat stabilizers.
 - .3 The HDPE geomembrane shall incorporate a co-extruded textured surface on both sides to increase the friction between the liner and the material on which it is placed.
 - .4 The geomembrane shall be designed for flexible geomembrane applications, resistant to UV radiation, and suitable for exposed conditions.
 - .5 The HDPE geomembrane shall be capable of being heat sealed or solvent welded for making field splices, seams and repairs.

.2 Geotextiles

- .1 Non-woven geotextiles as per Section 31 32 19.01 – Geotextiles.

2.2 MANUFACTURING QUALITY CONTROL

- .1 Provide certification from the geomembrane manufacturer prior to shipment to site that the geomembrane supplied for this project is in conformance with the Specification.
- .2 Provide certification from the geomembrane manufacturer prior to shipment to site that sampling and testing of the material have been carried out. At minimum, the geomembrane manufacturer shall perform the applicable tests every 7,500 square metres to assure conformance with the values listed in Clause 2.1 of this Section.

2.3 SHIPPING, HANDLING AND STORAGE

- .1 Ship the geomembrane in conformance with the requirements of the geomembrane manufacturer, but in any event shall be carried out in a manner which shall protect the material from damage in transit. Place a protective cover on each package to protect the material against damage during shipping, handling and storage.
- .2 Move geomembrane(s) about the site in a manner that will not damage the material.
- .3 Store geomembrane(s) on site in a secure location that will minimize the potential for damage due to the proximity of working equipment, vandalism, etc. In some cases, geomembrane can be marshalled at various locations to minimize transit distances and delays during deployment.

Part 3 Execution

3.1 QUALITY ASSURANCE

- .1 Contractor Construction Quality Control
- .1 Carry out a visual inspection of the liner panels and joints as the installation progresses and again upon completion of the liner. Clearly mark and repair defective and questionable areas. Repair all areas identified to the satisfaction of the Departmental Representative.
- .2 Test all joints and repairs in the HDPE liner by vacuum testing or pressurized dual seams testing (for double hot wedge welds only). Carry out all testing in the presence of or with knowledge of the Departmental Representative. Repair all defective areas detected to the satisfaction of the Departmental Representative.
- .3 Perform a vacuum test on all extrusion welded seams and repairs, in the following manner:
- .1 The area to be tested shall be cleaned of all dirt, debris, and other foreign matter and then a soap and water solution shall be applied.
- .2 A gasket vacuum box (American Parts and Service Company, Alhambra, California, Series #A100 or approved equal) assembly consisting of a rigid housing, a clean transparent viewing window, and a vacuum gauge shall be immediately placed, in a manner to ensure a seal over the area of the liner to be tested.
- .3 A vacuum of 3 to 6 psi shall be induced and held for a minimum of 5 seconds or long enough for the area to be thoroughly examined.

- .4 Examine the geomembrane through the viewing window for the presence of soap bubbling; all areas where leaks are identified shall be marked and repaired.
- .5 Any portion of an extrusion seam or repair that cannot be vacuum tested must be pick tested.
- .4 Perform pressurized testing of all double wedge weld seams, regardless of length, in the following manner:
 - .1 A needle with pressure gauge, or other approved pressure feed device equipped with a pressure gauge, shall then be inserted into the channel produced in the middle of the double wedge weld.
 - .2 The channel shall be pressurized to 45 psi to allow the seam to stretch and stabilize. The pressure shall then be dropped to 35 psi and sustained for five minutes.
 - .3 If the loss of pressure exceeds two (2) psi or does not stabilize, then the seam will either be repaired entirely or the faulty area will be located and marked for repair.
 - .4 If blockage is present, locate and test seam on both sides of blockage.
 - .5 Remove needle or other approved pressure feed device and seal all penetration holes by extrusion welding.
- .2 Destructive Testing
 - .1 Qualification Welds:
 - .1 Conduct destructive tests in accordance with ASTM D4437-84 on qualification welds to verify that seaming conditions and equipment are satisfactory.
 - .2 Test seams at the beginning of each seaming period, if welding has ceased for a period of 2 hours or more for each seaming apparatus used that day when climatic conditions cause wide changes in geomembrane temperature ($\pm 5^{\circ}\text{C}$ in 1 hour) or other conditions that could affect seam quality.
 - .3 Make all qualification welds at a location selected by the Departmental Representative in the area of the seaming and in contact with the base material. The qualification welds shall be a minimum of 1 metre long with the seam centred lengthwise. Cut specimens from each opposite end of the test seam and test for shear and peel. If a test seam fails to meet field seam specifications, the seaming apparatus and/or seam shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full test seams are achieved. A seam pass is achieved when the seam exhibits the following properties:
 - .1 Completed seams shall have a minimum strength in shear of at least 90% of the specified parent material tensile strength at yield when tested in accordance with ASTM D4437-84, or approved equal.
 - .2 Completed seams shall have a minimum strength in peel of at least 80% of the specified parent material tensile strength at yield, and break as a film tear bond or a minimum of 10% adhesion break when tested in accordance with ASTM D4437-84, or approved equal.
- .2 Field Seams

- .1 Destructive testing of field seams is not required. Verification of the integrity of field seams by destructive testing of test strips and the non-destructive testing of field seams will be sufficient for determination of conformance.
- .3 Factory Fabrication Seams:
 - .1 Use heat welding techniques for shop fabrication such that all shop welds will provide a "Full Tear Bond" as outlined in ANSI/NSF 54 Annex A, Part 5, Peel Adhesion, to the requirements listed in Clause 2.1 of this Section.
 - .2 Test factory fabrication welding for bonded seam strength and peel adhesion at a rate of 3 samples for every 900 metres of welded seam.
- .3 Recording of Results
 - .1 Provide daily documentation of all testing to the Departmental Representative. This documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successively retested.

3.2 DEFECTS AND REPAIRS

- .1 Inspect all seams and non-seam areas of the installed geomembrane for defects, holes, blisters, undispersed raw materials and any sign of contamination by foreign matter. Brush, blow, or wash the geomembrane surface, if required for inspection. The Departmental Representative shall decide if cleaning of the geomembrane is needed to facilitate inspection. This inspection shall be done immediately after placement of the liner.
- .2 Non-destructively test each suspect location in seam and non-seam areas, as appropriate, in the presence of the Departmental Representative. Mark each location that fails the non-destructive testing, and repair accordingly.
- .3 Make a vacuum box available on site in the event that non-destructive testing of non-seam areas is required.
- .4 Adhere to the following procedures in completion of geomembrane repairs:
 - .1 Restart/reseam defective seams as described in these Specifications.
 - .2 Repair holes and/or tears by patching. Where the tear is on a slope or an area of stress and has a sharp end it must be rounded prior to patching.
 - .3 Repair blisters, large holes, undispersed raw materials, and contamination by foreign matter by patching.
 - .4 Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 150 mm beyond the edge of defects. All patches shall be of the same compound and thickness as the geomembrane specified. Patches shall be applied using approved methods only.
 - .5 Non-destructively test each repair, except when the Departmental Representative requires a destructive seam sample obtained from a repaired seam. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.
 - .6 Carry out field patching operations at temperatures below +10°C by heat welding only.

3.3 WEATHER CONDITIONS

- .1 Do not proceed with seaming when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. The Installer shall demonstrate that acceptable seaming can be performed by completing trial welds acceptable to the Departmental Representative. Geomembrane seaming shall not be done during any precipitation, in the presence of excessive moisture (e.g. fog, rain, dew, snow) or in the presence of excessive winds as determined by the Departmental Representative. Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

3.4 BASE PREPARATION

- .1 Prepare 150 mm of bedding sand granular fill base layer by levelling and compacting the layer to 95% of Maximum Dry Density in accordance with ASTM D698. Do not begin installation of the geomembrane until the base layer has been approved by the Departmental Representative. If a key trench is used for anchorage, place the geotextile into the trench extending down the inside face and across the bottom of the trench.

3.5 DEPLOYMENT

- .1 No equipment or tools damage the geomembrane by handling, trafficking or other means.
- .2 No personnel working on the geomembrane wear damaging shoes or engage in other activities that could damage the geomembrane.
- .3 The method used to unroll the panels does not cause scratches or crimps in the geomembrane and does not damage the supporting soil or underlying geotextile.
- .4 The method used to place the panels minimize wrinkles (especially differential wrinkles between adjacent panels).
- .5 Slack for thermal contraction is well distributed, and in accordance with the manufacturer's recommendations.
- .6 All defects are marked and documented for repairs. Defects are defined as any abnormalities that affect the physical properties of the geomembrane material. If greater than ten defects per 500 m² exist, then replace or repair damaged geomembrane areas at the discretion of the Departmental Representative.
- .7 Use sand bags or other appropriate measures to prevent movement of the geomembrane panels.

3.6 FIELD SEAMING

- .1 Perform field seaming only when weather conditions are favourable, or where seaming operations can be protected from unfavourable weather conditions.
- .2 Make field seams between sheets of liner material using approved welding systems, equipment and techniques. Acceptable welding systems include extrusion fillet welding and hot wedge welding using a double wedge welder. All wedge welders shall be specifically designed for a compatible with the liner material and recommended by the manufacturer. Only repairs and detail welds shall be extrusion welded.
- .3 Clean the contact surfaces of the materials of dirt, dust, moisture, or other foreign materials.

- .4 Lay the materials to be field seamed flat against one another. Align the materials with sufficient overlap, and bond in accordance with the manufacturer's recommended procedures. Prior to seaming, match wrinkles to avoid fishmouths.
- .5 Make seams so there are no loose edges.
- .6 Where possible, orient seams on the slopes perpendicular to the toe of the slope; i.e. oriented down, not across the slope.
- .7 Seams which parallel the toe of the slope shall have the top sheet overlap the bottom sheet.
- .8 Cross and toe seams shall be staggered a minimum of one metre.
- .9 An overlap line a minimum of 150 mm from the edge of the underlying sheet will be clearly identified on every fusion seam.
- .10 The overlap shall be sufficient to leave a loose flap of geomembrane at least 25 mm wide adjacent to both sides of the seam.

3.7 ANCHORAGE

- .1 Anchor the geomembrane into the trench to the lines and dimensions as shown on the Drawings.
- .2 If a key trench is used for anchorage, place the geomembrane into the trench extending down the inside face and across the bottom of the trench.

3.8 COVER MATERIAL

- .1 Install geotextile cover in accordance with Section 31 32 19.01 – Geotextiles.
- .2 A minimum of 300 mm of granular fill between low ground pressure equipment and the liner is required at all times. Refer to equipment restrictions in Clause 3.9, Section 31 15 22 - Grading.
- .3 Avoid undue stress on the liner at all times. Push cover material up side slopes, not down.
- .4 Remove all rocks, stones, roots, or other debris that could cause damage to the liner.
- .5 Avoid sharp turns or quick stops with equipment that could pinch and tear the liner.
- .6 Place material ahead of the leading edge of the fill in such a fashion as to prevent stressing the geomembrane. Do not slide cover material over the liner.
- .7 Report any damage to the Departmental Representative immediately and perform repairs without needless delay.
- .8 Place and maintain cover in a uniform thickness, free of ruts and irregularities.
- .9 Do not work wet cover material that cannot support equipment.

END OF SECTION