Fisheries and Oceans Canada

Pêches et Océans Canada

Department of Fisheries and Oceans
Cape Race Building Demolitions
Project No. F5211-200346

Issued for Tender

October 16, 2020
CBCL Project No. 203055.00

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Issued for Tender	Jack Caines	Oct. 16, 2020	Calvin Hollett
Issue or Revision	***Reviewed By:***	***Date***	***Issued By:***

CBCL

PROVINCE OF NEWFOUNDLAND AND LABRADOR
pegnl
ENGINEERING PERMIT
D0178
CBCL Limited
M.I.R.C JACK CAINES #03559
Signature or Member Number (Member-in-Responsible Charge)

REGISTERED PROFESSIONAL ENGINEER
JACK CAINES
SIGNATURE
Oct 16 2020
DATE
NEWFOUNDLAND & LABRADOR

CBCL Project No. 203055.00

PART 1 - GENERAL

1.1 REFERENCES

.1 National Building Code of Canada (NBC) latest edition, including all amendments up to Tender closing date.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this contract comprises of demolition of three (3) buildings and associated site features at Cape Race, NL. Refer to specifications and Hazardous Materials Report in Appendix B for further details. This work includes but is not limited to:

.1 Given the location and nature of the work, contractors are encouraged to arrange a site visit with the Departmental Representative prior to submitting bid. Details of the site visit will be provided by the Departmental Representative after a request has been made.

.2 Preparation, submission and implementation of an approved site specific Health and Safety Plan, Hazmat Plan, Demolition Work Plan, Emergency Response Plan, Environmental Management Plan, Waste Management Plan, Fire Plan, and Schedule.

.1 Where possible, waste materials shall be recycled.

.3 Complete demolition, removal and appropriate disposal of:

.1 Three (3) Buildings hereafter referred to as the old fog horn building, the old generator building and the old dwelling.

.1 Old fog horn building work to include, but not be limited to:

.1 Complete demolition and removal of an approximate 73 square meter wood frame building, including all interior building contents.

.2 Demolition to include removal and abatement of all hazardous material as identified in the Hazardous Materials Report in Appendix B. Contractor shall assume all light ballasts in the building contain PCBs. Contractor shall assume existing fuel tanks are 3/4 full.

.3 Salvage and turn over to Departmental Representative two fog horns on exterior wall and all glass panels in the generator room.

.4 Backfilling and grading the site with topsoil and hydroseed.

1.2 WORK COVERED BY CONTRACT DOCUMENTS (Cont'd)

.1 (Cont'd)

.3 (Cont'd)

.2 Old generator building work to include, but not be limited to:

.1 Complete demolition and removal of an approximate 49 square meter wood frame building, including all interior building contents.

.2 Demolition to include removal and abatement of all hazardous materials as identified in the Hazardous Materials Report in Appendix B.

.3 Salvage and turn over to Departmental Representative red steel rods.

.4 Backfilling and grading the site with topsoil and hydroseed.

.3 Old dwelling building work to include, but not be limited to:

.1 Complete demolition of and removal of an approximate 133 square meter wood frame building complete with concrete foundations and footings, including all interior building contents.

.2 Demolition to include removal and abatement of all hazardous material as identified in the Hazardous Materials Report in Appendix B. Contractor shall assume existing fuel tank is 3/4 full.

.3 Pumping and removal of existing concrete septic tank.

.4 Salvage and turn over to Departmental Representative 14 interior brown doors and two bi-fold doors.

.5 Backfill foundation excavations and building footprint with rock materials as indicated.

.6 Install sign posts in gravel area as detailed.

.2 Contractor shall provide written proof of disposal from disposal facility to Departmental Representative for all demolition materials, including but not limited to, electrical equipment, waste fuel, hazardous materials, building materials, all interior and exterior contents, excavated soils, etc.

1.2 WORK COVERED BY CONTRACT DOCUMENTS (Cont'd)

.1 (Cont'd)

.3 (Cont'd)

.3 After removal of buildings, coordinate environmental testing with Departmental Representative. Provide minimum 72 hours notice to Departmental Representative for testing. Allow reasonable time for Departmental Representative to obtain testing results from laboratory prior to backfilling or placing fill materials. Cost for sampling to be paid by the Departmental Representative. Contractor shall assist Departmental Representative, as required, to obtain samples at no cost to the contract. Assistance may include machinery to collect samples at depth, general labour, etc.

.4 Carry out work in accordance with the Site Specific Risk Management Plan in Appendix F.

.5 Contractor to coordinate disconnect of existing electrical services with utility. Contractor to remove pole.

.6 Snow clearing of roadway and work site as required to execute work.

1.3 WORK SCHEDULE

.1 Provide within seven (7) working days after contract award, schedule showing anticipated progress stages and final completion of work within time period required by Contract Documents.

.2 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative. If deemed necessary, Contractor shall update schedule to approval of Departmental Representative.

.3 All work shall be carried out in a time frame designated by the Departmental Representative and shall be completed as per the tender documents.

.4 Construct Work in stages to accommodate Owner's continued use of premises during construction.

1.4 CONTRACTOR USE OF PREMISES

.1 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.2 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

1.4 CONTRACTOR USE OF PREMISES (Cont'd)

.3 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.4 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.5 OWNER'S OCCUPANCY

.1 The existing buildings will not be occupied during demolition.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Arrange with Departmental Representative to facilitate execution of work.

1.7 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.

1.8 CODES

.1 Perform work in accordance with the latest edition of the National Building Code of Canada (NBC) and any other code of Provincial or local application. In the event of a conflict or discrepancy, the more stringent requirements shall apply.

.2 Perform work in accordance with National Fire Code of Canada, Latest Edition.

.3 Perform work in accordance with Canadian Electrical Code CSA C22.1, Latest Edition.

.4 Meet or exceed requirements of:
.1 Contract Documents.

1.8 CODES (Cont'd)

.4 (Cont'd)
.2 Specified standards, codes and referenced documents.

1.9 COST BREAKDOWN

.1 Before submitting first progress claim, submit detailed breakdown of contract price as directed by Departmental Representative. Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.

1.10 PROJECT MEETINGS

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

1.11 SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

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

.3 Supply such devices as straight edges and templates, required to facilitate Departmental Representative's inspection of work.

1.12 CUTTING AND PATCHING

.1 Obtain Departmental Representative's approval prior to cutting, boring or sleeving load-bearing members.

.2 Cut and patch work as required to make fit.

.3 Make cuts clean, true and smooth edges.

.4 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

1.13 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with the plans, referred to in contract documents.

1.14 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

1.15 MEASUREMENT FOR PAYMENT

.1 All costs associated with this specification will be considered incidental to the project and will not be measured for payment.

1.16 SNOW CLEARING

.1 Contractor shall provide snow clearing as required for execution of the project.

1.17 UTILITY CO-ORDINATION

.1 Contractor shall contact utility providers as required to coordinate disconnection of services.

1.18 PERMITS

.1 Contractor shall obtain and pay for all necessary permits as required to complete the work.

1.19 SALVAGE VALUE

.1 The Departmental Representative assumes no responsibility for the quality or quantity of any material removed under this project.

.2 Any assumptions made regarding the salvage value of any and all materials under this contract are by the Contractor only. All estimates of quality and quantity of salvaged materials are to be made by the Contractor.

.3 No consideration for any payment will be made by the Departmental Representative to the Contractor as a result of the Contractor receiving less than assumed salvage value of any materials.

1.20 SPECIAL OPERATING CONSIDERATIONS

.1 Clean and maintain the cleanliness of adjacent roads and the property occupied by the Contractor from waste material, soil tracking/spillage or refuse resulting from the Contractor's operations to the satisfaction of the Departmental Representative.

.2 Trucks hauling material, aggregate, or other loose material from or to the site shall have their loads trimmed and covered before leaving the site and their bodies shall be tight in order that no spillage of their load will occur.

1.20 SPECIAL OPERATING CONSIDERATIONS (Cont'd)

.3 In general, the Contractor's truck and equipment operations shall be governed by all local ordinances and regulations of Municipal, Provincial and Federal Agencies.

.4 Should the Contractor be negligent in his duties in maintaining proper road cleanliness in the opinion of the Departmental Representative, the Departmental Representative will take the necessary steps to perform such cleanliness and shall charge the Contractor all costs thereof.

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 EXISTING CONDITIONS

.1 After removal of buildings, coordinate environmental testing with Departmental Representative. Provide minimum 72 hours notice to Departmental Representative for testing. Allow reasonable time for Departmental Representative to obtain testing results from laboratory prior to backfilling or placing fill materials. Cost for sampling to be paid by the Departmental Representative. Contractor shall assist Departmental Representative as required to obtain samples at no cost to the contract. Assistance may include machinery to collect samples at depth, general labour, etc.

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 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint and pay for services of testing laboratory except follows:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor's convenience.
.3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
.4 Mill tests and certificates of compliance.
.5 Tests specified to be carried out by Contractor.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.2 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:
.1 Provide access to Work for inspection and testing.
.2 Facilitate inspections and tests.
.3 Make good Work disturbed by inspection and test.
.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Departmental Representative 72 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

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

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

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

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

.7 Verify field measurements and affected adjacent Work are co-ordinated.

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

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means 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.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Newfoundland and Labrador, Canada.

.3 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 7 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 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 revisions other than those requested.

.7 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.

.8 Submissions include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.8 (Cont'd)

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 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 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.13 (Cont'd)
.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.21 (Cont'd)

.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 sub-trades.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 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.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of digital photography in jpg format, standard resolution, as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

1.5 PHOTOGRAPHIC DOCUMENTATION (Cont'd)

.3 Frequency of photographic documentation: as directed by Departmental Representative.

.1 Upon completion of excavation, backfilling and before concealment of work, as directed by Departmental Representative.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

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 SUBMITTALS

.1 Submit to Departmental Representative copies of the following documents, including updates:

.1 Site Specific Health and Safety Plan.

.1 COVID-19 safety precautions to be included in Site Specific Health and Safety Plan. See Appendix D.

.2 Building Permit, compliance certificates and other permits obtained.

.3 Reports or directions issued by Federal and Provincial Inspectors and other Authorities having jurisdiction.

.4 Accident or Incident Reports.

.5 MSDS data sheets.

.6 Name of Contractor's representative designated to perform full time health and safety supervision on site.

.7 Letter of Good Standing/Certificate of Clearance form the provincial Workers Compensation Board.

.2 Upon request by Departmental Representative, submit reports and other documentation as stipulated to be produced and maintained by Federal and Provincial Occupational Health and Safety Regulations and as specified herein.

.3 Submit above documents in accordance with the submittal procedures specified in Section 01 33 00 - Submittal Procedures.

1.2 COMPLIANCE REQUIREMENTS

.1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety Regulations made pursuant to the Act.

.2 A copy of the Canada Labour Code Part II may be obtained at:

https://laws-lois.justice.gc.ca/eng/acts/L-2/

.3 Maintain Workers Compensation Coverage for duration of Contract. Submit Letter of Good Standing to Departmental Representative at time of submitting the Project Health and Safety Plan and with each Request for Progress Payment.

1.3 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, of property and for protection of persons and public circulating adjacent to work operations to extent that they may be affected by conduct of the Work.

.2 Enforce compliance by all workers, sub-contractors and other persons granted access to work site with safety requirements of Contract Documents, applicable Federal, Provincial, and local statutes, regulations, and ordinances, and with site specific Health and Safety Plan.

1.4 SITE CONTROL AND ACCESS

.1 Control work site and entry points to construction areas.
.1 Delineate and isolate construction areas from other areas of site by use of appropriate means.
.2 Post notices and signage at entry points and at other strategic locations identifying entrance onto site to be restricted to authorized persons only.
.3 Signage must be professionally made, bilingual in both official languages or display internationally understood graphic symbols.

.2 Approve and grant access to site only to workers and authorized persons.
.1 Immediately stop non-authorized persons from circulating in construction areas and remove from site.
.2 Provide site safety orientation to all persons before granting access. Advise of site conditions, hazards and mandatory safety rules to be observed on site.

.3 Secure site at night time to extent required to protect against unauthorized entry. Provide security guard where protection cannot be achieved by other means.

.4 Ensure persons granted access to site wear appropriate personal protective equipment (PPE) suitable to work and site conditions.
.1 Provide such PPE to authorized persons who require access to perform inspections or other approved purposes.

1.5 PROTECTION

.1 Carry out work placing emphasis on health and safety of the Public, Facility personnel, construction workers and protection of the environment.

1.5 PROTECTION (Cont'd)

.2 Erect safety barricades, lights and signage on site to effectively delineate work areas, protect pedestrian and vehicular traffic around and adjacent to work, and to create a safe working environment.
.1 Erect protective barriers and temporary lighting as required. See Section 01 56 00 - Temporary Barriers and Enclosures for minimum acceptable barricades.

.3 Should unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.6 PERMITS

.1 Obtain building permit, licenses, compliance certificates and other permits as specified in Section 01 11 00 - Summary of Work before and during progress of work. Post on site.

.2 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify Departmental Representative in writing and obtain Departmental Representative's approval to proceed prior to carrying out that portion of work.

1.7 HAZARD ASSESSMENTS

.1 Conduct site specific health and safety hazard assessment before commencing project and during course of work identifying risks and hazards resulting from site conditions, weather conditions and work operations.
.1 Perform on-going assessments addressing new risks and hazards as work progresses including when new subtrade or sub-contractor arrives on site.
.2 Also, conduct assessment when the scope of work has been changed by Change Order and when potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety representative.

.2 Record results in writing and address in Health and Safety Plan.

.3 Keep copy of all assessments on site.

1.8 PROJECT/SITE CONDITIONS

.1 Safety hazards due to existing site conditions and conduct of work adjacent inside operational Facility are:
.1 conflicts with operating equipment and personnel using the facility.

.2 The following are known or potential project related safety hazards at site:
.1 Wet and slippery conditions.
.2 Inclement weather.
.3 Potential structural weakness of existing structures.
.4 Heavy equipment activity in the area.
.5 Heavy lifting.
.6 Cutting tools and other construction power tools.
.7 Overhead power/utility lines.
.8 Working around excavations.
.9 Working around hazardous materials, including, but not limited to, asbestos, lead, mould and mercury.
.10 Working around electricity.

.3 Above list shall not be construed as being complete and inclusive of potential health, and safety hazards encountered during work. Include above items into hazard assessment process.

.4 Obtain from Departmental Representative, copy of MSDS Data sheets for existing hazardous products stored on site or used by Facility personnel.

1.9 HEALTH AND SAFETY MEETINGS

.1 Attend pre-construction health and safety meeting conducted by Departmental Representative. Have following persons in attendance:
.1 Site Superintendent.
.2 Contractor's designated Health and Safety Site Supervisor.
.3 Departmental Representative will advise of date, time and location.

.2 Conduct health and safety meetings and tool box briefings on site. Hold on a regular and pre-scheduled basis during entire work in accordance with requirements and frequency as stipulated in provincial Occupational Health and Safety Regulations.
.1 Keep workers informed of potential hazards and provide safe work practices and procedures to be followed.
.2 Take written minutes and post on site.

1.10 HEALTH AND SAFETY PLAN

.1 Develop written site specific Project Health and Safety Plan, based on hazard assessments, prior to commencement of work.
.1 Submit copy to Departmental Representative within 7 calendar days of acceptance of bid.
.2 Submit updates as work progresses.

.2 Health and Safety Plan shall contain three (3) parts with the following information:
.1 Part 1 - Hazards: List of individual health risks and safety hazards identified by hazard assessment process.
.2 Part 2 - Safety Measures: Engineering controls, personal protective equipment and safe work practices used to mitigate hazards and risks listed in Part 1 of Plan.
.3 Part 3a: Emergency Response: standard operating procedures, evacuation measures and emergency response in the occurrence of an accident, incident or emergency.
.1 Include response to all hazards listed in Part 1 of Plan.
.2 Evacuation measures to complement the Facility's existing Emergency Response and Evacuation Plan. Obtain pertinent information from Departmental Representative.
.3 List names and telephone numbers of officials to contact including:
.1 General Contractor and all Subcontractors.
.2 Federal and Provincial Departments as stipulated by laws and regulations of authorities having jurisdiction and local emergency resource organizations, as needed base on nature of emergency.
.3 Officials from PWGSC and site Facility Management. Departmental Representative will provide list.
.4 Part 3b - Site Communications:
.1 Procedures used on site to share work related safety issues between workers, subcontractors, and General Contractor.
.2 List of critical tasks and work activities, to be communicated with the Facility Manager, which has risk of affecting tenant operations, or endangering health and safety of Facility personnel and the general public. Develop list in consultation with the Departmental Representative.

.3 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

1.10 HEALTH AND SAFETY PLAN (Cont'd)

Column 1 "Part 1" Identified Hazards	Column 2 "Part 2" Safety Measures	Column 3 "Part 3a/3b" Emergency Response & Site Communications

.4 Develop Plan in collaboration with subcontractors. Address work activities of all trades. Revise and update Plan as subcontractors arrive on site.

.5 Implement and enforce compliance with requirements of Plan for full duration of work to final completion and demobilization from site.

.6 As work progresses, review and update Plan. Address additional health risks and safety hazards identified by on-going hazard assessments.

.7 Post copy of Plan and updates, on site.

.8 Submission of the Health and Safety Plan and updates, to the Departmental Representative, is for review and information purposes only. Departmental Representative's receipt, review and any comments made of the Plan shall not be construed to imply approval in part, or in hold, of such Plan by Departmental Representative, and shall not be interpreted as a warranty of being complete and accurate, or as a confirmation that all health and safety requirements of the Work, have been addressed, and that it is legislative compliant. Furthermore, Departmental Representative's review of the Plan shall not relieve the Contractor of any of his legal obligations for Occupational Health and Safety provisions specified as part of the Work and those required by provincial legislation or those which would otherwise be applicable to the site of the Work.

1.11 SAFETY SUPERVISION AND INSPECTIONS

.1 Designate one person to be present on site at all times, responsible for supervising health and safety of the Work.

.1 Person to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.

.2 Assign responsibility, obligation and authority to such designated person to stop work as deemed necessary for reasons of health and safety.

1.11 SAFETY SUPERVISION AND INSPECTIONS (Cont'd)

.3 Conduct regularly scheduled informal safety inspections of work site on a minimum bi-weekly basis.
.1 Note deficiencies and remedial action taken in a log book or diary.

.4 Cooperate with Facility's Health and Safety Site Coordinator responsible for the entire site, should one be designated by Departmental Representative.

.5 Keep inspection reports on site.

1.12 TRAINING

.1 Ensure that all workers and other persons granted access to site are competently trained and knowledgeable on:
.1 Safe use of tools and equipment.
.2 How to wear and use personal protective equipment (PPE).
.3 Safe work practices and procedures to be followed in carrying out work.
.4 Site conditions and minimum safety rules to be observed on site, as given at site orientation session.

.2 Maintain evidence and records of worker training.

1.13 MINIMUM SITE SAFETY RULES

.1 Notwithstanding the requirement to abide by federal and provincial health and safety regulations, the following safety rules shall be considered minimum requirements to be obeyed by all persons granted site access:
.1 Wear personnel protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear and eye protection.
.2 Immediately report unsafe activity or condition at site, near-miss accident, injury and damage.
.3 Maintain site in tidy condition.
.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules and on disciplinary measures to be taken by Departmental Representative for violation or non-compliance of such rules. Post rules on site.

1.13 MINIMUM SITE SAFETY RULES (Cont'd)

.3 The following actions or conduct by Contractor, workers and sub-contractors will be considered as non conformance with the health and safety requirements of the contract for which a Non-compliance Notification will be issued to the General Contractor by the Departmental Representative:

.1 Failure to follow the minimum site safety rules specified above.

.2 Negligence resulting in serious injury or major property damage.

.3 Deliberate non-compliance with Federal and Provincial Acts and Regulations.

.4 Falsification of information in Workers Compensation Reports, safety reports and other health and safety related documents submitted to Departmental Representative or to Authority having jurisdiction.

.5 Possession of firearms on site.

.6 Possession of non-prescriptive illegal drugs or alcohol.

.7 Action, or lack thereof, resulting in the issuance of Warnings, Fines or Stop Work Orders from a Provincial Authority having jurisdiction.

.8 Violation of other specified health and safety rules and requirements as determined by Departmental Representative.

.4 See elsewhere in this section for details on Non-Compliance Notifications and resulting disciplinary measures.

1.14 ACCIDENT REPORTING

.1 Investigate and report the following incidents and accidents:

.1 Those as required by Provincial Occupational Safety and Health Act and Regulations.

.2 Injury requiring medical aid as defined in the Canadian Dictionary of Safety Terms-1987, published by the Canadian Society of Safety Engineers (C.S.S.E)as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.3 Property damage in excess of $5000.00.

.4 Interruption to Facility operations with potential loss in excess of $5,000.00 to a Federal Department.

.5 Those which require notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable law or regulations.

1.14 ACCIDENT REPORTING (Cont'd)

.2 Send written report to Departmental Representative for all above cases.

1.15 TOOLS AND EQUIPMENT SAFETY

.1 Routinely check and maintain tools, equipment and machinery for safe operation.

.2 Conduct checks as part of site safety inspections. When requested, submit proof that checks and maintenance have been carried out.

.3 Tag and immediately remove from site items found faulty or defective.

1.16 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site. Post on site. Submit copy to Departmental Representative upon receipt.

1.17 POSTING OF DOCUMENTS

.1 Post on site safety documentation as stipulated by Authorities having jurisdiction and as specified herein. Place in a common visible location.

1.18 SITE RECORDS

.1 Maintain on site a copy of all health and safety documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.

.2 Upon request, make available to Departmental Representative, or authorized safety representative, for review. Provide copy when directed by Departmental Representative.

1.19 NON-COMPLIANCE AND DISCIPLINARY MEASURES

.1 Immediately address and correct health and safety violations and non-compliance issues.

.2 Negligence or failure to follow occupational health and safety provisions specified in the Contract Documents and of those of applicable laws and regulations could result in disciplinary measures taken by the Departmental Representative against the General Contractor.

1.19 NON-COMPLIANCE AND DISCIPLINARY MEASURES (Cont'd)

.3 PWGSC uses a system of Non-Compliance Notifications and Disciplinary Measures on projects as follows:

.1 A non-compliance notification is issued to the General Contractor, by the Departmental Representative, whenever there is a violation or non-compliance of the project's health and safety requirements and of those of Provincial and Federal regulations by any worker, subcontractor or other person to whom the Contractor has granted access to the work site.

.2 Non-compliance notifications are progressive in nature resulting in disciplinary measures imposed depending on the frequency, nature and severity of the infraction.

.3 Disciplinary measures could include:

.1 Removal of the offending person or party from site;

.2 Financial penalties in the form of progress payment reduction or holdback assessments made against the Contract and;

.3 Taking the Work Out of Contractor's Hands in accordance with the General Conditions.

.4 Departmental Representative will make final decision as to what constitutes a violation and when to issue a Non-compliance Notification.

.5 Non-compliance Notifications issued by Departmental Representative shall not be construed as to overrule or disregard warnings, orders and fines levied against Contractor by a regulatory agency having jurisdiction.

.6 Each non-compliance notification issued is given a numerical rating based on a three level numbering system. Each level is progressive in nature to reflect:

.1 The seriousness of the infraction as viewed by the Departmental Representative.

.2 The degree of disciplinary action which will be taken by the Departmental Representative.

.7 Numerical ratings are as follows:

.1 Non-compliance Notification-Level No.1 Rating:

.1 Situation: occurrence of a first time infraction by a person or party on site.

.2 Action: verbal warning to General Contractor, documented in Departmental files and copy sent to the General Contractor.

.2 Non-compliance Notification-Level No.2 Rating:

.1 Situation:

.1 The second occurrence of a previous infraction by the same person or party on site or;

1.19 NON-COMPLIANCE AND DISCIPLINARY MEASURES (Cont'd)

.7 (Cont'd)

.2 (Cont'd)

.2 Accumulation of several level-1 notifications for different infractions by the same person or party on site or;

.3 Non-action on the part of the Contractor or subcontractor to rectify non-compliance infractions previously identified in one or several level-1 notifications or;

.4 Violation or non observance of a Federal or Provincial safety Law or Regulation by subcontractor or Contractor or;

.5 Negligence by a person or party resulting in injury or major property damage.

.2 Action: written notice to General Contractor complete with an order for immediate remedial action to be taken. Depending on the severity of the offence, the order may include request for the immediate removal of the offending person or party from site.

.3 Non-compliance Notification-Level No.3 Rating:

.1 Situation:

.1 Continued and repeated non-compliance with health and safety requirements by the General Contractor or by subcontractor(s) or;

.2 The occurrence of a serious accident on site resulting in serious bodily injury or death.

.2 Action:

.1 Formal letter issued to General Contractor with an order to "Immediately Stop Work" until so notified to proceed.

.2 Review of all non-compliance and/or accident occurrences in the project with possible investigation by the Department of PWGSC.

.3 Based on outcome of the review/investigation, Work could be suspended or taken out of the Contractor's hands in accordance with the General Conditions.

.3 The term "serious accident" used herein shall have the same meaning as defined in the Canadian Dictionary of Safety Terms - 1987 issue from the Canadian Society of Safety Engineers (C.S.S.E).

.8 Decision on which rating level to be placed on any given Non-Compliance Notification will be determined solely by Departmental Representative.

1.19 NON-COMPLIANCE AND DISCIPLINARY MEASURES (Cont'd)

.9 Further details on the disciplinary system will be provided at the pre-construction Health and Safety meeting after acceptance of bid.

.10 Be responsible to fully brief workers and subcontractors on the operation and importance of this system.

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 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 humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit Environmental Protection Plan (EPP) for review by Departmental Representative before delivering materials to site or commencing construction activities.

.3 EPP shall include comprehensive overview of known or potential environmental issues to be addressed on site during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan (EPP):
.1 Names of persons responsible for ensuring adherence to EPP.
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
.3 Names and qualifications of persons responsible for training site personnel.
.4 Descriptions of environmental protection personnel training program.
.5 Submit a site-specific Stormwater Pollution Prevention Plan (SPPP). Include the site-specific Erosion and Sediment Control Plan (ESCP) identifying the type and location of erosion and sediment control measures to be provided on site. Include monitoring and reporting requirements to ensure that ESC control measures are in compliance with erosion and sediment control plan, Federal and Provincial regulations, and Municipal by-laws.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)

.6 Submit drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Submit a site-specific Traffic Control Plan (TCP) including measures to reduce erosion of temporary and existing roadbeds by construction traffic, especially during wet weather.

.1 TCP to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Submit a Site Work Plan (SWP) showing work areas for proposed activities in each portion of area and identifying areas of limited use or non-use.

.1 SWP to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Submit a Spill Control Plan (SCP) including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Submit a Solid Waste Disposal Plan (SWDP) for non-hazardous solid wastes identifying methods and locations for solid waste disposal including clearing debris.

.11 Submit an Air Pollution Control Plan (APCP) detailing provisions to ensure that dust, debris, materials, and trash, are contained within the project site.

.12 Submit a site-specific Contaminant Prevention Plan (CPP) identifying the proper procedures and actions to be implemented to prevent potentially or expected hazardous substances due to the presence of any hazardous substances within the project site. The intent of the CPP is to:

.1 Prevent introduction of designated substances (DS) into air, water, or ground;

.2 Detail provisions for storage and handling of these materials in compliance with Federal, Provincial, and Municipal laws.

.13 Submit a Wastewater Management Plan (WMP) identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)

.14 Submit an Identification and Protection Plan (IPP) that defines procedures for identifying and protecting historical, archaeological, cultural and biological resources and wetlands.

1.3 FIRES

.1 Fires and burning of rubbish on site is not permitted.

1.4 DRAINAGE

.1 Ensure that the ESCP measures are provided and that its recommendations are followed on site, in accordance with the site-specific SPPP, at all times during construction.

.2 Provide temporary drainage and pumping as required to keep excavations on site free of standing water.

.1 Obtain Departmental Representative approval before pumping standing water, which is free of suspended materials, into waterways, sewer or drainage systems.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with the site-specific SPPP in compliance with the requirements of authorities having jurisdiction.

1.5 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties in accordance with the Canadian Landscape Standard -First Edition, Section 03 - Site Preparation and Protection of Existing Site Elements.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of two (2) m minimum. Ensure that control measures used for protection are in compliance with Municipal laws and regulations.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

1.5 SITE CLEARING AND PLANT PROTECTION (Cont'd)

.5 Restrict tree removal to areas designated by Departmental Representative. Obtain permits before trees removal in accordance with the requirements of the authorities having jurisdiction.

1.6 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only.

.2 Keep waterways free of excavated fill, waste material and debris.

.3 Design and construct temporary crossings to minimize waterways erosion.

.4 Do not skid logs or construction materials across waterways.

1.7 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract in accordance with site-specific SPPP.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements. Check with local authorities for any environmental compliance requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
.1 Provide temporary enclosures where directed by Departmental Representative.

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

1.8 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Refer to the site-specific IPP for procedures in identifying and protecting historical and archaeological resources previously known to be on project site or discovered during construction.
.1 Plan to include methods to ensure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.9 WILD LIFE PROTECTION

.1 Should sea bird nests be encountered during the work, immediately notify Departmental Representative for directives to be followed.
.1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
.2 Minimize work immediately adjacent to such areas until nesting is completed.

1.10 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial environmental laws and regulations or Municipal environmental bylaws, permits, and other elements of site-specific plans.

.2 Contractor after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action to obtain the approval of Departmental Representative.
.1 Take action only after receipt of written 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.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.

.2 Bury rubbish and waste materials on site is not permitted.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

3.1 CLEANING (Cont'd)

.4 Proceed with final cleaning upon completion and removal of surplus materials, rubbish, tools and equipment.

.5 Waste Management: separate waste materials for in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 SITE CONDITIONS

.1 Existing Conditions:
.1 Reference Hazardous Materials Report in Appendix B for locations of hazardous materials located in the buildings.

1.2 ENVIRONMENTAL PROTECTION

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure deconstruction work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Do not bury waste or materials on site unless approved in writing by Departmental Representative.

.5 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.
.1 Ensure proper disposal procedures in accordance with applicable Provincial/Territorial regulations.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties in accordance with authorities having jurisdiction.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.

.8 Protect trees, plants and foliage on site and adjacent properties where indicated.

.9 Prevent extraneous materials from contaminating air beyond deconstruction area, by providing temporary enclosures during Work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on temporary roads.

.11 Use natural lighting to do Work where possible.
.1 Shut off lighting except those required for security purposes at end of each day.

1.2 ENVIRONMENTAL PROTECTION (Cont'd)

.12 Organize site and workers in manner which promotes efficient flow of materials through disassembly, processing, stockpiling, and removal.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 Employ necessary means to assess site conditions and structures to determine quantity and locations of hazardous materials.

.2 Investigate site and structures to determine dismantling, processing and storage logistics required prior to beginning of Work.

.3 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.

3.2 PREPARATION

.1 Obtain necessary permits and approvals.
.1 Provide copies to Departmental Representative prior to start of Work on site.

.2 Post signs in visible locations and appropriate languages which indicates to workers, subcontractors, haulers, and public.

3.3 REMOVAL FROM SITE

.1 Transport material designated for alternate disposal using approved haulers, facilities and receiving organizations.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial 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.

1.2 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

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 in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

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

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 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.

1.3 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 orderly sequence to not cause delays 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.

1.4 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.5 REPORTS

.1 Submit 4 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

END OF SECTION

PART 1 - GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY

.1 Provide continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

.3 Pay for utility charges at prevailing rates.

1.5 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 flameless (vent free) type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

1.5 TEMPORARY HEATING AND VENTILATION (Cont'd)

.4 Maintain temperatures of minimum 10 degrees Celsius in areas where construction is in progress.

.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied 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 contaminants.

.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.

1.6 TEMPORARY POWER AND LIGHT

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

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

.3 Provide and maintain temporary lighting throughout project.

1.7 TEMPORARY COMMUNICATION FACILITIES

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

1.8 FIRE PROTECTION

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

.2 Burning rubbish and construction waste materials is not permitted on Site.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to, requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CSA Group (CSA)
- .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
- .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

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

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

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

.5 Remove from site all such work after use.

1.4 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

1.5 HOISTING

.1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

1.5 HOISTING (Cont'd)

.2 Hoists and cranes to be operated by qualified operator.

1.6 SITE STORAGE/LOADING

.1 Confine work and operations of employees by 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 Work.

1.7 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.8 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.10 SANITARY FACILITIES

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

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

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

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

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

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

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

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

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

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

1.12 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

1.12 CLEAN-UP (Cont'd)

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB).
- .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International).
- .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 FENCING

.1 Delineate worksite as required to prevent entry by pedestrians and vehicles with 2.44m high wire fence complete with reflective markers at 5m spacing.

1.4 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Design enclosures to withstand wind pressure and snow loading.

1.5 DUST TIGHT SCREENS

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

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

1.6 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.7 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Be responsible for damage incurred due to lack of or improper protection.

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 REFERENCES

.1 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.3 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

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

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

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.4 STORAGE, HANDLING AND PROTECTION (Cont'd)

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

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

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

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

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.8 CO-ORDINATION (Cont'd)

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

1.9 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative

1.10 REMEDIAL WORK

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

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

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

.3 When requested by Departmental Representative, submit field drawings to indicate relative position of various services and equipment.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

1.12 FASTENINGS (Cont'd)

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

.7 Conceal fasteners where indicated. Space evenly and layout neatly.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 NOT USED.

PART 3 - EXECUTION

3.1 NOT USED

.1 NOT USED.

END OF SECTION

PART 1 - GENERAL

1.1 SURVEY REFERENCE POINTS

.1 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.2 Make no changes or relocations without prior written notice to Departmental Representative.

.3 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.4 Require surveyor to replace control points in accordance with original survey control.

1.2 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.3 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.4 RECORDS

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

.2 Record locations of maintained, re-routed and abandoned service lines.

1.5 SUBSURFACE CONDITIONS

.1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

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 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 33 00 - Submittal Procedures.

1.2 SUBMITTALS

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

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.3 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

1.4 PREPARATION (Cont'd)

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Cut rigid materials using masonry saw or core drill.

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 WASTE MANAGEMENT PLAN

.1 Prior to commencement of work, prepare waste Management Workplan.

.2 Workplan to include:
- .1 Waste audit.
- .2 Waste reduction practices.
- .3 Material source separation process.
- .4 Procedures for sending recyclables to recycling facilities.
- .5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site.
- .6 Training and supervising workforce on waste management at site.

.3 Workplan to incorporate waste management requirements specified herein and in other sections of the Specifications.

.4 Develop Workplan in collaboration with all subcontractors to ensure all waste management issues and opportunities are addressed.

.5 Implement and manage all aspects of Waste Management Workplan for duration of work.

.6 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.

1.2 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

1.3 STORAGE, HANDLING AND PROTECTION

.1 Store materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

1.4 DISPOSAL REQUIREMENTS

.1 Refer to Hazardous Materials Report in Appendix B for a list of known hazardous materials.

.2 Burying or burning of rubbish and waste materials is prohibited.

1.4 DISPOSAL REQUIREMENTS (Cont'd)

.3 Disposal of waste, volatile materials, mineral spirits, oil, paint, paint thinner or unused preservative material into waterways, storm, or sanitary sewers is prohibited.

.4 Do not dispose of preservative treated wood through incineration.

.5 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.6 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.

.7 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

.8 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

.9 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.

.10 Sale of salvaged items by Contractor to other parties not permitted on site.

.11 Remove materials from deconstruction as deconstruction/disassembly work progresses.

1.5 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.6 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 NOT USED

PART 3 - EXECUTION

3.1 APPLICATION

.1 All materials are to be disposed of as required by regulatory codes, regulations, acts and municipal by-laws.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 78 00 - Closeout Submittals.

1.2 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and Subcontractors: conduct 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 perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Certificates required have been submitted.
.4 Work is complete and ready for final inspection.

.4 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 reinspection.

.5 Declaration of Substantial Performance: when Departmental Representative consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

1.2 INSPECTION AND DECLARATION (Cont'd)

.7 Final Payment: when Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

1.3 REINSPECTION

.1 Should status of work require reinspection by Departmental Representative due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of Departmental Representative's compensation for reinspection services from payment to the Contractor.

1.4 CLEANING

.1 Remove waste and surplus materials, rubbish and construction facilities from the site.

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 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.2 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.
.1 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,process flow, 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.
.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg format on CD, DVD or USB drive.

1.3 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;
.1 Date of submission; names.
.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to 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.

.5 Typewritten Text: as required to supplement product data.
.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.4 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions,at site for Departmental Representative one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.
.1 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.
.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

1.4 AS -BUILT DOCUMENTS AND SAMPLES (Cont'd)

.4 Maintain record documents in clean, dry and legible condition.
.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.5 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information concurrently with construction progress.
.1 Do not conceal Work until required information is recorded.

.2 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 Referenced Standards to related shop drawings and modifications.

.3 Specifications: 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 Addenda and change orders.

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

.5 Provide digital photos, if requested, for site records.

1.6 FINAL SURVEY

.1 Submit final site survey georeferenced to the MTM coordinate system in a format compatible with Autodesk AutoCAD software, showing point northing, easting, elevation and description.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.8 WARRANTIES AND BONDS

.1 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.2 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
.4 Verify that documents are in proper form, contain full information, and are notarized.

.3 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.4 Respond in timely manner to oral or written notification of required construction warranty repair work.

.5 Written verification to follow oral instructions.
.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Methods and procedures for demolition of structures, parts of structures, basements and foundation walls.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 02 81 01 - Hazardous Materials.

.4 Section 01 56 00 - Temporary Barriers and Enclosures.

.5 Section 01 35 43 - Environmental Procedures.

.6 Section 01 35 29.06 - Health and Safety Requirements.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International).
.1 CSA S350-M1980 (R1988) - Code of Practice for Safety in Demolitions of Structures.

.2 Department of Justice Canada (Jus).
.1 Canadian Environmental Assessment Act (CEAA), 1992, c. 37.
.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.3 Underwriters' Laboratories of Canada (ULC).
.1 ULC/ORD-C107.19-1992, Secondary Containment of Underground Piping.

.4 U.S. Environmental Protection Agency (EPA)/Code of Federal Regulations (CFR), Title 40 - Protection of Environment, Chapter 1, Subchapter C - AIR, Part 86 - CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES.
.1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.

1.3 REFERENCES (Cont'd)

.4 (Cont'd)
.2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.

1.4 DEFINITIONS

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

.2 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.

.3 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.4 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

1.5 SUBMITTALS

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

.2 The WMC is responsible for fulfilment of reporting requirements.

.3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal and indicate:
.1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
.2 Schedule of selective demolition.
.3 Number and location of dumpsters.
.4 Anticipated frequency of tippage.
.5 Name and address of haulers, waste facilities and waste receiving organizations.

1.5 SUBMITTALS (Cont'd)

.4 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site on a weekly basis.
.1 Written authorization from Departmental Representative is required to deviate from haulers, facilities and receiving organizations listed in Waste Reduction Workplan.

.5 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

.6 Submit drawings stamped and signed by qualified professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial and Municipal regulations.

.2 Meetings:
.1 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
.2 Hold project meetings every week.
.3 Ensure key personnel attend.
.4 WMC must provide written report on status of waste diversion activity at each meeting.
.5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of materials as required by regulation, authorities having jurisdiction and as specified in the project documents.

1.8 ENVIRONMENTAL PROTECTION

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

1.8 ENVIRONMENTAL PROTECTION (Cont'd)

.4 Do not bury rubbish waste materials.

.5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout project.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction as directed by Departmental Representative.

.8 Protect trees, plants and foliage on site and adjacent properties where indicated.

.9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.9 EXISTING CONDITIONS

.1 Buildings and structures to be demolished contain asbestos, lead, mercury, polychlorinate biphenyl, and petroleum containing materials. Reference hazardous materials report in Appendix B of this specification. Prior to the start of any demolition work, remove contaminated or hazardous materials defined by authorities having jurisdiction and dispose of at a designated disposal facility in a safe manner and in accordance with TDGA and all other applicable regulatory requirements.

.2 Structures to be demolished to be based on their condition, at time of examination prior to tendering.

.3 Existing concrete septic tank for old dwelling building to be pumped and removed. Existing disposal field to remain.

.4 Coordinate the disconnect and removal of utilities with appropriate authorities.

1.10 SCHEDULING

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
.1 In event of unforeseen delay notify Departmental Representative in writing.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Equipment and heavy machinery to:
.1 On-road vehicles to meet applicable emission requirements as prescribed in CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
.2 Off-road vehicles to meet applicable emission requirements as prescribed in EPA CFR 86.098-10 and EPA CFR 86.098-11.

.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping and adjacent grades.
.1 Provide bracing, shoring and underpinning as required.
.2 Repair damage caused by demolition as directed by Departmental Representative.

.2 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

.3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

3.2 PREPARATION

.1 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

.2 Remove rodent and vermin as required by Departmental Representative.

3.3 SAFETY CODE

.1 Do demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Blasting operations not permitted during demolition.

3.4 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

.2 Prior to start of demolition work remove contaminated or hazardous materials listed as hazardous as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA.

3.5 DEMOLITION

.1 For the purpose of this contract, the limit of demolition shall be defined as the area of the building footprint or as indicated on the contract drawings.

.2 Prior to the start of any demolition work, remove contaminated or hazardous materials as defined by authorities having jurisdiction and dispose of at a designated disposal facility in a safe manner and in accordance with the TDGA.

.3 Remove all existing mechanical and electrical equipment and systems and dispose of as required by regulation.

.4 Demolish structure including underground services as specified.

.5 Concrete foundations, walls and floors are to be completely removed and disposed of.

.6 At the end of each day's work, leave work and site in a safe and stable condition.

.7 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

.8 Do not backfill excavated areas until inspected by Departmental Representative.

3.6 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

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

.3 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.

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

.5 Stockpile materials in neat and orderly fashion in location and as directed by Departmental Representative for disposal. Stockpile materials in accordance with applicable fire and safety regulations.

.6 Supply separate, clearly marked disposal bins for categories of waste material. Do not remove bins from site until inspected and approved by Departmental Representative. Notify Departmental Representative prior to removal of bins from site.

.7 Stockpile on site, steel studs in good condition for reuse in new construction.

3.7 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved haulers, facilities and receiving organizations listed in Waste Reduction Workplan.

.4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.8 REPORTING

.1 Through data gathered from bills of lading, report the following information at specified project milestones to the satisfaction of Departmental Representative.

3.8 REPORTING (Cont'd)

.1 (Cont'd)

.1 Description of disposed hazardous materials provided to disposal facility.

.2 Weight, volume, quantity of material provided to disposal facility.

.3 Breakdown of reuse, recycling and landfill percentages.

.4 End destination of materials.

.5 **Documentation must be provided to the Departmental Representative before final payment.**

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

.1 Canadian Federal and Provincial Legislation and Guideline

.1 Canadian Environmental Protection Act (CEPA), 1999

.2 Canadian Environmental Assessment Act (CEAA), 1995

.3 Environment Canada Technical Assistance Bulletin TAB 8, Tanks

.4 Transportation of Dangerous Goods Act (TDGA), 1992

.5 Motor Vehicle Safety Act (MVSA), 1995

.6 Canadian Council of Ministers of the Environment (CCME)

.7 PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

.8 Newfoundland and Labrador Regulation 58/03 - Storage and Handling of Gasoline and Associated Products Under the Environmental Protection Act.

.9 Newfoundland and Labrador Regulation 60/03 Heating Oil Storage Tank System Regulations Under the Environmental Protection Act.

.2 National Fire Protection Agency (NFPA)

.1 NFPA 30: Flammable and Combustible Liquids Code (the most up-to-date)

.2 NFPA 326: Standard for Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair (the most up-to-date)

.3 NFPA 329: Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases (the most up-to-date)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit a written report describing in detail procedures used to remove liquid from aboveground storage tank, cleaning and removing of aboveground storage tank, and disposal of liquid residues; provide verification that materials were disposed of in an environmentally responsible waste disposal facility; provide photographic documentation of work, including lab and field results, and receipts from disposal sites for tank and liquid residue.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Submit a written contingency plan for actions to be taken in the event of a release or emergency including:
.1 Emergency contact numbers;
.2 Classification of land use;
.3 Plans for covering/containing contaminated soil;
.4 Plans for site assessment/remediation work; and,
.5 Reducing risk to human health.

.4 Forward Affidavit of Destruction of aboveground storage tank to Departmental Representative.

1.3 QUALITY ASSURANCE

.1 Refer to laws, by laws, ordinances, rules, regulations and orders of authority having jurisdictions, and other legally enforceable requirements applicable to Work at that area; or become in force during Work performance.

.2 Aboveground fuel tank removal and disposal shall comply with requirements of authorities having jurisdiction.

.3 Contractor shall be licensed by Province of Newfoundland and Labrador for removal of storage tanks.

.4 Regulatory Requirements: Ensure work is performed in compliance with CEPA SOR/2008-197

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:
.1 Separate waste materials for reuse.
.2 Direct waste materials not destined for reuse to provincially approved waste processing sites for alternative disposal. Certificate of approval required for each facility chosen.

.2 Divert metal materials from landfill to metal recycling facility approved by Authority Having Jurisdiction.

.3 Segregate and deliver non-salvageable or non-recyclable materials, including waste liquids and sludges to licensed waste facility.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Provide necessary materials, equipment and tarps to prevent further contamination of site, and for safe handling and containment of fuel, fuel storage and removed contaminated soils.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Provide all necessary personal protective equipment, purging and inert gases, and electrical protection equipment, and verify that equipment is working properly before starting work of this Section.

3.2 PREPARATION SAFETY AND SECURITY

.1 Conform to or exceed Federal, Provincial and Territorial codes, local municipal by-laws, by-laws,and codes and regulations of utility authorities having jurisdiction.

.2 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Protection:

.1 Meet safety requirements of Occupational Safety and Health, Canada Labour Code Part II and Regulations for Construction Projects.

.2 Disconnect or remove source of ignition from vicinity of tank.

.3 Provide temporary protection for safe movement of personnel and vehicle traffic.

.4 Cut, braze or weld metal only in monitored areas established to be free of ignitable vapour concentrations.

.5 Ground and bond metal equipment, including tanks and transfer pipes, before operating equipment or transferring flammable materials.

.6 Use non-sparking tools and intrinsically safe electrical equipment.

.7 Smoking is not permitted.

3.3 DRAINING

.1 Drain and flush piping into tank.

.2 Remove sludge from tank bottom.

3.3 DRAINING (Cont'd)

.2 (Cont'd)

.1 Dispose of product and sludge in accordance with local, Provincial and Territorial regulations using waste disposal carrier licensed by Provincial/Territorial Environmental Agency having jurisdiction.

.2 Gas free the tanks as per Section 3.5 prior to any removal activities.

.3 Monitor and maintain appropriate vapour levels in the tanks until delivery of the tanks to the decommissioning site.

3.4 TANK REMOVAL

.1 Remove tanks and place in a secure location prior to removal from site.

3.5 VAPOUR REMOVAL

.1 Purging:

.1 Purge vapours to less than 10% of lower explosive limit (LEL).

.2 Verify with combustible gas metre.

.3 Provide Departmental Representative with test results.

.2 Dry Ice Method:

.1 Add 1.85 gm of solid carbon dioxide (dry ice) for each 100 litre capacity.

.2 Crush and distribute ice evenly over greatest area to secure rapid evaporation. Avoid skin contact.

.3 Verify dry ice has vapourized.

.3 Air Method:

.1 Ventilate tank with air using small gas exhauster operated with compressed air or other suitable means.

.2 Air to enter opening at one end and to exit opening at other end to quickly remove vapour.

.3 Test interior of tank to determine when tank is free of vapour.

.4 Provide Departmental Representative with copy of test results (SOR 2008-197, Section 44).

3.6 CAPPING

.1 Plug holes after each tank has been freed of vapours and before tanks are moved from site.

.2 Leave 3 mm vent hole in one plug to prevent tank from being subjected to excessive pressure differential caused by extreme temperature change.

3.7 SECURING AND REMOVAL FROM SITE

.1 Check vapour levels prior to transport:
.1 Remove vapour if required.

.2 Dispose of tank in accordance with local, Provincial, Federal or Territorial regulations.

.3 Truck removal:
.1 Secure tank on truck for transport to disposal site.
.2 Cut suitable openings in tank sides to render tank unusable.
.3 Ensure 3 mm vent hole located at uppermost point on tank.
.4 Label tank stating "Not for reuse" and "To be disposed".

3.8 WORKMANSHIP AND DISPOSAL

.1 Tanks destined for disposal:
.1 Dismantle, cut sufficient openings or otherwise render unusable.
.2 Forward affidavit of destruction to Departmental Representative as per Section 01 77 00.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Definitions:

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

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

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

.2 Reference Standards:

.1 Canadian Environmental Protection Act,1999 (CEPA 1999).

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada 2005.

.4 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1999, (c. 34).

.5 Transportation of Dangerous Goods Regulations (SOR/2001-286).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit 2 copies of WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.

.1 Provide hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

1.3 DELIVERY, STORAGE AND HANDLING (Cont'd)

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer flammable and combustible liquids out of vicinity of open flames or heat-producing devices.

.7 Solvents and cleaning agents must have flash point above 38 degrees C.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
.1 Store hazardous materials and wastes in closed and sealed containers.
.2 Label containers of hazardous materials and wastes in accordance with WHMIS.
.3 Store hazardous materials and wastes in containers compatible with that material or waste.
.4 Segregate incompatible materials and wastes.
.5 Ensure that different hazardous materials or hazardous wastes are not mixed.
.6 Store hazardous materials and wastes in secure storage area with controlled access.
.7 Maintain clear egress from storage area.

1.3 DELIVERY, STORAGE AND HANDLING (Cont'd)

.10 (Cont'd)
.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

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

.12 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.4 TRANSPORTATION

.1 Transport hazardous materials and wastes to and from site in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.

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

1.4 TRANSPORTATION (Cont'd)

.3 (Cont'd)

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.

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

1.5 MATERIAL IDENTIFICATION

.1 Clearly label all containers in accordance with 5 Wing Hazardous Materials Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Allow hazardous materials on site only in quantities required to perform Work.

.1 Notify Departmental Representative 24 hours minimum prior to bringing hazardous materials onto work site.

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

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines. Refer to Appendix "B" for known hazardous materials identified in the building.

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

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

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

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

3.1 WASTE MANAGEMENT (Cont'd)

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

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
.1 Hazardous wastes recycled in manner constituting disposal.
.2 Hazardous waste burned for energy recovery.
.3 Lead-acid battery recycling.
.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Reference Hazardous Materials Report in Appendix B for areas requiring intermediate precautions.

1.2 REFERENCES

.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)

1.3 DEFINITIONS

.1 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

.2 Asbestos-Containing Materials (ACMs): materials that contain 1% (one) per cent or more asbestos by dry weight and are identified under Existing Conditions including associated fallen materials and settled dust.

.3 Asbestos Work Area: area where work takes place which will, or may disturb ACMs.

.4 Authorized Visitors: Engineers, or designated representatives, and representatives of regulatory agencies.

.5 Competent worker person: 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 provincial and federal laws and with the provisions of the regulations that apply to the work.

1.3 DEFINITIONS (Cont'd)

.5 (Cont'd)
.3 Has knowledge of all potential or actual danger to health or safety in the work.

.6 Friable Materials: material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.7 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.

.8 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 dimension at 99.97% efficiency.

.9 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.10 Occupied Area: any area of building or work site that is outside Asbestos Work Area.

.11 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.

.12 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Obtain from the Province of Newfoundland and Labrador and submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos containing waste in accordance with requirements of authority having jurisdiction.

1.4 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.4 Submit proof of Contractor's Asbestos Liability Insurance.

.5 Obtain from the Province of Newfoundland and Labrador and submit to Departmental Representative necessary permits for transportation and disposal of asbestos containing waste and proof that asbestos containing waste has been received and properly disposed.

.6 Submit proof satisfactory to Departmental Representative that all asbestos workers have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene, entry and exit from Asbestos Work Area, aspects of work procedures and protective measures while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.7 Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.

.8 Submit Worker's Compensation Board status and transcription of insurance.

.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;
.3 Slow drying sealer.

.10 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.5 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 the time work is performed.

1.5 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator 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 to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker 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. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. It includes suitable footwear, and it to be repaired or replaced if torn.

.3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

1.5 QUALITY ASSURANCE (Cont'd)

.2 (Cont'd)

.4 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing to be provided by Contractor.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.7 Visitor Protection:

.1 Provide protective clothing and approved 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.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and recycling and place in designated containers steel metal plastic waste in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

1.6 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Fold up metal banding, flatten and place in designated area for recycling.

.8 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 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

.9 Provide manifests describing and listing waste created. Transport containers by approved means to licenced landfill for burial.

1.7 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMS to be handled, removed, or otherwise disturbed and disposed of during this Project are bound into this specification in Appendix B.

.2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by the Departmental Representative.

1.8 PERSONNEL TRAINING

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, in use of glove bag procedures, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at minimum:
- .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 competent, qualified person.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Drop and Enclosure Sheets:
.1 Polyethylene: 0.15 mm thick.
.2 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 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 bag or where glove bag method is used, glove bag itself.
.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or 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, or Alternative material approved by addendum during tendering period in accordance with Instructions to Tenderers.
.2 The glove bag to be equipped with:
.1 Sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period.
.2 Valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.
.3 A tool pouch with a drain.
.4 A seamless bottom and a means of sealing off the lower portion of the bag.
.5 A high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

2.1 MATERIALS (Cont'd)

.4 (Cont'd)
.2 (Cont'd)

.5 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

.6 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 and be compatible with new fireproofing.

PART 3 - EXECUTION

3.1 SUPERVISION

.1 Minimum of one Supervisor for every ten workers is required.

.2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

3.2 PROCEDURES

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.

.3 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.

.4 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

3.2 PROCEDURES (Cont'd)

.4 (Cont'd)

.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in work areas where dust or contamination cannot otherwise be safely contained.

.2 When removing suspended ceilings and walls themselves do not enclose work area and when removing asbestos containing material from piping or equipment and "glove bag" method is not used erect enclosure of polyethylene sheeting around work area, shut off mechanical ventilation system serving work area and seal ventilation ducts to and from work area.

.5 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 Perform Work in a manner to reduce dust creation to lowest levels practicable.

.6 Pipe Insulation Removal Using Glove Bag:

.1 A glove bag not to be used to remove insulation from a pipe, duct or similar structure if:

.1 It may not be possible to maintain a proper seal for any reason including, without limitation:

.1 The condition of the insulation.

.2 The temperature of the pipe, duct or similar structure.

.2 The bag could become damaged for any reason including, without limitation.

.1 The type of jacketing.

.2 The temperature of the pipe, duct or similar structure.

.2 Upon installation of the glove bag, inspect bag for any damage or defects. If any damage or defects are found, the glove bag is to be repaired or replaced. The glove bag to be inspected at regular intervals for damage and defects, and repair or replaced, as appropriately. The asbestos containing contents of the damaged or defective glove bag found during removal are to be wetted and the glove bag and its contents are to be removed and disposed of in an appropriate waste disposal container. Any damaged or defective glove bags are not be reused.

.3 Place tools necessary to remove insulation in tool pouch. Wrap bag around pipe and close zippers. Seal bag to pipe with cloth straps.

3.2 PROCEDURES (Cont'd)

.6 (Cont'd)

.4 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.

.5 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.

.6 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.

.7 After removal of bag ensure that pipe is free of residue. Remove residue using HEPA vacuum or wet cloths. Ensure that surfaces are 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.

.8 Upon completion of Work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.

.7 A final inspection will be carried out by the Departmental Representative to verify that all Asbestos Containing Materials have been removed and that no dust or debris remains on surfaces as a result of removal activities.

.1 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require additional asbestos abatement to be completed following Type III Asbestos Abatement (Maximum Precautions) procedures and clean-up of affected areas.

.2 Do not allow asbestos fibres to be discharged to the air. Air at and adjacent to the work area may be monitored by the Departmental Representative and must report asbestos levels not exceeding 0.01 fibres/cm^3, as determined by NIOSH Method 7400-A Phase Contrast Microscopy (PCM) report.

.8 Cleanup:

.1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.

3.2 PROCEDURES (Cont'd)

.8 (Cont'd)

.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 and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

3.3 AIR MONITORING

.1 All air monitoring shall be coordinated and paid for by the Contractor. Air Monitoring Reports shall be forwarded to the Departmental Representative.

.2 Air monitoring representative shall conduct visual inspections on a regular basis to the satisfaction of the Departmental Representative.

.3 From beginning of work until completion of cleaning operations, collect air samples from within the work area or outside the Asbestos Abatement Work Area.

.4 Conduct final air monitoring as follows:

.1 After the Asbestos Abatement Work Area has passed visual inspection and an acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period has passed, perform air monitoring within Asbestos Abatement Work Area.

.2 Final air monitoring results must show fibre levels of less than 0.01 fibre/cm3.

.3 If air monitoring results show fibre levels in excess of 0.01 fibre/cm3, re-clean work area and apply another acceptable coat of lock-down agent to surfaces.

.4 Repeat as necessary until fibre levels are less than 0.01 fibre/cm3.

3.3 AIR MONITORING (Cont'd)

.5 Conduct air sampling from within the Asbestos Abatement Work Area throughout the duration of the Work. Use results of air monitoring inside the Asbestos Abatement Work Area to establish type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods. Provide all air testing results to the Departmental Representative within 24hrs of receipt of the results of the testing.

.1 If fibre levels are above safety factor of respirators in use, stop abatement, apply means of dust suppression, and use higher safety factor in respiratory protection for persons inside enclosure.

.2 If air monitoring shows that areas outside work area report fibre levels exceeding 0.01 fibre/cm3, enclose, maintain, and clean these areas in same manner as that applicable to Asbestos Abatement Work Areas.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work:
.1 Removal of lead based paint from as indicated on drawings by scraping or sanding using non-powered hand tools.

1.2 REFERENCES

.1 Department of Justice Canada
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Health Canada
.1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).

.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 Ontario Ministry of Labour - Lead on Construction Projects Guidelines (2011).

.6 Underwriters' Laboratories of Canada (ULC)

.7 Government of Newfoundland and Labrador Guidance Document, Leachable Toxic Waste Testing and Disposal.

1.3 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 Authorized Visitors: Departmental Representative or designated representatives and representatives of regulatory agencies.

.3 Occupied Area: areas of building or work site that is outside Work Area.

1.3 DEFINITIONS (Cont'd)

.4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

.5 Airlock: ingress or egress system, without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.

.6 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows:
.1 Place two overlapping polyethylene sheets over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway, and secure other sheet along opposite vertical side of doorway.
.2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
.3 Overlap each polyethylene sheet at openings 1.5 m on each side.

.7 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic meter of air within Work Area.

.8 Competent person: individuals capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.

.3 Provide: Provincial and local requirements for Notice of Project Form.

.4 Provide proof of Contractor's General and Environmental Liability Insurance.

1.4 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 Quality Control:

.1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that it has been received and properly disposed.

.2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.

.6 Product data:

.1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers and visitors in Work Area includes:

.1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.

.2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.2 Requirements for workers:

1.5 QUALITY ASSURANCE (Cont'd)

.2 (Cont'd)

.1 (Cont'd)

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms 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 - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead 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.

.3 Eating, drinking, chewing, and smoking are not permitted in Work Area.

.4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.

.5 Ensure workers wash hands and face when leaving Work Area. Provide facilities as required by authority having jurisdiction.

.6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

1.6 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

.2 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

.3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 EXISTING CONDITIONS

.1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are bound into this specification. See Appendix B.

.2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

.3 Some lead based paints located at the former dwelling and former fog horn building contain leachable lead levels exceeding the allowable limits for disposal at a land fill and must be treated as hazardous waste and be disposed of at an approved disposal facility qualified to accept and properly dispose of lead based paints and substrates containing these levels. Submit letter to Departmental Representative from the facility stating material will be accepted.

1.8 SCHEDULING

.1 Not later than two 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-containing materials identified in Existing Conditions.

.3 Provide Departmental Representative copy of notifications prior to start of Work.

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 8 hours and designed for trapping residual lead paint residue.

.5 Lead waste containers: metal fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
.1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

.1 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead based paints.

3.2 PREPARATION

.1 Work Area:
.1 Shut off and isolate HVAC system, ducts, louvres or any other component of the building ventilation system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
.2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
.3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
.4 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

3.2 PREPARATION (Cont'd)

.1 (Cont'd)

.5 Cover ground surfaces in work area with FR polyethylene drop sheets to protect surrounding ground.

.6 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.

.7 At point of access to work areas install warning signs in both official languages 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 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).

.8 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.

.9 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.

.10 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.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 and work areas, with two curtained doorways, one to the rest of suite, and one to 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 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.

3.2 PREPARATION (Cont'd)

.2 (Cont'd)
.1 (Cont'd)

.3 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 doorway always remains closed.

.4 Separation of Work Areas from Occupied Areas
.1 Barriers between Work Area and occupied area to be constructed as follows:
.1 Construct floor to ceiling lumber stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
.2 Cover plywood with polyethylene sheeting and sealed with duct tape.

.5 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 LEAD - BASE PAINT ABATEMENT

.1 Removal of lead based paint to be performed by scraping or sanding using non-powered hand tools.

.2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.

.3 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 Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.3 LEAD - BASE PAINT ABATEMENT (Cont'd)

.4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean work area including equipment and access room, and equipment used in process. After inspection by Departmental Representative, apply continuous coat of slow drying sealer to surfaces. Do not disturb work for 8 hours with no entry, activity, ventilation or disturbance during this period.

.6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

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 cleanliness and 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 Follow specified cleaning procedures.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum equipment.

.3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.

3.5 FINAL CLEANUP (Cont'd)

.4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.

.5 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.

.6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.6 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Remove and dispose of all PCBs, mercury, and lead as identified in the Hazardous Materials Reports bound to this specification in Appendix B. Quantities are estimated. The Contractor will be responsible for accurately verifying/calculating the amount of each PCBs, mercury, and lead containing product/material identified and confirming the removal and disposal of all the identified materials or products are included in their bid price. Materials containing PCBs, mercury, and lead may be found in other parts of the buildings. It is the responsibility of the Contractor to locate, handle, remove and dispose of all materials.

.2 Comply with requirements of this Section when performing the following Work:

.1 Handling, packaging, and transferring materials containing PCBs, mercury, lead, and silica. Such as, but not limited to, fluorescent light ballasts, fluorescent light tubes, and silica containing materials such as concrete, cement products, and halocarbon containing materials.

.2 Spill response: conduct spill response training and have a plan in place and maintain sufficient equipment and materials on-site to respond to a discharge of materials which occurs during waste handling.

1.2 RELATED SECTIONS

.1 Section 01 35 29.06 - Health and Safety Requirements.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 02 41 16 - Structure Demolition.

1.3 REFERENCES

.1 Handbook on PCBs in Electrical Equipment, EPS, 1982.

.2 Manual for the Management of Wastes Containing Polychlorinated Biphenyl (PCBs), EPS 9 (HA) 1, February 1987.

.3 Identification of Fluorescent Lamp Ballasts Containing PCBs, Environment Canada's Document (EPS/CC/2, August 1991).

1.3 REFERENCES (Cont'd)

.4 Transportation of Dangerous Goods Act, PC 1985 - 147, 17 January 1985, Regulations respecting the handling, offering for transport and transporting of dangerous goods (Extract from the Canada Gazette Part II, dated January 6, 1985, and all amendments.

.5 Environmental Contaminants Act, Environment Canada and Health and Welfare Canada.

.6 Federal Halocarbon Regulations, 2003 (SOR/2003-289).

.7 Halocarbon Regulations, 2005 under the Environmental Protection Act (O.C. 2005-229) Newfoundland and Labrador Regulation 41/05.

.8 Canadian Environmental Protection Act, Ch. 22, 1988, and all Amendments.

.9 Transportation of Dangerous Goods Regulations, 1986, distributed by the International Compliance Centre Ltd.

.10 Ontario Ministry of Labour, Occupational Health and Safety Branch. April 2011. Guidelines - Silica on Construction Projects.

1.4 REMOVAL QUALIFICATIONS

.1 Use qualified electricians for removal of light ballasts.

.2 Where contact with hazardous materials is expected, instruct personnel in handling procedures, safety precautions, use of safety equipment and applicable Provincial Federal legislation and regulations.

1.5 MANAGEMENT OF WASTES

.1 Containers for use in the transportation and disposal of PCBs-containing ballasts, equipment and paints shall be approved by the Departmental Representative prior to use.

.2 Provide the containers for use in the transportation and disposal of mercury containing materials and equipment.

.3 Provide the containers for use in the transportation and disposal of lead containing materials and equipment.

.4 Be responsible for the pick up and delivery of the containers from and to the proposed hazardous materials handling facility.

1.5 MANAGEMENT OF WASTES (Cont'd)

.5 All containers and the disposal of all other hazardous and non hazardous materials is the responsibility of the Contractor unless indicated otherwise in this and other sections of the specifications.

1.6 REGULATORY REQUIREMENTS

.1 Comply with the following:

.2 Canadian Environmental Protection Act (Canada) and pursuant regulations. Transportation of Dangerous Goods Act (Canada).

.3 All other legislation and regulations which apply to the performance of the Work of this section.

1.7 HANDLING AND WORKER PROTECTION

.1 Follow Provincial and Federal regulations relating to proper personal protective equipment and Work procedures for removal, handling, and disposal of hazardous materials; provided that in case of conflict among these requirements or with these specifications the more stringent requirements applies. Comply with regulations in effect at the time the Work is performed.

.2 Provide workers with additional protective clothing and equipment where contact with hazardous materials may occur. Provide clothing and equipment appropriate for the potential level of exposure.

.3 Inform personnel removing hazardous materials of the hazards associated with exposure to the materials and the procedures that are to be followed if they come in contact with the hazardous material.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Absorptive Material: PCBs absorptive material that creates a quasi-solid product which can be swept or shovelled. Acceptable materials include:
.1 Sawdust.
.2 Vermiculite.
.3 Activated Charcoal.
.4 Oclansorb.
.5 Imbiber Beads.
.6 Hi-Dry.
.7 Desorb.
.8 Stay-Dry.

2.1 MATERIALS (Cont'd)

.1 (Cont'd)
.9 Oil-Dry.
.10 Conwed.
.11 3M Matting.
.12 Graboil.

.2 Disposal containers for PCBs-containing ballasts:
.1 200 litre capacity metal drums.

.3 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified.

.4 Hazardous waste bags: minimum 0.15 mm thick polyethylene bags complete with wire ties. All hazardous waste, as well as materials contaminated with Hazardous Materials, must be double bagged. Each bag must be wire-tie closed.

PART 3 - EXECUTION

3.1 PREPARATION

.1 The Work area will be isolated during the removal of hazardous materials.

.2 Maintain emergency and fire exits from Work area.

3.2 REMOVAL OF PCB-CONTAINING BALLASTS

.1 Examine fluorescent light fixtures in the buildings upon removal. Verify the total number of PCBs-containing ballasts. Identify ballasts containing PCBs with reference to Identification of fluorescent lamp ballasts containing PCBs EPS/CC/2, August 1991 or through contact with manufacturer.

.2 For materials containing PCBs, follow provincial and federal regulations regarding removals with respects to respiratory gear, proper clothing, handling of materials, ventilation, etc. The procedure for handling these materials must be submitted to the Departmental Representative prior to removal.

.3 All ballasts which cannot be identified as non PCBs-containing, with reference to above, will be treated as containing PCBs.

.4 Submit a list to the Departmental Representative showing the total number of light ballasts containing PCBs complete with model number and date codes.

.5 Remove all PCBs-containing ballasts as follows:

3.2 REMOVAL OF PCB-CONTAINING BALLASTS (Cont'd)

.5 (Cont'd)

.1 Remove entire ballast, including capacitor, for fluorescent lights.

.2 Cut off excess wire and dispose of as construction waste.

.3 Place ballast into plastic lined disposal drums.

.4 Pack drum with sufficient absorbent material to absorb any PCBs which may leak from ballasts.

.5 Dispose of PCBs-contaminated gloves and work clothes in drums as PCBs waste. Contaminated gloves and other personal protective equipment (PPE) will be stored in separate drums to facilitate disposal.

.6 Label drums containing waste PCBs in accordance with Section 9 of the Interim Order respecting the Storage of Wastes containing Polychlorinated Biphenyls (PCBs), as issued under the Canadian Environmental Protection Act in September 1990.

.7 Seal drum and store in a designated storage area pending transportation.

.8 Transport and deliver PCB-containing materials to approved disposal facility. Provide Departmental Representative with written confirmation from facility that the PCB containing materials have been disposed of in accordance with governing regulations.

.9 All non PCBs-containing ballasts will be disposed of by the contractor.

3.3 REMOVAL OF MERCURY-CONTAINING MATERIALS

.1 Identify all mercury-containing materials and submit to the Departmental Representative, a list of the mercury contaminated materials identified at the Work area and a map of the Work site identifying their locations.

.2 For materials containing mercury, follow Provincial and Federal regulations regarding removals with respects to respiratory gear, proper clothing, handling of materials, ventilation, etc. The procedure for handling these materials must be submitted to the Departmental Representative prior to removals.

.3 All workers are to be given an orientation to the project including a discussion of exposure, routes, the toxicity of mercury, and the protective equipment to be used during removals. These procedures will also include the hazards associated with mercury spills and the proper method of clean up if a spill occurs and the medical procedures used by the worker if the spilled mercury comes in contract with the worker's skin.

3.3 REMOVAL OF MERCURY-CONTAINING MATERIALS (Cont'd)

.4 Carefully remove all materials containing mercury (fluorescent light tubes, mercury filled vials in thermostats) from their operating position with special attention not to damage the container holding the mercury material and to avoid having mercury come in contact with the worker. Carefully place items containing mercury in a 0.15 mm thick plastic bag, double bagged and sealed tightly with a wire tie or alternately may be wrapped in polyethylene sheeting and sealed with tape.

.5 Mercury containing equipment other than fluorescent light tubes shall be:
.1 Placed in new 205 litre open top steel drums or in new 20 litre pail (if quantities are minimal).
.2 Seal and label filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area.
.3 Notify and provide to Serco as per 5 Wing Hazardous Materials Management Plan.
.4 Fluorescent light tubes shall be placed undamaged in cardboard containers.

.6 Be responsible for the proper disposal of mercury-containing materials.

3.4 REMOVAL OF HALOCARBON CONTAINING MATERIALS

.1 Prior to disposal of halocarbon containing equipment, the regulated substance shall first be recovered and the equipment shall be labelled "Halocarbon Free".

.2 Units shall be drained by a certified technician.

.3 Containers used to receive, contain, or transport recovered or recycled regulated substances shall be approved containers and may only be disposed of:
.1 At a facility approved by the authority having jurisdiction which recycles approved containers, where the approved container is evacuated to a minimum 20 inches of vacuum and the regulated substance is recovered; and where metal from containers is disposed of, to a scrap metal dealer licensed as a salvage dealer under the Salvage Dealer Licencing Act or at a waste disposal site established under the Environmental Protection Act.

3.5 REMOVAL OF OTHER HAZARDOUS MATERIALS

.1 Be responsible for the removal, handling and disposal of all other hazardous materials present in the structure, in accordance with requirements of Authorities having jurisdiction, unless specified. Stockpiling of hazardous waste on site is prohibited unless authorized by Departmental Representative, or Provincial and Federal Environmental Departments. Utilize appropriate methods and personal protection measured when disturbing silica containing products to ensure that the exposure criteria for silica does not exceed the applicable guideline.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 22 13 - Rough Grading.

.2 Section 31 23 25 - Rock and Gravel Fill.

.3 Section 32 92 19.13 - Topsoil Placement and Grading.

1.2 REFERENCE STANDARDS

.1 ASTM International
.1 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Sustainable Design Submittals:
.1 Submit Erosion and Sedimentation Control Plan for review and approval by Departmental Representative clearly demonstrating means and methods that are proposed to be installed during construction to ensure sedimentation and runoff occurs during construction while maintaining positive drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Rock fill and common fill to section 31 23 25 - Rock and Gravel Fill.

.2 Topsoil to Section 32 92 19.13 - Topsoil Placement and Grading.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Evaluation and Assessment:
.1 Before commencing work verify establish locations of buried services on and adjacent to site.

3.2 PREPARATION

.1 Temporary erosion and sedimentation control:
.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to approved sediment and erosion control plan.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Protection of in-place conditions:
.1 Keep site clean, free of standing water, and loose soil.
.2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
.3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
.4 Protect buried services that are required to remain undisturbed.

.3 Removal:
.1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
.2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.
.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

3.3 EXCAVATION

.1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial,Territorial, and Municipal regulations whichever is more stringent.

.2 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
.1 Stockpile topsoil on site for later use.

.3 Excavate as required to carry out work.
.1 Do not disturb soil or rock below bearing surfaces.

3.3 EXCAVATION (Cont'd)

.3 (Cont'd)

.2 Notify Departmental Representative when excavations are complete.

.3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.

.4 Excavation taken below depths shown without Departmental Representative's written authorization to be filled with concrete of same strength as for footings at Contractor's expense.

.4 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground.

.1 Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

.5 Excavate for slabs and paving to subgrade levels.

.1 In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.4 FIELD QUALITY CONTROL

.1 Testing of materials and compaction of fill as required will be carried out by testing laboratory designated by Departmental Representative.

.2 Not later than 1 week minimum before backfilling or filling, submit to designated testing agency, samples of backfill as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

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

.4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative to allow compaction tests to be carried out by designated testing agency.

3.5 BACKFILLING

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

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

.3 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as fill.

3.5 BACKFILLING (Cont'd)

.3 (Cont'd)
.1 Fill excavated areas with selected subgrade material, gravel and sand compacted as specified for fill.

.4 Placing:
.1 Place backfill, fill and base course material in 150 mm lifts: add water as required to achieve specified density.
.2 Place unshrinkable fill in areas as indicated: consolidate and level unshrinkable fill with internal vibrators.

.5 Compaction: compact each layer of material to following densities for material to ASTM D 698:
.1 To underside of base courses: 95%.
.2 Base courses: 100%.
.3 Elsewhere: 90%.

.6 In trenches:
.1 Up to 300 mm above pipe or conduit: sand placed by hand.
.2 Over 300 mm above pipe or conduit: Type III material approved by Departmental Representative.

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

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

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

3.6 GRADING

.1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative.
.1 Grade to be gradual between finished spot elevations shown on drawings.

3.7 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.
.2 Dispose of cleared and grubbed material off site daily.

3.7 CLEANING (Cont'd)

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

.1 ASTM C 127-04, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.3 ASTM D 1557-02e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.4 ASTM D 4253-00, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.2 DEFINITIONS

.1 Corrected maximum dry density is defined as:

.1 D = (D1xD2) / ((F1 x D2) + (F2 x D1))

.2 Where: D = corrected maximum dry density kg/m^3.

.1 F1 = fraction (decimal) of total field sample passing 4.75 mm sieve

.2 F2 = fraction (decimal) of total field sample retained on 4.75 mm sieve (equal to 1.00 - F1)

.3 D1 = maximum dry density, kg/m^3 of material passing 4.75 mm sieve determined in accordance with Method A C of ASTM D 698 ASTM D 1557.

.4 D2 = bulk density, kg/m^3, of material retained on 4.75 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C 127.

.3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D 4253 dry method wet method when directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)
.1 ASTM D 4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 SAMPLES

.1 Testing of materials shall be carried out by approved testing company.

.2 Cost of testing shall be paid for by the Contractor.

.3 Testing company shall issue reports on quality of materials to Departmental Representative.

.4 Allow continual sampling by testing company during production.

.5 Provide testing company with access to source and processed material for sampling.

.6 Install sampling facilities at discharge end of production conveyor, to allow testing company to obtain representative samples of items being produced. Stop conveyor belt when requested by testing company to permit full cross section sampling.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.
.1 Greatest dimension to exceed five times least dimension.

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

2.1 MATERIALS (Cont'd)

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

2.2 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 2 weeks prior to commencing production.

.2 If, in opinion of Departmental Representative, from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

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

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

PART 3 - EXECUTION

3.1 PREPARATION

.1 Offsite aggregate source preparation
.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.2 Processing

3.1 PREPARATION (Cont'd)

.2 (Cont'd)

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

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

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

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

.3 Handling

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

.4 Stockpiling

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

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

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

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

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

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

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

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

.2 Max 1.5 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

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

.10 Do not use conveying stackers.

3.1 PREPARATION (Cont'd)

.4 (Cont'd)

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

.3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
.1 ASTM D 698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

1.2 EXISTING CONDITIONS

.1 Known underground and surface utility lines and buried objects are as indicated on site plan.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Fill material: In accordance with Section 31 23 25 - Rock and Gravel Fill.

PART 3 - EXECUTION

3.1 EXAMINATION

.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 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated, eliminating uneven areas and low spots.

.2 Slope rough grade to provide positive drainage.

.3 Compact fill and disturbed areas to corrected maximum dry density to ASTM D 698, as follows:
.1 85% under landscaped areas.

.4 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

3.4 PROTECTION

.1 Protect existing fencing, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies supply, placement and compaction of rock and gravel fill as required or as directed by Departmental Representative.

1.2 RELATED SECTIONS

.1 Section 31 00 00.01 - Earthwork - Short Form.

.2 Section 31 05 10 - Corrected Maximum Dry Density for Fill.

.3 Section 31 05 16 - Aggregate Materials.

1.3 TESTING

.1 Provide access and assistance to Departmental Representative in obtaining samples for testing purposes.

PART 2 - PRODUCTS

2.1 ROCK FILL

.1 Blasted rock fill will be of hard, durable, evenly graded blasted stone having a maximum diameter of 150 mm in major portion of fill and a maximum diameter of 100 mm in upper 300 mm of rock fill. Fill material will contain not more than 6 percent by weight passing the 25 mm sieve. Rock fill to be evenly graded within the limits specified.

.2 Use of shale rock or slate will not be permitted.

.3 Fill shall be unfrozen and free from cinders,ashes, sods, refuse or other deletrious material.

PART 3 - EXECUTION

3.1 PLACING ROCK FILL

.1 Only rock fill material approved by Departmental Representative will be placed. Material will be placed uniformly across full cross-section in layers not exceeding 300 mm loose depth.

.2 Use suitable earth moving and surface grading equipment to place and spread rock fill in continuous and uniform horizontal layers.

3.1 PLACING ROCK FILL (Cont'd)

.3 Compact rock fill after each 300 mm lift.

.4 All side slopes to be one (1) vertical to two horizontal.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.5 ASTM D 1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).

.6 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.7 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.2 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials. Stockpile minimum 50% of total aggregate required prior to beginning operation.

.2 Store cement in weather tight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Testing of materials shall be carried out by an approved testing company.

2.1 MATERIALS (Cont'd)

.2 Cost of testing shall be paid for by the Departmental Representative.

.3 Testing company shall issue reports on quality of material to Departmental Representative.

.4 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:

.1 Crushed stone or gravel.

.2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.

.1 Gradation Method # 1 to:

Sieve Designation			% Passing
19	mm	-	100
12.5	mm	-	70-100
9.5	mm	-	-
4.75	mm	-	40-70
2.00	mm	-	23-50
0.425	mm	-	7-25
0.180	mm	-	-
0.075	mm	-	3-8

.2 Liquid limit: to ASTM D 4318, maximum 25

.3 Plasticity index: to ASTM D 4318, maximum 6.

.4 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 45

.5 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

Passing		Retained on
50 mm	to	25 mm
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

.6 Soaked CBR: to ASTM D 1883, min 10, when compacted to 100% of ASTM D 1557.

PART 3 - EXECUTION

3.1 SEQUENCE OF OPERATION

.1 Place granular base after subgrade surface is inspected and approved by Departmental Representative.

.2 Placing
.1 Construct granular base to depth and grade in areas indicated.
.2 Ensure no frozen material is placed.
.3 Place material only on clean unfrozen surface, free from snow and ice.
.4 Place material using methods which do not lead to segregation or degradation of aggregate.
.5 Place material to full width in uniform layers not exceeding 100 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
.6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
.7 Remove and replace that portion of layer in which material becomes segregated during spreading.

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

.4 Compacting
.1 Compaction testing shall be carried out by approved testing company.
.2 Cost of testing shall be paid for by the Departmental Representative.
.3 Testing company shall issue reports on compaction to Departmental Representative.
.4 Compact to density not less than 100% in accordance with maximum dry density ASTM D 698.
.5 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
.6 Apply water as necessary during compacting to obtain specified density.
.7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
.8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCES .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 31 22 13 - Rough Grading.

.4 Section 32 92 19.16 - Hydraulic Seeding.

1.2 SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil to be utilized 7 days in advance.

.2 Contractor is responsible for soil analysis and requirements for amendments to supply topsoil as specified. Soil sampling, testing and analysis to be in accordance with Province of Newfoundland and Labrador's Standards.

.3 Obtain Departmental Representative's approval of equipment and methods of construct planting soil and amend stripped topsoil if required by soil's report.

.4 Contractor responsible to test topsoil from source prior to stripping and stockpiling for clay, sand and silt, coarse fragments, particle size, N, P, K, Mg, and organic matter.

.5 Testing of topsoil to be carried out by approved laboratory.

PART 2 - PRODUCTS

2.1 TOPSOIL

.1 Imported Unscreened Topsoil: Friable loam, neither heavy clay nor very light sandy nature, containing minimum 4% organic matter for clay loams and 2% for sandy loams to maximum of 25%. Free from subsoil, roots, grass, weeds, stones larger than 100mm, foreign objects. Acidity range (pH) of 6.0 to 7.0. Topsoil containing crabgrass, couchgrass or other noxious weeds is not acceptable.

2.2 SOIL AMENDMENTS

.1 Limestone:
.1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.

2.2 SOIL AMENDMENTS (Cont'd)

.2 Peat: Natural bog peat free from deleterious material, surface vegetation and associated roots.

.3 Loam: Local available clay, sand and silty loam, characteristic of topsoil in texture and acceptable to Departmental Representative.

.4 Fertilizer:
.1 Complete, commercial, with 35% soluble nitrogen.
.2 Ratio: 6-12-12.

2.3 CONSTRUCTED TOPSOIL FOR PLANTING

.1 Thoroughly mix by volume:
.1 4 parts imported topsoil.
.2 1 part saturated peat moss.
.3 1 part well-rotted manure.
.4 1 kg. bonemeal per m^3 topsoil mix.

PART 3 - EXECUTION

3.1 PLACING AND SPREADING TOPSOIL

.1 Place and spread constructed topsoil to depth of 100mm after Departmental Representative has approved loosened subgrade.

.2 Spread imported topsoil with recommended amendments of 100mm minimum depth after settlement and 80% compaction.

.3 Manually spread topsoil in areas hard to reach by machine.

3.2 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative. Leave surfaces smooth, uniform and firm against deep footprinting.

3.3 ACCEPTANCE

.1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material is subject to soil testing and analysis.

3.4 RESTORATION OF STOCKPILE SITES

.1 Restore stockpile sites acceptable to Departmental Representative.

3.5 SURPLUS MATERIAL

.1 Dispose of materials surplus to the work in areas indicated on drawings or as directed by Departmental Representative

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data.

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

.2 Provide product data for:

.1 Seed.

.2 Mulch.

.3 Tackifier.

.4 Fertilizer.

.3 Submit in writing to Departmental Representative 10 days prior to commencing work:

.1 Volume capacity of hydraulic seeder in litres.

.2 Amount of material to be used per tank based on volume.

.3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.2 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.3 SCHEDULING

.1 Schedule hydraulic seeding to coincide with preparation of soil surface.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Division 1.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.5 MEASUREMENT AND PAYMENT

.1 Hydroseeding: Measurement for payment for hydroseeding shall be the area in square meters rounded to one decimal place within limits indicated as directed by the Departmental Representative for area that has been landscaped.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.

.1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".

.1 Mixture composition:

.1 45 % Birdsfoot Trefoil, Variety LEO.

.2 30 % Wild White Clover

.3 10 % Creeping Red Fescue Variety Boreal

.4 15 % Annual Rye Grass.

.2 The White Clover and Birdsfoot Trefoil seed must be inoculated with the following bacterial cultures at the specified rates in order to product nodules. The inoculum is added to the hydroseed tank with the seed.

.1 White Clover Inoculum, Birdsfoot Trefoil Inoculum: Rate 100 grams per kilogram of White Clover Seed Birdsfoot Trefoil Inoculum.

.2 Alternate hydraulic mix designs shall be submitted to the Departmental Representative for review and approval. This submission shall also include five (5) examples of other projects completed in the Avalon Region of Newfoundland and Labrador where this mix was successfully used within the last three (3) years.

.2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:

.1 The mulch shall be of a type consisting of natural sun dried straw or wood fibres.

2.1 MATERIALS (Cont'd)

.2 (Cont'd)

.2 Straw fibres shall include: oat, barley, alfalfa or wheat fibres and shall be free from any weeds or other foreign matter which may be detrimental to plant life. Any straw fibre combination shall be maintained in a dry condition to allow even distribution when processed through a blower. The addition of other vegetative material consisting of hay, chopped corn stalks or other similar substances may be used with prior approval of the Departmental Representative.

.3 Wood fibres shall include any wood or wood cellulose fibres and shall be free from any germination or growth inhibiting components.

.4 Any fibres to be included in a mulch mixture shall be processed in lengths of 20 mm - 40 mm and supply air dry in packages not exceeding 50 kg in weight for proper storage and handling.

.5 The mulch shall be capable of dispersing in water to form a homogeneous slurry and remain in such a state when agitated or mixed with other additives.

.6 When applied, the mulch shall be capable of forming an absorptive mat, which will allow moisture to percolate into the underlying soil.

.3 Binder:

.1 The binder must be capable of joining seeds, mulch and soil particles together on slopes and erodible surfaces until plant growth has been established. The binder must not form an impervious seal which would prevent the penetration of moisture to the underlying soil.

.2 The binder shall be supplied as a water-soluble powder composed of polymerized and organic substance and must be absolutely non-toxic.

.4 Water: free of impurities that would inhibit germination and growth.

.5 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Fertilizer shall be granular, non-burning, free flowing and free of lumps.

.3 The fertilizer to be placed in the hydroseeding mixture shall have plant food ration of 10 nitrogen, 20 phosphorus and 20 potash plus 2% Fritted Trace Elements or 12 nitrogen, 24 phosphorus, 24 potash plus 2% Fritted Trace Elements. The Fertilizer mixture shall be applied at the rate of 400 kg/ha. The fertilizer to be spread the following spring during the maintenance period shall be 5-10-30, applied at the rate of 300 kg/ha.

2.1 MATERIALS (Cont'd)

.6 Inoculants: inoculant containers to be tagged with expiry date.

PART 3 - EXECUTION

3.1 WORKMANSHIP

.1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.

.2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.

.3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.

.4 Protect seeded areas from trespass until plants are established.

3.2 PREPARATION OF SURFACES

.1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.

.2 Cultivated areas identified as requiring cultivation to depth of 25mm.

.3 Ensure areas to be seeded are moist to depth of 150 mm before seeding.

.4 Obtain Departmental Representative's approval of grade and soil depth before starting to seed.

.5 Contractor should wait for several days after the application of lime before hydroseeding.

.6 Once hydroseeding has been placed contractor shall apply a light layer of local slash.

.7 Contractor shall ensure slash layer placed is adequate enough to protect hydroseed from the wind.

.8 Contractor shall ensure slash layer placed does not impede air and sun from promoting growth.

.9 Acceptance in accordance with clause 3.5 of this Section.

3.3 INSTALLATION

.1 The hydroseeding procedure to be applied to designated areas shall be undertaken in one operation. The operation shall consist of the distribution of a slurry composed of: the required seed mixture, the fertilizer, mulch and binder.

.2 The rate of application of the ingredients of hydroseeding slurry shall be as follows for standard applications: SEED MIXTURE 50 kg/ha FERTILIZER 400 kg/ha BINDER 20 kg/ha MULCH 1600 kg/ha INOCULUM IN ACCORDANCE WITH SECTION 632.02.01

.3 For late summer applications of hydroseeding the following seed mixture shall be used for slope treatment with this late condition of application: SEED MIXTURE 50 kg/ha FERTILIZER 600 kg/ha BINDER 20 kg/ha MULCH 1250 kg/ha INOCULUM IN ACCORDANCE WITH SECTION 632.02.01

.4 The Contractor shall measure the quantities of each of the materials to be charged into the seeder, either by mass or by a system of mass-calibrated volume measurements approved by the Departmental Representative and the Contractor shall provide all equipment required for this purpose.

.5 The ingredients required for the hydroseeding operation shall be thoroughly mixed with water in a hydroseeding tank.

.6 In order to prevent all of one type of seed being planted on one part of the job, and all of another type being planted on another part of the job, it is imperative that the hydroseeding slurry be continuously agitated during the hydroseeding operation to ensure that a homogeneous slurry is spread.

.7 The distribution of the slurry shall be by means of an approved hydroseeder and shall be applied uniformly and in such a manner as to prevent puddling and movement of the soil surface.

.8 Work shall proceed only in calm weather and on ground free of frost, snow, ice or standing water and when, in the opinion of the Departmental Representative, weather and seasonal conditions are suitable. Hydroseeding shall not be carried out during periods of rainfall.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of seed application until acceptance by Departmental Representative.

.2 Grass Mixture:

.1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.2 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles; water in well.

.3 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.5 ACCEPTANCE

.1 Seeded areas will be accepted by Departmental Representative provided that:

.1 Seeded areas are free of rutted, eroded, bare or dead spots.

.2 Areas have been fertilized.

.3 Mixed soil contains acceptable ratios of organics and till.

.4 Slash material has been satisfactorily placed to promote good growth.

.2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

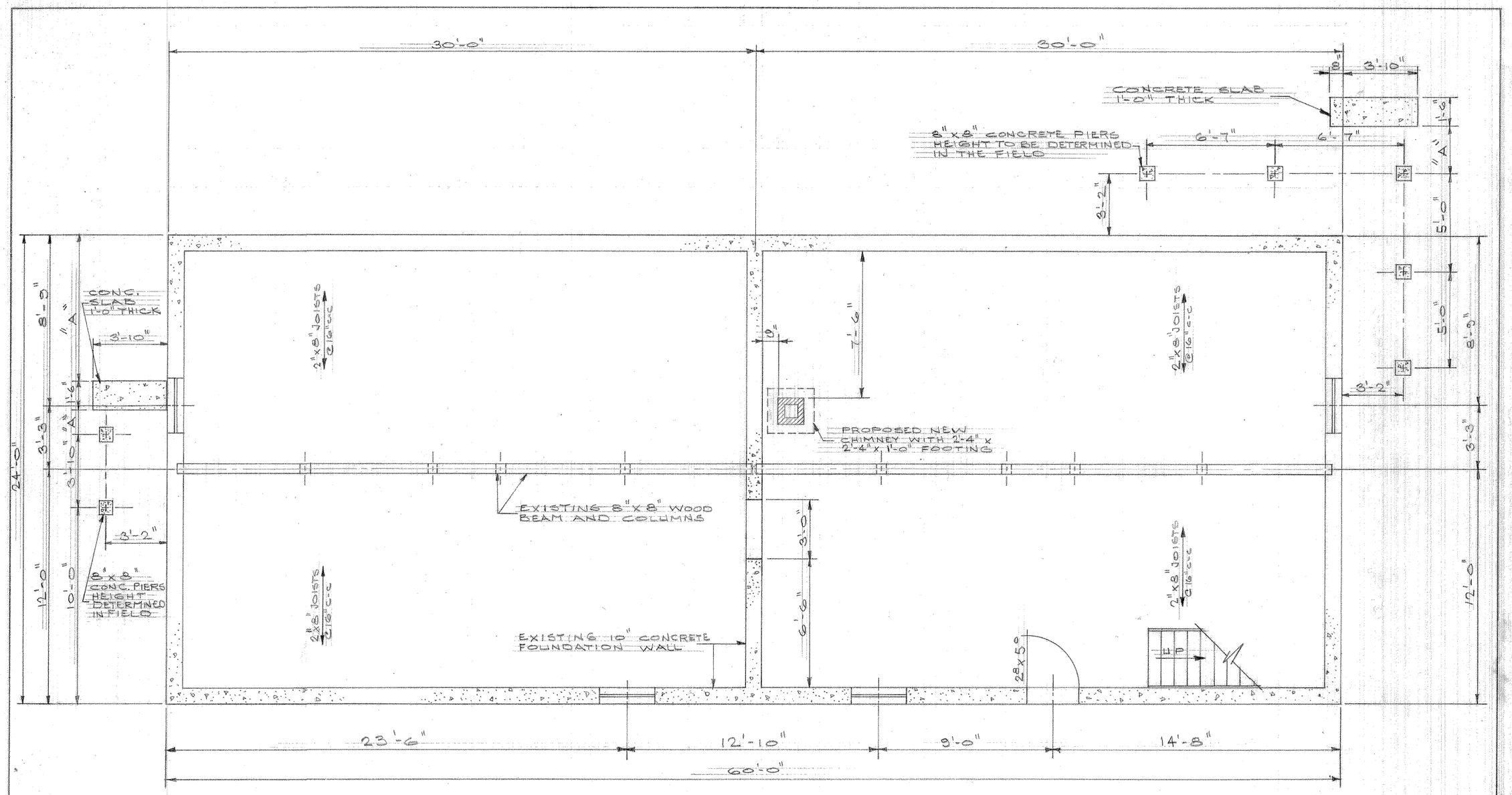
.2 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.7 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

APPENDIX A
HISTORICAL DRAWINGS



BASEMENT PLAN

NOTE
DIMENSIONS MARKED "A" ARE TO BE DETERMINED IN THE FIELD.

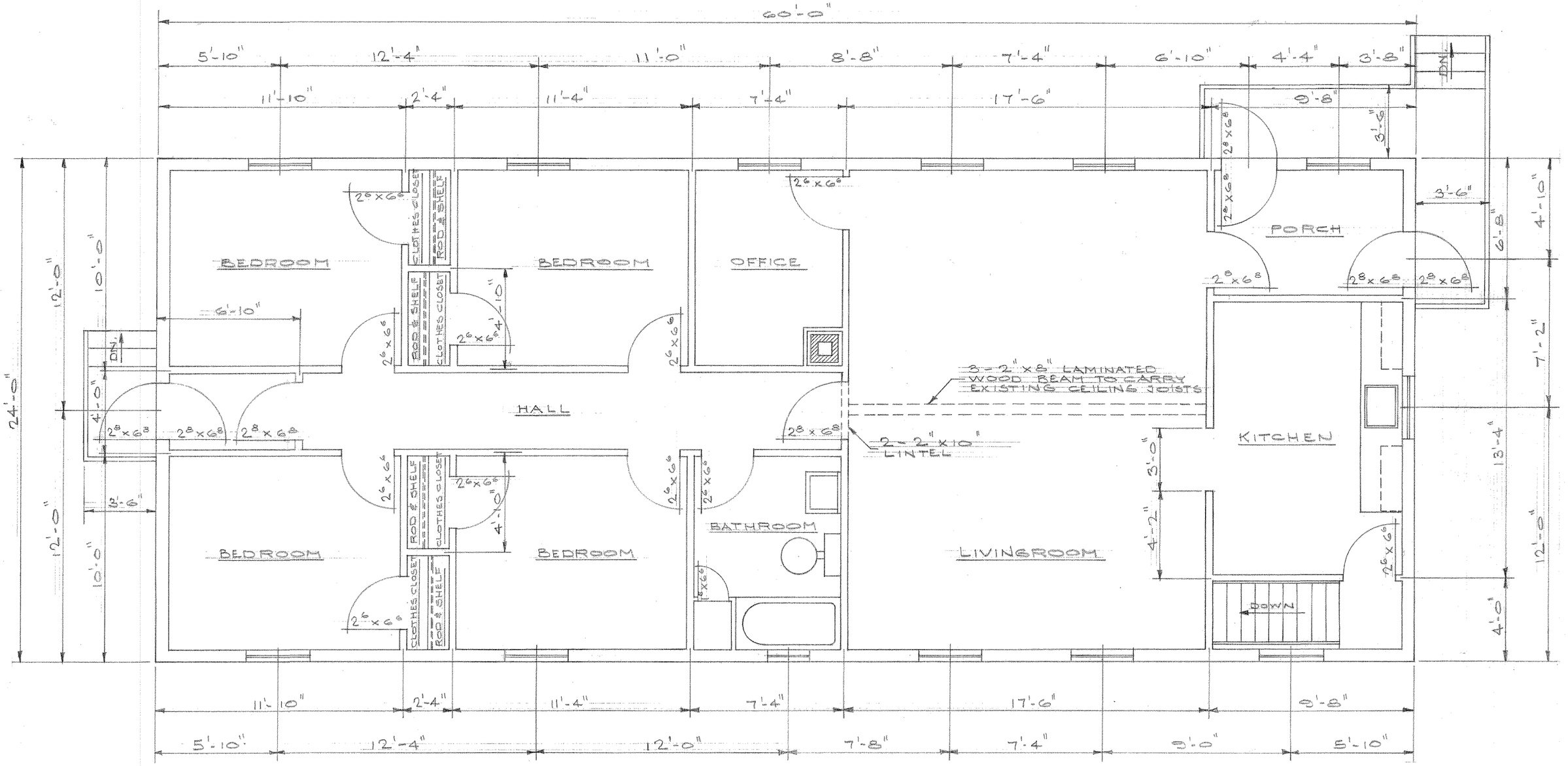
DWG # WAS AR-NF-2004

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
BASEMENT FLOOR PLAN

DESIGNED	SCALE:- 1/4"=1'-0"
DRAWN J.W.	
CHECKED [illegible]	SHEET 1 OF 9 SHEETS
APPROVED E.H.N.	
DATE:- 22 MAY 1968	NMA120-012-FP

01K1101A01501



GROUND FLOOR PLAN

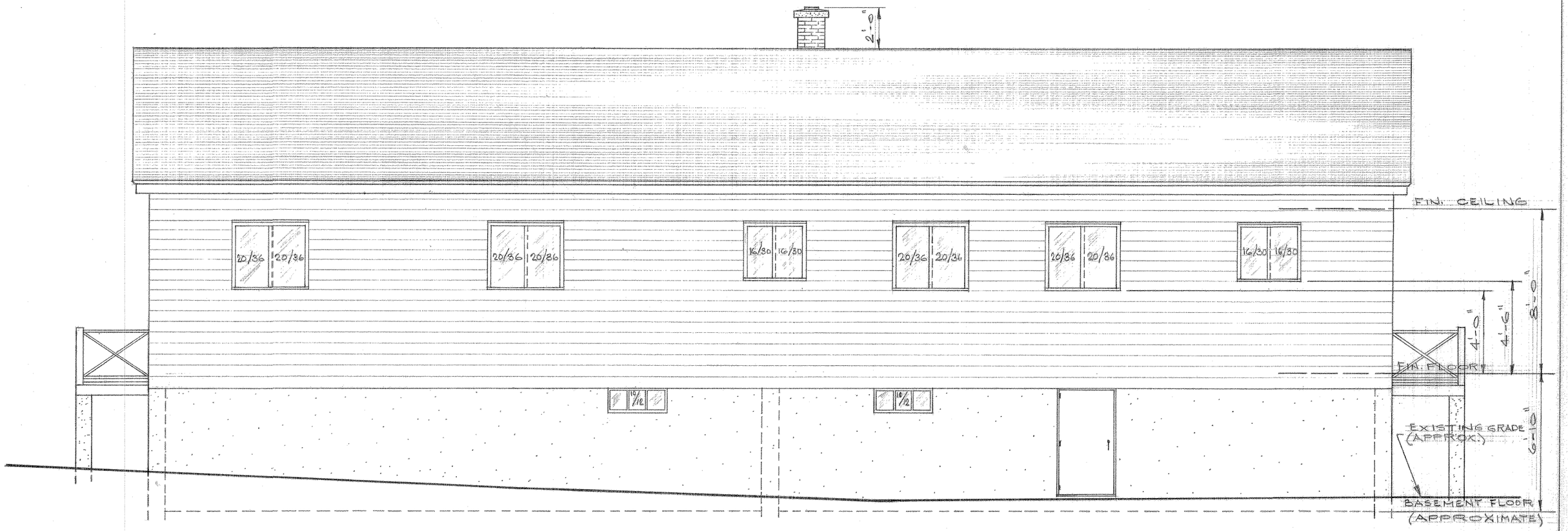
DWG # WAS AR-NF-2005

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
GROUND FLOOR PLAN

DESIGNED	SCALE:- 1/4" = 1'-0"
DRAWN J.W.	
CHECKED [illegible]	SHEET 2 OF 9 SHEETS
APPROVED C.H.N.	
DATE:- 22 MAY 1968	NMA 120-012-FP

01K1101A01502



FRONT ELEVATION

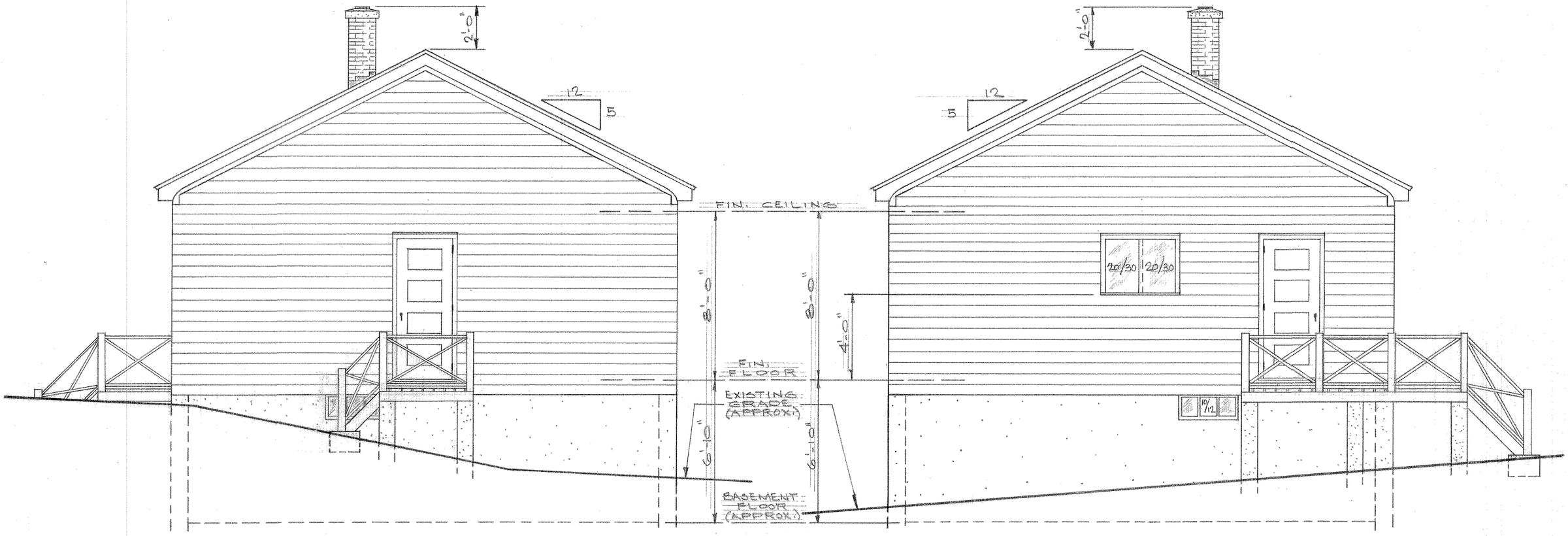
DWG # WAS AR-NF-2006

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
FRONT ELEVATION

DESIGNED	SCALE:- 1/4" = 1'-0"
DRAWN J.W.	
CHECKED Engineer	SHEET 3 OF 9 SHEETS
APPROVED G.H.N.	
DATE:- 5 JUNE 1968	NMA 120-012-EL

01K1101A01503



LEFT SIDE ELEVATION

RIGHT SIDE ELEVATION

DWG # WAS AR-NF-2007

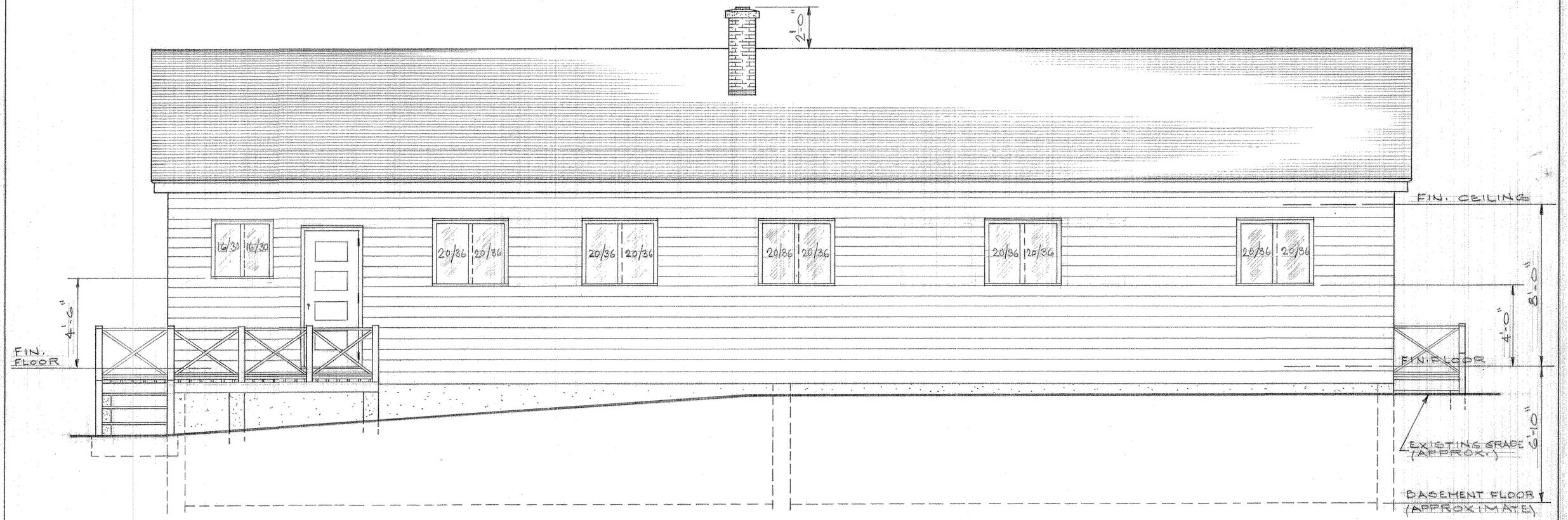
DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
END ELEVATIONS

DESIGNED
DRAWN J.W.
CHECKED Guiboard
APPROVED G.H.N.
DATE:- 6 JUNE 1968

SCALE:- 1/4" = 1'-0"
SHEET 4 OF 9 SHEETS
NMA120-012-EL

01K1101A01504



REAR ELEVATION

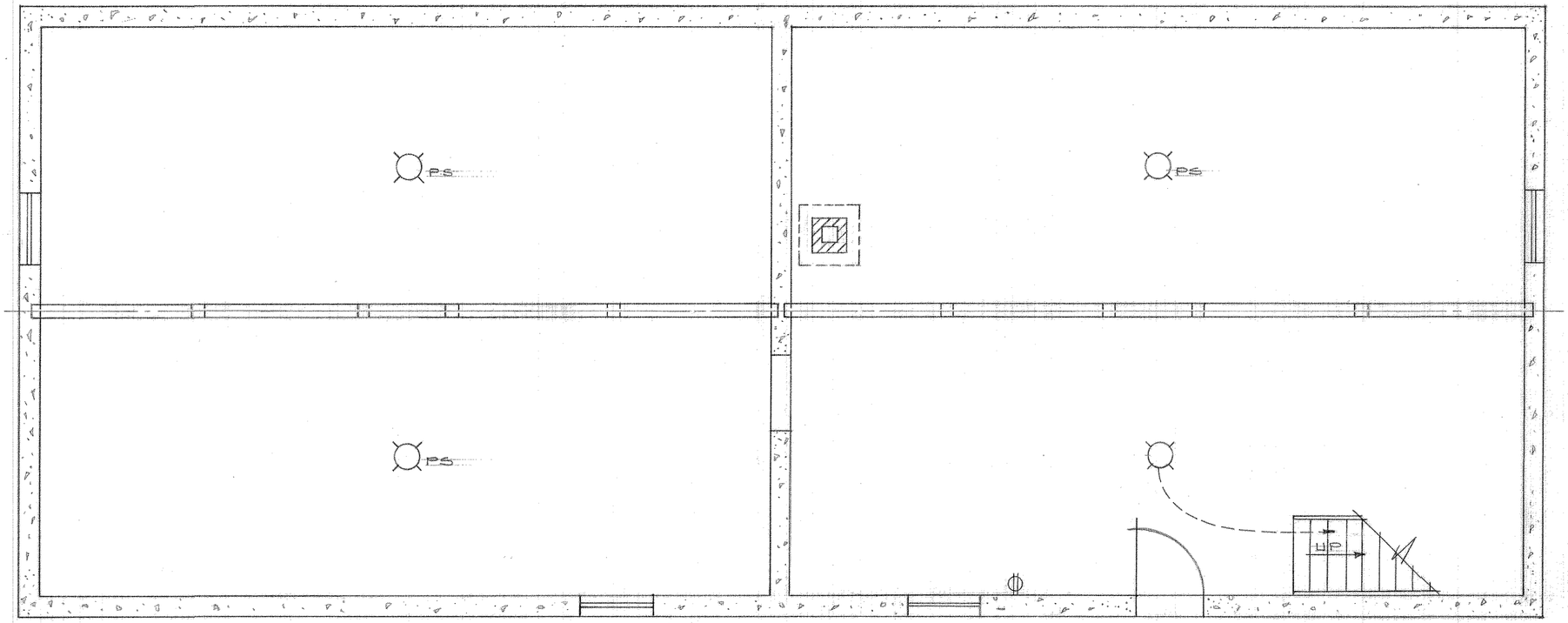
DWG # WAS AR-NF-2008

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
REAR ELEVATION

DESIGNED	SCALE:- 1/4"=1'-0"
DRAWN J.W	
CHECKED [illegible]	SHEET 5 OF 9 SHEETS
APPROVED G.H.N.	
DATE:- 7 JUNE 1968	NMA 120-012-EL

01K1101A01505



BASEMENT FLOOR PLAN

LEGEND

- LIGHT
- PS LIGHT WITH PULL CHAIN SWITCH
- DUPLEX OUTLET

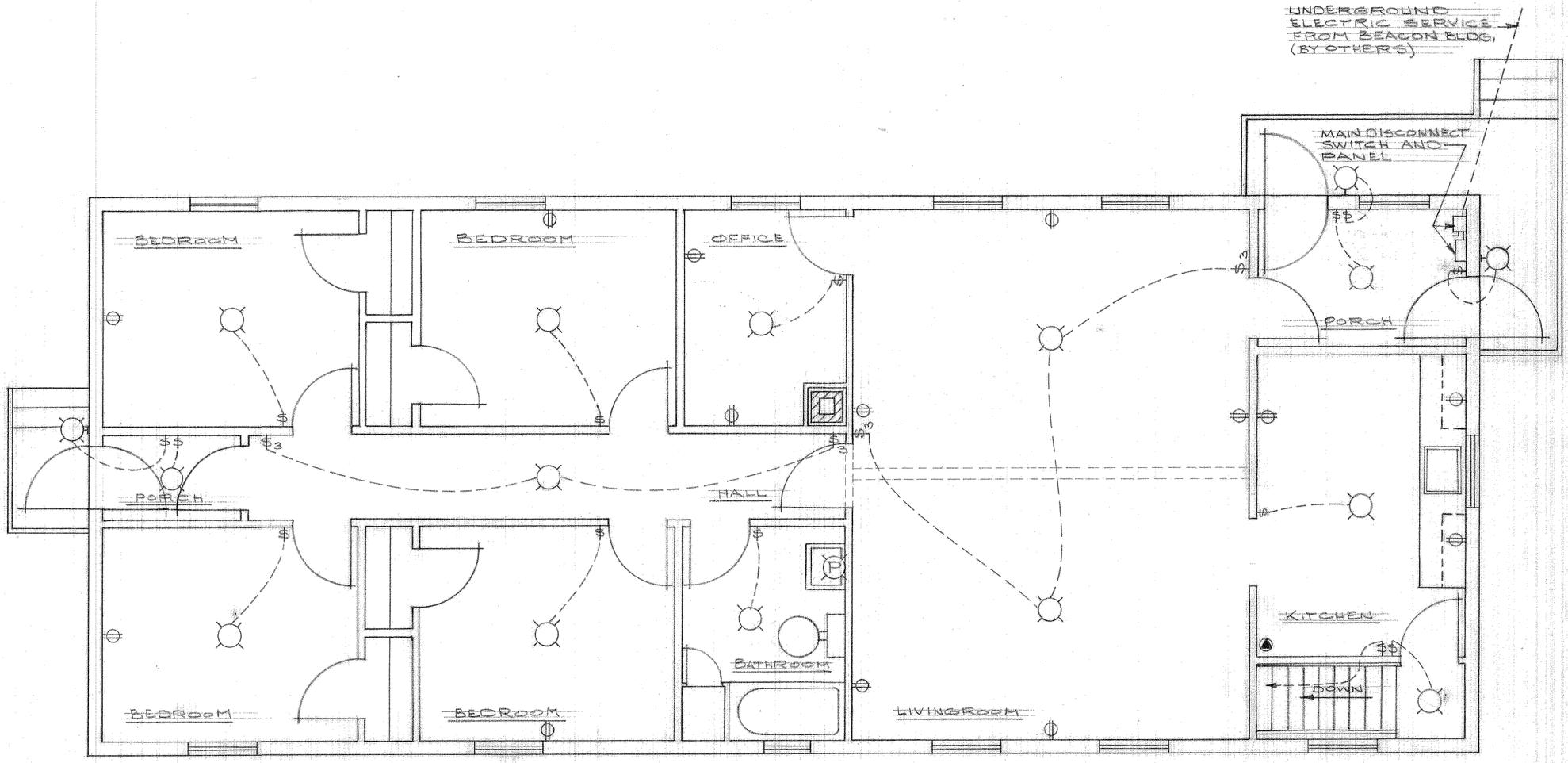
DWG # WAS AR-NF-2009

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
BASEMENT ELECTRICAL PLAN

DESIGNED	SCALE: 1/4" = 1'-0"
DRAWN J.W.	SHEET 6 OF 9 SHEETS
CHECKED	
APPROVED	NMA 120-012-EP
DATE: 30 JULY 1968	

01K1101A01506



GROUND FLOOR PLAN

LEGEND

- LIGHT
- EXTERIOR WALL MOUNTED WEATHERPROOF LIGHT
- (P) LIGHT WITH RAZOR OUTLET
- DUPLEX OUTLET
- (A) ELECTRIC RANGE OUTLET
- $ SINGLE POLE SWITCH
- $3 THREEWAY SWITCH

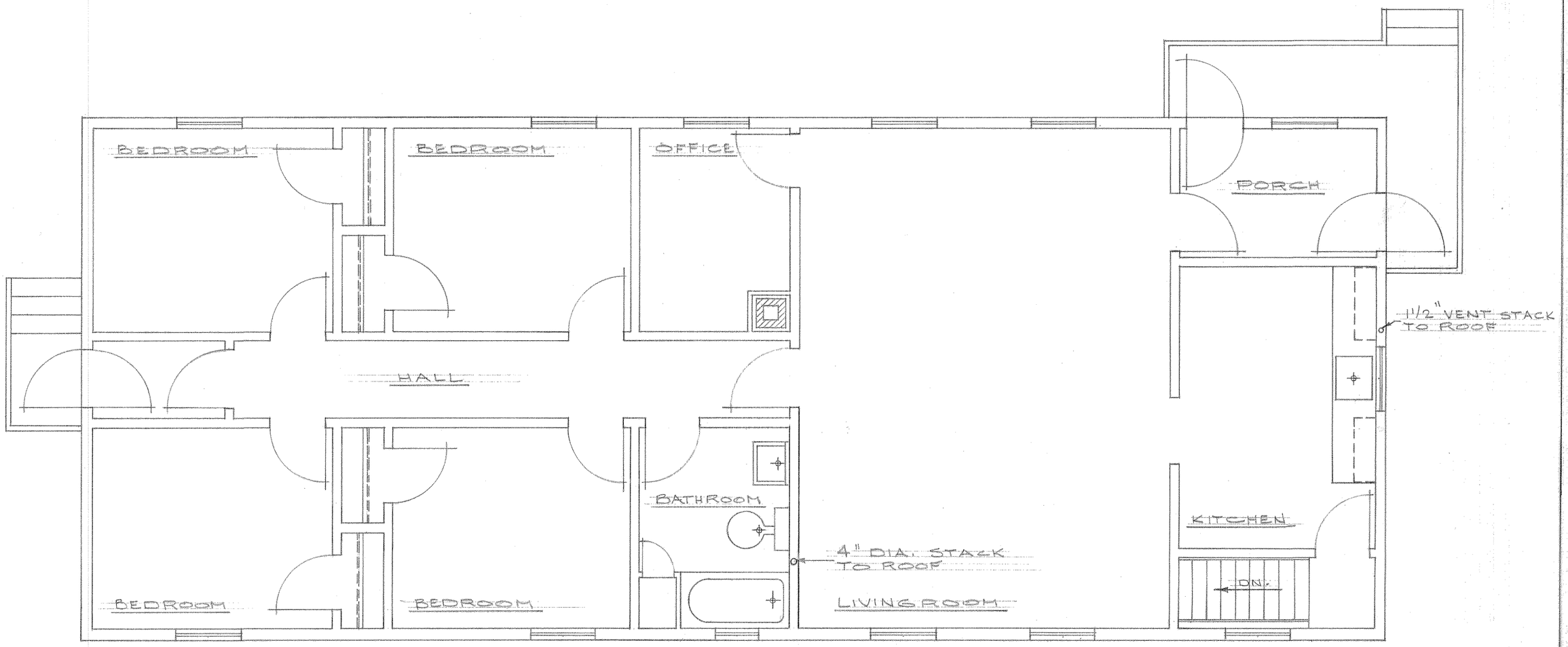
DWG # WAS AR-NF-2010

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
GROUND FLOOR ELECTRICAL PLAN

DESIGNED	SCALE:- 1/4" = 1'-0"
DRAWN J.W.	SHEET 7 OF 9 SHEETS
CHECKED	
APPROVED	
DATE:- 30 JULY 1968	NMA120-012-FP.

OIKIIOIA01507



GROUND FLOOR PLAN

DWG # WAS AR-NF-2014

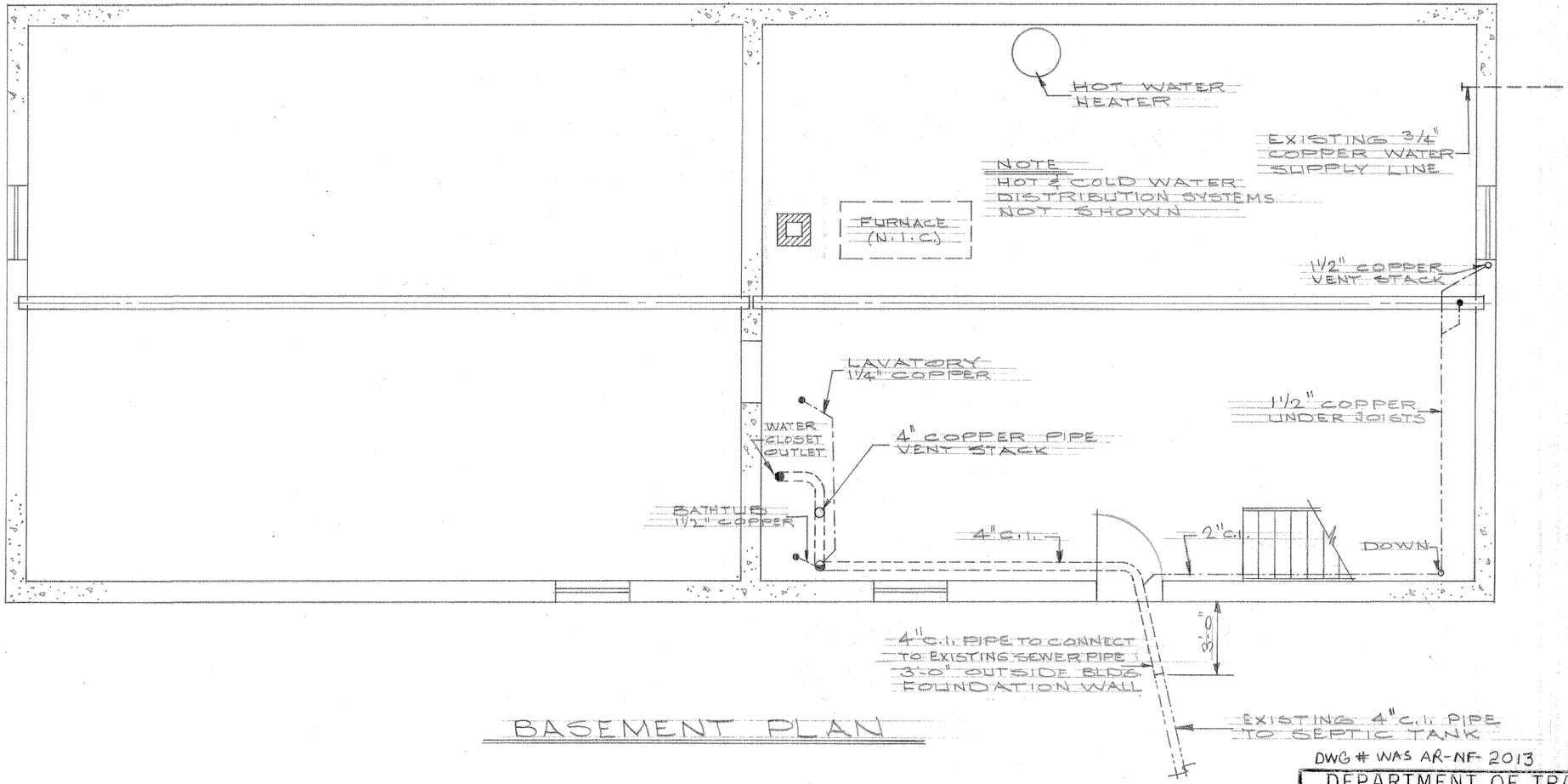
DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
GROUND FLOOR PLUMBING PLAN

DESIGNED
DRAWN J. W.
CHECKED
APPROVED
DATE: 25 SEPT. 68

SCALE: 1/4" = 1'-0"
SHEET 8 OF 9 SHEETS
NMA120-012 ME

01K1101A01508



BASEMENT PLAN

DWG # WAS AR-NF-2013

DEPARTMENT OF TRANSPORT
MARINE BRANCH
AIDS TO NAVIGATION DIVISION
ST. JOHN'S NEWFOUNDLAND

CAPE RACE, NEWFOUNDLAND
MODIFICATIONS TO EXISTING DWELLING
BASEMENT PLUMBING PLAN

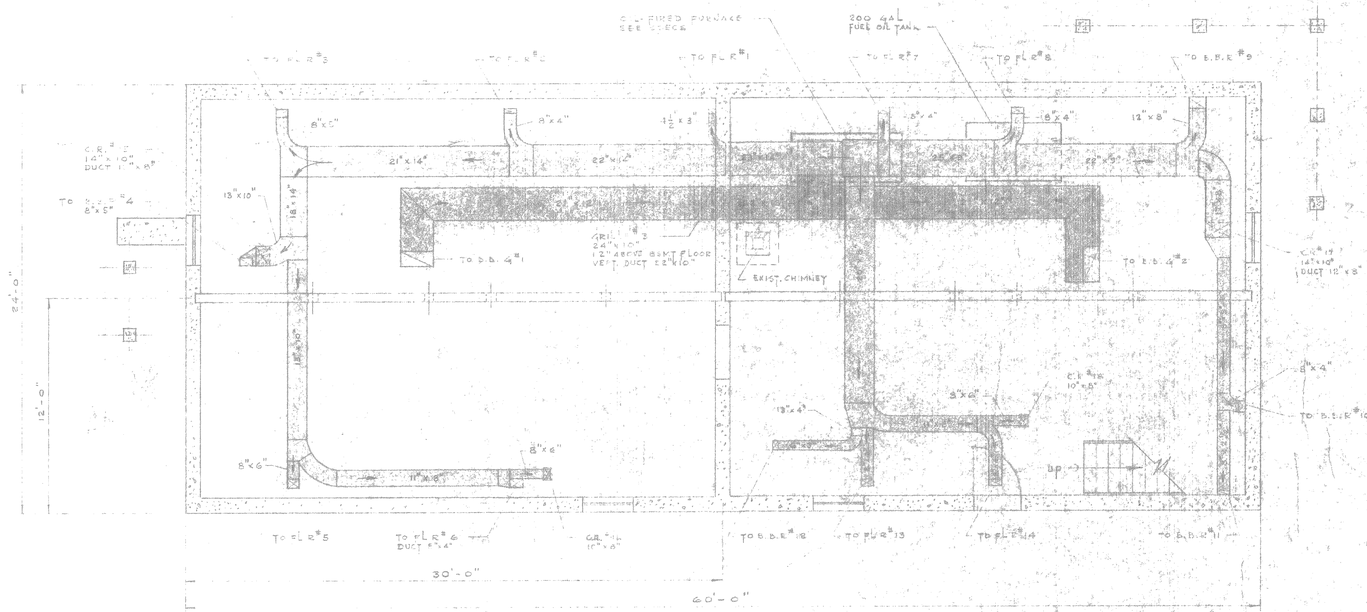
DESIGNED
DRAWN NW
CHECKED
APPROVED
DATE: 27 SEPT/68

SCALE: 1/4"=1'-0"
SHEET 9 OF 9 SHEETS
NMA 120-012-ME

01K1101A01509

GROUND FLOOR PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



BASEMENT PLAN

SCALE: $\frac{1}{4}$" = 1'-0"

LEGEND

- DUCT SECTION (SUPPLY)
- DUCT SECTION (RETURN)
- FLR. FLOOR REGISTER
- B.B.R. BASE BOARD REGISTER
- C.R. REGISTER IN BASEMENT AT CEILING
- B.B.G. BASE BOARD GRILLE
- DIRECTION OF AIR FLOW

NOTE :- THE CONTRACTOR MAY CHANGE, WITH THE APPROVAL OF THE ENGINEER, THE CROSS-SECTIONAL DIMENSIONS OF THE DUCTS PROVIDED THE CROSS-SECTION AREA OF THE DUCTS IS KEPT THE SAME AS SHOWN ON THIS DRAWING.

DWG # WAS CR-15240

DEPARTMENT OF TRANSPORT
MARINE WORKS BRANCH
AIDS TO NAVIGATION DIVISION
OTTAWA

CAPE RACE, NFLD.
PROPOSED HEATING SYSTEM
FOR BACHELOR QUARTERS

DESIGNED	SCALE:- AS NOTED
DRAWN	
CHECKED	SHEET 1 OF 1 SHEETS
APPROVED	NMA 20-0-4 P.
DATE:-	

01K1101A01601

APPENDIX B
HAZARDOUS MATERIALS REPORT

-FINAL REPORT-

HAZARDOUS BUILDING MATERIALS ASSESSMENT
FORMER DWELLING, FORMER FOG HORN BUILDING AND FORMER GENERATOR BUILDING
CAPE RACE LIGHTSTATION, CAPE RACE
NEWFOUNDLAND AND LABRADOR
DFRP 00004

Submitted to:

Public Works and Government Services Canada
Environmental Services
The John Cabot Building
10 Barter's Hill, PO Box 4600
St. John's, NL
A1C 5T2

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
A Division of Amec Foster Wheeler Americas Limited
133 Crosbie Road, PO Box 13216
St. John's, NL
A1B 4A5

March 2017

Amec Foster Wheeler Project No. TF16076698

IMPORTANT NOTICE

This report was prepared exclusively for Public Works and Government Services Canada (PWGSC) and Fisheries and Oceans Canada (DFO) by Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Amec Foster Wheeler's services and based on: i) information available at the time of preparation, ii) data supplied by outside sources and iii) the assumptions, conditions and qualifications set forth in this report. This report is for use by PWGSC and DFO only, subject to the terms and conditions of its contract with Amec Foster Wheeler. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

SECTION 1.0 EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to conduct a Hazardous Building Materials Assessment (HBMA) of three (3) existing buildings at the Cape Race Lightstation (DFRP 00004) located at the southeast tip of the Avalon Peninsula, Newfoundland and Labrador (NL), herein referred to as the "site". The HBMA was requested to provide PWGSC and DFO with an evaluation of known and potential hazardous building materials for the structures at the site that are slated for potential transfer to the local development association or other tourism operations.

The site is a DFO Lightstation located in a remote area at the southeast tip of the Avalon Peninsula, approximately 20 kilometres (km) southeast of Portugal Cove South, NL. The site is accessible by gravel access road from the community of Portugal Cove South. The lightstation was developed before 1900 and is currently an operating lightstation, but there are no permanent residents on-site. There are currently six (6) buildings on-site: a light tower, a former dwelling, a former fog horn building, a former generator building, a new fog horn building and a Lightkeeper's dwelling. The ground surface at the site is predominantly covered with grass and gravel surfaces. On the southern boundary of the site, there is a 30 metre (m) high cliff which drops steeply down to the Atlantic Ocean.

The objective of the HBMA was to identify the type and location of potential and confirmed hazardous building materials within the buildings that are slated for potential transfer to the local development association or other tourism operations. The scope of work for the assessment was completed in accordance with Amec Foster Wheeler's *Proposal for Professional Consulting Services, Hazardous Building Materials Assessment, Cape Race Lightstation, NL* (Proposal Number P4665).

For reporting purposes, the findings for the three (3) buildings included in the HBMA are divided into separate sections within the report as outlined below:

Section	Description	Pages	Appendices
1.0	Introduction	1-i to 1-10	A1 to B1
2.0	Former Dwelling	2-i to 2-19	A2 to D2
3.0	Former Fog Horn Building	3-i to 3-18	A3 to D3
4.0	Former Generator Building	4-i to 4-15	A4 to D4
5.0	Closure and Limitations	5-i to 5-6	A5 to B5

It is important to note that the report has been structured such that each section includes a separate table of contents.

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), was retained by Public Works and Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to conduct a Hazardous Building Materials Assessment (HBMA) of three (3) existing buildings (Former Dwelling, Former Fog Horn Building and Former Generator Building) at the Cape Race Lightstation (DFRP 00004) located at the southeast tip of the Avalon Peninsula, Newfoundland and Labrador (NL), herein referred to as the "site" (refer to Figures 1.1 and 1.2, Appendix A1 and Photos 1 to 4, Appendix B1). The Real Property division of DFO were approached by a local tourism group (Irish Loop Development Association) for the potential transfer of ownership of the three (3) on-site buildings that the Association would like to acquire for tourism operations in the area. The HBMA was requested to provide PWGSC and DFO with an evaluation of known and potential hazardous building materials for the structures at the site that are slated for potential transfer to the local development association or other tourism operations.

1.1 SITE DESCRIPTION

The site is a DFO Lightstation located in a remote area at the southeast tip of the Avalon Peninsula, approximately 20 kilometres (km) southeast of Portugal Cove South, NL (refer to Figure 1.1, Appendix A1). The site is accessible by gravel access road from the community of Portugal Cove South.

The lightstation was developed before 1900 and is currently an operating lightstation, but there are no permanent residents on-site. There are currently six (6) buildings on-site: a light tower, a former dwelling, a former fog horn building, a former generator building, a new fog horn building and a Lightkeeper's dwelling. The ground surface at the site is predominantly covered with grass and gravel surfaces. On the southern boundary of the site, there is a 30 metre (m) high cliff which drops steeply down to the Atlantic Ocean.

1.2 REPORT STRUCTURE

For reporting purposes, the findings for the three (3) buildings included in the HBMA are divided into separate sections within the report as follows:

- Section 1.0: Introduction
- Section 2.0: Former Dwelling
- Section 3.0: Former Fog Horn Building
- Section 4.0: Former Generator Building
- Section 5.0: Closure and Limitations

1.3 OBJECTIVES

The objective of the HBMA was to identify the type and location of potential and confirmed hazardous building materials within the buildings that are slated for potential transfer to the local development association or other tourism operations.

1.4 SCOPE OF WORK

The scope of work for the HBMA, as per Amec Foster Wheeler Proposal Number P4665 (*Proposal for Professional Consulting Services, Hazardous Building Materials Assessment, Cape Race Lightstation, NL*), included:

- Inspecting potentially hazardous building materials at the site, including:
  - Asbestos-containing materials (ACMs);
  - Lead-based paint (LBP) and other lead-containing materials or equipment;
  - Mercury-based paint (MBP) and other mercury-containing materials or equipment;
  - Polychlorinated biphenyl (PCB)-based paint and other PCB-containing materials or equipment;
  - Treated timber building materials;
  - Urea formaldehyde foam insulation (UFFI);
  - Sources of ozone depleting substances (ODS); and
  - Other potentially hazardous building materials.
- Performing intrusive cavity inspections to attempt to identify any hidden and potentially hazardous building materials that may be concealed by walls and/or ceiling systems.
- Inspecting the site buildings for evidence of areas that are impacted by suspected visible mould growth (SVG), and if observed, sampling and laboratory testing of suspected mould growth to confirm the presence or absence of mould.
- Sampling and laboratory testing of suspected ACMs to confirm the presence or absence of asbestos fibres.
- Sampling and laboratory testing of paint to determine the concentrations of lead, mercury and PCBs.
- Sampling and laboratory testing of caulking (or other bulk materials) to determine the concentrations of PCBs.
- Depending on the type of chemical treatment applied, sampling and laboratory testing of treated timber materials to determine the concentrations of “pressure treated” inorganic preservatives, creosote or chlorophenolic formulations using the Toxicity Characteristic Leaching Procedure (TCLP).
- Sampling and laboratory testing of suspected insulation of concern to determine the presence/absence of UFFI.

- Inspecting thermostats to assess the presence/absence of mercury-containing switches.
- Inspecting accessible fluorescent lights (if present) for PCB-containing light ballasts and to report on ballast condition.
- Documenting the location of any ODS and Federal Halocarbons identified during the assessment.
- Preparing a written report documenting the methodologies and findings of the HBMA, with recommendations for handling and disposal of any identified hazardous materials.

Buildings/structures that were to be assessed as part of the HBMA included:

- Former Dwelling
- Former Fog Horn Building
- Former Generator Building

The findings of the HBMA were based on the interpretation of data from the areas investigated and analytical results pertaining to specific samples collected and tested. It is possible that materials exist that could not be reasonably identified within the scope of the work or which were not apparent or accessible during the site visit.

1.5 ENVIRONMENTAL REGULATORY FRAMEWORK

The federal and provincial governments in Canada have prepared and/or adopted numerous acts (and amendments), regulations (and amendments), guidelines, policies, and procedures related to the protection of the environment and the investigation of sites containing hazardous building materials including the following:

- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)
    - Canadian Soil Quality Guidelines (CSQG) for the Protection of Environmental and Human Health
- CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products
- Canadian Environmental Protection Act (1999, C. 33)
    - PCB Waste Export Regulations (SOR/97-109)
    - Ozone-depleting Substances Regulations (SOR/99-7)
    - PCB Regulations (SOR/2008-273)
    - Regulations Amending the PCB Regulations (SOR/2010-57)
    - Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301)
    - Federal Halocarbon Regulations (SOR/2003-289)
    - Export and Import of Hazardous Waste and Hazardous Recyclable Material

Regulations (SOR/2005-149)

- Federal Hazardous Products Act (R.S., 1985, c. H-3)
  - Surface Coating Materials Regulations (SOR/2005-109)
  - Regulations Amending the Surface Coating Materials Regulations (SOR/2010-224)
- Federal Transportation of Dangerous Goods Act (1992, c. 34)
  - Transportation of Dangerous Goods Regulations (SOR/2012-245)
- Health Canada Guidelines for Canadian Drinking Water Quality (Summary Table, 2014)
- National Plumbing Code of Canada (National Research Council Canada)
- NL Environmental Protection Act (SNL2002 cE-14.2)
  - Storage of PCB Wastes Regulations (61/03)
  - Halocarbon Regulations (41/05)
- NL Dangerous Goods Transportation Act (RSNL1990 Chapter D-1)
  - Dangerous Goods Transportation Regulations (5/96)
- NL Department of Environment, Pollution Prevention Division, Guidance Document: Leachable Toxic Waste, Testing and Disposal (2003, GD-PPD-26.1)
- NL Department of Environment and Conservation, Guidance Document for the Management of Impacted Sites (2005, Version 1.01)
- NL Department of Environment and Conservation, Pollution Prevention Division, Guidance Document: Treated Wood Waste Disposal (2015, GD-PPD-075.1)
- NL Occupational Health and Safety Act (RSNL1990 Chapter O-3)
  - Occupational Health and Safety Regulations (5/12)
  - Asbestos Abatement Regulations (111/98)

Amec Foster Wheeler has considered the above documents in conducting this HBMA.

1.5.1 Selection of Guidelines/Standards

The following sections present the guidelines and standards that were used to evaluate analytical results for samples of suspected hazardous materials collected during this assessment.

1.5.1.1 Asbestos-Containing Materials (ACMs)

Analytical results for asbestos in building materials were compared to the NL Asbestos Abatement Regulations (111/98) under the Occupational Health and Safety Act. Under these regulations, materials containing greater than 1% asbestos by dry weight are considered to be ACMs and should be managed in accordance with the applicable regulations.

1.5.1.2 Lead in Paint

Analytical results for lead in paint were compared to the current and former Federal Hazardous Products Act (HPA) criteria of 90 mg/kg and 5,000 mg/kg, respectively. Under the HPA, the lead content limit was reduced from 5,000 mg/kg to 600 mg/kg in 2005 for surface coating materials used in or around the home or other premises where children may become exposed. In 2010, the lead content limit was further reduced from 600 mg/kg to 90 mg/kg.

In order to determine disposal options, the former Federal HPA criterion of 5,000 mg/kg lead in paint is typically used as a Provincial disposal guideline to determine whether or not paint samples would be submitted for leachate analysis. Paint samples that contain less than 5,000 mg/kg are not likely to be leachable and therefore may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval. Paint samples with lead concentrations in excess of 5,000 mg/kg should be subjected to leachability testing.

In order to determine disposal options, some paint samples were subjected to leachability testing. Analytical results for lead leachate were compared to the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) guideline of 5.00 mg/L lead to determine disposal options, if required, for any lead-containing paint to be removed during future demolition activities at the site. Any paints that require disposal and exceed the lead leachate guideline are considered to be leachable toxic waste and must be disposed of at an approved hazardous waste disposal site and not a landfill disposal site.

1.5.1.3 Mercury in Paint

Analytical results for mercury in paint were compared to the Federal HPA criterion. The maximum acceptable concentration of mercury in paint, under the HPA, is 0.001% (equivalent to 10 mg/kg) in or around the home or other premises where children or pregnant women may become exposed.

In order to determine disposal options, the CCME CSQG of 50 mg/kg for mercury in soil at an industrial site is typically used as a Provincial disposal guideline to determine whether or not the paint samples would be submitted for leachate analysis. Paint samples with a mercury concentration of less than 50 mg/kg are not likely to be leachable and therefore may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval. Paint samples with a mercury concentration exceeding 50 mg/kg should be subjected to leachability testing.

1.5.1.4 PCBs in Paint and Caulking

Analytical results for PCBs in paint and caulking were compared to the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site. The Federal HPA does not include any assessment criteria for PCBs in paint.

In order to determine disposal options, concentrations of PCBs in paint and caulking were compared to the criterion of 50 mg/kg for PCB solid provided in the NL Department of

Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) and the Federal Transportation of Dangerous Goods (TDG) Regulations. Any paints or caulking that require disposal and exceed the PCB solid criterion must be disposed of at an approved hazardous waste disposal site and not a landfill disposal site.

1.5.1.5 Treated Wood Chemicals

In order to determine disposal options, depending on the type of chemical treatment applied, treated wood samples were subjected to leachability testing. The NL Department of Environment, 2015 Guidance Document for Treated Wood Waste Disposal (GD-PPD-075.1) provide landfill disposal standards for "pressure treated" inorganic preservatives (i.e., arsenic and chromium) and creosote (i.e., total cresol and benzo(a)pyrene) and chlorophenolic (i.e., pentachlorophenol) formulations used to preserve wood. These landfill disposal standards for treated wood waste (TWW) were used to assess the results of leachability testing to determine disposal options for any treated wood to be removed during any future renovation or demolition activities at the site.

1.5.1.6 Mould

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada. In addition, there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. However, Sections 4 and 42 of the NL Occupational Health and Safety Act and Regulations, respectively, states that an employer shall ensure, where it is reasonably practicable, the health, safety and welfare of his or her workers and that an employer shall monitor the use or presence of substances at the workplace that may be hazardous to the health and safety of workers. This includes exposure to moulds and other biological matter. Two Canadian guidelines have been published that outline mould abatement. These documents were published by the Canadian Construction Association (CCA) and the Environmental Abatement Council of Ontario (EACO). Since there are no clear regulatory limits for determining an acceptable exposure limit to moulds, there is no numerical guideline for determining safe or unsafe concentrations of surface mould growth. Therefore, interpretation of sampling results is subjective. The guidelines listed below were used to evaluate the visual assessment and sampling results for mould:

- *"Mould Guidelines for the Canadian Construction Industry."* CCA, 2004.
- *"Mould Abatement Guidelines."* EACO, 2010.

1.6 METHODOLOGY

The site inspection and sampling for the HBMA were conducted by Amec Foster Wheeler personnel on October 13, 2016. Additional paint sampling for the HBMA was conducted by Amec Foster Wheeler personnel on December 9, 2016.

1.6.1 Bulk Material Sampling and Laboratory Analytical Program

Building materials suspected of containing asbestos and/or PCBs were sampled by removing a 2.0 cm by 2.0 cm piece of material (where possible) and placing the sampled materials into Glad® or Ziploc® plastic bags. Building materials suspected of containing wood preservatives were sampled by removing a 2.5 cm thick piece of material (where possible) from suspect treated timber and placing it into Glad® or Ziploc® plastic bags.

Bulk material samples suspected of containing asbestos were submitted to the EMSL Canada Inc. (EMSL) laboratory located in Mississauga, Ontario (ON) for the analysis of asbestos using Polarized Light Microscopy (PLM) with dispersion staining. The analysis was conducted in accordance with the United States Environmental Protection Agency (USEPA) Method EPA 600/R-93/116 (Method for the Determination of Asbestos in Bulk Building Materials). EMSL is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Industrial Hygiene Association (AIHA) for bulk asbestos fibre analysis by PLM.

Bulk material samples suspected of containing PCBs (i.e., caulking) were submitted to the Maxxam Analytics Inc. (Maxxam) laboratory located in Bedford, Nova Scotia (NS) for the analysis of PCB content. The analysis for PCBs was conducted using gas chromatographic analysis with an electron capture detector (GC-ECD). Maxxam conducted the analysis in accordance with an in-house method, as there is currently no recognized reference method for PCBs in bulk materials.

Bulk material samples suspected of containing wood preservatives were submitted to the Maxxam laboratory located in Bedford, NS for Toxicity Characteristic Leaching Procedure (TCLP) analyses of arsenic, chromium, cresols, benzo(a)pyrene and pentachlorophenol.

1.6.2 Paint Sampling and Laboratory Analytical Program

Paint samples were collected from painted surfaces by cutting and scraping areas of flaking paint using clean knives and scrapers or by cutting out a small section of the painted substrate (e.g., wood, aspenite, etc.) using a reciprocating saw. If a portion of the substrate was unable to be removed, paint samples were collected down to the bare substrate (e.g., concrete). A minimum of five grams (where possible) of paint was obtained from each sampling location and the samples were placed into Glad® or Ziploc® plastic bags.

Paint samples were submitted to the Maxxam laboratory located in Bedford, NS for the analysis of lead, mercury and PCB content. The lead and mercury analysis was conducted in accordance with the EPA 6020A, method analysis for metals using inductively coupled plasma – mass spectrometry (ICP-MS). Based on the findings of the analytical program, paint samples were analyzed for lead leachate using the TCLP, as required. Maxxam is accredited under the Standards Council of Canada (SCC) to perform analysis of lead and mercury in paint samples. The analysis for PCBs was conducted using GC-ECD. Maxxam conducted the analysis in accordance with an in-house method, as there is currently no recognized reference method for PCBs in paint.

1.6.3 Inspection for Urea Formaldehyde Foam Insulation (UFFI)

According to the USEPA and the US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), formaldehyde is a colourless, pungent-smelling gas that is commonly used in some manufactured building materials and household products such as particleboard, medium density fibreboard, fibreglass, plywood, carpets, fabrics, urea-formaldehyde resins, paints, paper, fertilizer, food preservatives, antiseptics, medicines and cosmetics. These agencies also state, that as a by-product of combustion, formaldehyde may also be released to indoor air environments by means of un-vented wood and fuel-burning appliances and tobacco smoke. According to the Canada Mortgage and Housing Corporation (CMHC), new carpets and composite wood products used in the present-day construction of buildings have the potential to increase the levels of formaldehyde in indoor air and are deemed to be the most likely sources of high formaldehyde levels in these newer and well-sealed buildings.

UFFI is a thermal insulation material that is pumped into interstitial spaces between the walls of buildings where it hardens to form a solid layer of insulation. UFFI is comprised of a cured mixture of urea-formaldehyde resin and compressed air. The sale and installation of UFFI was banned for health-related reasons in 1980 because of the formation of formaldehyde gas which is released from the UFFI to the building interior.

The focus of the visual inspection included searching for visible signs of UFFI (e.g. a series of small patched holes at regular intervals on exterior or interior walls; foam around electrical outlets or switch plates). Intrusive cavity inspections were also performed in select areas of the site buildings to investigate the presence or absence of UFFI.

1.6.4 Inspection for Suspected Visible Mould Growth (SVG)

Mould spores are present in all indoor environments and cannot be completely eliminated. Cellulose based building materials provide a nutrient base for many mould species; however, mould cannot grow unless an adequate amount of excess moisture is present.

The focus of the visual inspection included, but was not limited to, searching for visible signs of water staining, water damage, excess moisture, and/or infiltration; and signs of SVG and/or staining. In this report, the term SVG refers to a smearable discoloration of surfaces differing from that of the natural substrate with observable fungal characteristics based on Amec Foster Wheeler's experience evaluating similar building types.

1.6.5 Inspection of Thermostats for Mercury-Containing Switches

Thermostats identified within the site buildings were visually inspected by removing the casings and checking for the presence of mercury-containing switches.

1.6.6 Inspection of Light Ballasts for PCBs

Fluorescent light fixtures observed in the site buildings were not de-energized; therefore, no light ballasts were visually inspected for the presence or absence of PCB-containing dielectric fluid at the time of the site visit.

1.6.7 Documentation of Potential Sources of ODSs and Halocarbons

Ozone depleting substances (ODS) include any substances containing chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), halon or any other material capable of destroying ozone in the atmosphere. ODS have been used in rigid polyurethane foam and insulation, laminates, aerosols, air conditioners, freezers, chillers, fire extinguishers, cleaning solvents and for the sterilization of medical equipment. Federal regulations introduced in 1995 required the elimination of production and import of CFCs by January 1, 1996 (subject to certain essential uses) and a freeze on the production and import of HCFC-22 by January 1, 1996. These regulations also require the complete elimination of HCFC-22 by the year 2020. The NL Halocarbon Regulations (dated May 2005) required the elimination of halon in portable fire extinguishers effective June 1, 2005 and the elimination of halon in fire extinguishing systems by January 1, 2010.

Potential sources of ODS identified within the site buildings (if present) were documented during the HBMA.

1.6.8 Documentation of Other Potentially Hazardous Building Materials

Other potentially hazardous building materials (e.g., mercury in lighting devices, lead in plumbing and/or batteries, silica in cementitious building materials, etc.) within the site buildings (if present) were documented during the HBMA.

1.6.9 Quality Assurance/Quality Control (QA/QC) Program

Laboratory blanks and duplicates and Quality Control (QC) standard samples were analyzed to assess the reliability of the paint, caulking and treated timber analyses. In order to minimize cross contamination during sampling, a field Quality Assurance/Quality Control (QA/QC) program was followed, which included the following measures:

- Latex or nitrile gloves were worn during all sampling (new pair of gloves for each sample);
- All sampling equipment was thoroughly cleaned prior to sampling to ensure that samples were unaffected by cross-contamination from previous samples; and
- Each sample was photographed, given a unique sample ID and logged onto a chain of custody form before shipment to the laboratory.

The laboratories utilized have extensive QA/QC programs in place to ensure that reliable results are consistently obtained. Specific laboratory QA/QC measures include:

- Chain of Custody and sample integrity inspection;
- Strict documentation control and files;
- Trained personnel prepare and analyze samples according to Standard Operating Procedures (SOPs);
- All analytical methods are based on accepted procedures and are fully validated prior to use;
- Precision is monitored by performing replicate analysis of samples;
- Accuracy is verified by analyzing spiked samples and reference materials;
- Instrument calibration integrity is ensured by analyzing calibration check standards within each run sequence;
- Extensive use is made of reference material for routine procedure evaluation;
- Highest available purity analytical standards;
- Predefined analytical sequences ensure all results are traceable to calibration and QC data;
- Hard copy reports displaying all of the required data are generated for each instrument;
- Analytical results are determined only from instrument responses that fall within the calibration range;
- Acceptable QC performance must be demonstrated prior to data authorization;
- On-going method and instrument performance records are maintained for all analysis; and,
- A full-time QA Scientist evaluates the QA program on an on-going basis.

APPENDIX A1

FIGURES

NOTES:

THIS DRAWING BASED ON 1:50,000 TOPOGRAPHIC MAP 1 K/11.

THIS DRAWING IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION IN SUPPORT OF THIS REPORT.

Amec Foster Wheeler
Environment & Infrastructure
133 Crosbie Road
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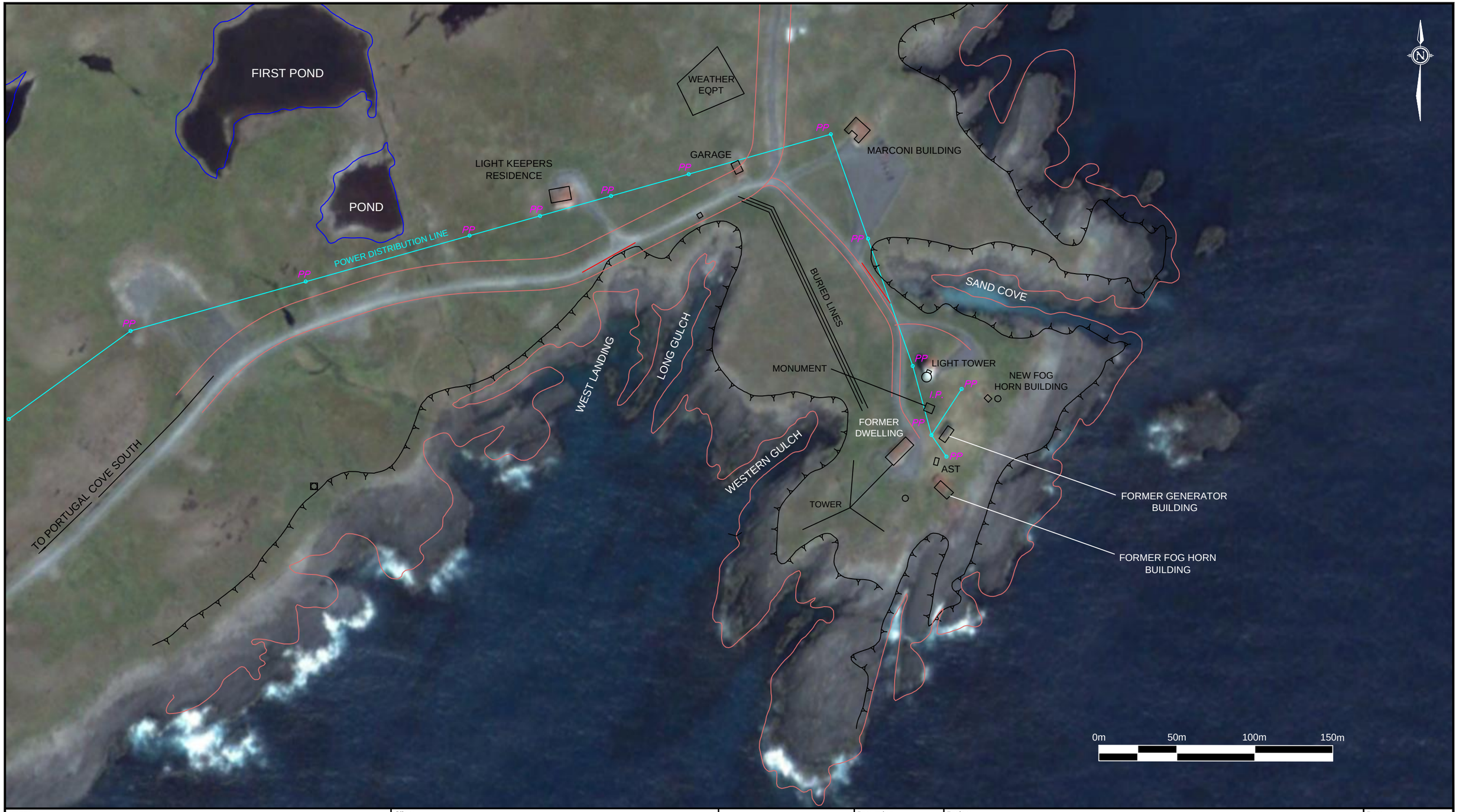
709-722-7023

Client:

Public Works and Government Services Canada
Travaux publics et Services gournementaux Canada

Date: February 2017	Project: HAZARDOUS BUILDING MATERIAL ASSESSMENT CAPE RACE LIGHTSTATION		
Drawn by: T. Rideout	Title: SITE LOCATION PLAN		
Approved by: L. Wiseman	Scale: NTS	Project No.: TF16076698	Figure No.: 1.1



NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PUBLIC WORKS AND GOVERNMENT SERVICES CANADA AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.

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Drawn by: T. Rideout

Approved by: L. Wiseman

Scale: As Shown

Project: HAZARDOUS BUILDING MATERIAL ASSESSMENT
CAPE RACE LIGHTSTATION

Title: SITE PLAN - CAPE RACE

Date: February 2017

Project No. TF16076698

Rev. No. 0

Figure No. 1.2

APPENDIX B1

PHOTOGRAPHIC RECORD

Photo 1: View of the gravel access road to the Cape Race Lightstation.

Photo 2: View of the Cape Race Lightstation.

Photo 3: View of the Former Dwelling with the Light Tower and Former Generator Building in the background.

Photo 4: View of the Former Fog Horn Building with the light Tower in the background.

SECTION 2.0 EXECUTIVE SUMMARY

Hazardous materials identified at the Former Dwelling during the HMBA are summarized in Table E-2.

Table E-2: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Drywall Joint Compound	NL Asbestos Abatement Regulations (Reg. 111/98)	Room 5	6 m^2 (drywall including joint compound) Note: Asbestos-containing drywall joint compound debris may be present throughout building.	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based and Lead Leachable Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1);	Rooms 1 – 10 Rooms 11 and 12	140 m^2 (paint on ceilings on main floor) 130 m^2 (paint on concrete foundation walls in basement)	These painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed and treated as hazardous waste prior to renovation/demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Various locations throughout building interior (e.g., floor, exterior walls, ceilings)	Dark-coloured water staining on floor surface Areas of dark-stained wood on exterior walls Sporadic areas of SVG on ceiling surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Potential ODS	Federal Hydrocarbon Regulations (SOR/2003-289)	Rooms 3 and 11	Refrigerants (refrigerator and freezer)	Materials containing ODS should be received by a contractor or facility that has the proper approvals to remove, handle and/or dispose of ozone depleting substances.
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Rooms 5 and 11	Fire Extinguishers (3)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Building interior	Piping/solder	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.
Treated Wood Materials	NL Department of Environment and Conservation, 2015 Guidance Document for Treated Wood Waste Disposal (GD-PPD-075.1)	Building exterior	Pressure Treated Decking	The treated timber sample collected from the side deck on the exterior of the building was not leachable for arsenic or chromium, and is not considered to be hazardous. This treated timber can be disposed of at an approved landfill facility pending Provincial regulatory and landfill operator approval.
Petroleum Hydrocarbon Storage Tank	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 11	Petroleum hydrocarbons (if present in AST/fuel lines)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2016	Building interior/ exterior	Asphalt shingles, drywall and drywall joint compound, brick, mortar and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing drywall joint compound.
Radioactive Materials	Federal Transportation of Dangerous Goods Act (1992, c. 34)	Room 3	Smoke Detector (1)	Smoke detectors that contain low level radioactive materials must be transported, as per Federal TDG Regulations, to a licensed disposal facility.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 11 and 12	Various types of waste, including but not limited to cardboard, pieces of wood and metal, cables, plastic beverage containers, metal paint cans, possible heating oil.	Some of these materials or products (i.e., heating oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., drywall debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

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APPENDICES

2.0 FORMER DWELLING

The Former Dwelling is located approximately 20 km from Route 10 via the gravel access road to Cape Race (refer to Figure 1.2, Appendix A1 and Photos 1, 2 and 3, Appendix B1). Based on information available on the Directory of Federal Real Property website, the Former Dwelling (Building No. 000004) at the Cape Race Lightstation was constructed in 1960.

2.1 BUILDING DESCRIPTION

A description of the Former Dwelling is outlined in Table 2-1. Photographs of the Former Dwelling are provided in Appendix B2.

Table 2-1: Site Building Description

Building Name	Former Dwelling	Photo (Appendix B2)
Number of Stories	One	Photos 1, 2 and 3
Attic	Yes	Photos 4 and 5
Basement	Yes	Photos 14, 15, 16, 17, 18 and 19
Type of Structure	Wood Frame	Photos 4, 5 and 6
Type of Foundation	Concrete	Photos 2, 14 and 17
Exterior	Painted Clapboard	Photos 1, 2 and 3
Window/Door Frames	Vinyl Windows/Painted Wood Frames/Trim	Photos 1, 2 and 3
Exterior Doors	Metal/Painted Wood Doors	Photos 2 and 3
Roofing Materials	Asphalt Shingles, Felt and Tar	Photo 1
Interior Walls Finishes	Unfinished (Exposed Wood Framing)	Photos 6, 7, 8, 9 and 10
	Unpainted Plywood	Photo 12
	Painted Drywall	Photo 13
	Panel Board	Photo 12
Ceiling Finishes	Painted Boards	Photos 7 and 11
Floor Finishes	Unpainted/Painted Boards/Plywood	Photos 8, 9 and 10
	Vinyl Floor Tiles	Photo 12
	Painted Concrete	Photos 14 and 15
Interior Doors	None (New Closet Doors – Not Installed)	Photo 9
Interior Lighting	Incandescent	Photo 11
Exterior Lighting	Incandescent	Photo 3
Heating	Oil Fired Warm Air Furnace	Photos 15 and 16
	Electrical Baseboard Heaters	Photo 32

2.2 FINDINGS

The findings documented in this section are based on observations made by Amec Foster Wheeler personnel at the time of the site visit and laboratory analyses of samples collected from the Former Dwelling.

2.2.1 Asbestos-Containing Materials (ACMs)

There are over 3,000 ACMs that are commercially available, which can be divided into two broad categories: friable and non-friable. ACMs were discontinued from use in Canada in the late 1970s/early 1980s, although non-friable asbestos is still found in many more recent buildings.

During the HBMA, a total of 12 building material samples (ASB-01 to ASB-12) were collected from the Former Dwelling and analyzed for asbestos content (refer to Photos 20 to 31, Appendix B2). It is important to note that samples ASB-02 and ASB-04 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., ASB-02A and ASB-04A) and one subsample to be analyzed for PCB content (i.e., ASB-02B and ASB-04B). It should also be noted that select samples were separated into sub-samples representing distinct material layers and re-labeled by the laboratory prior to analysis (i.e., ASB-06-Paper Backing, ASB-06-Insulation, ASB-09-Floor Tile, ASB-09-Floor Tile, ASB-11-Drywall Joint Compound and ASB-11-Gypsum). Sample descriptions and analytical results are summarized in Table C2-1, Appendix C2. Sample locations and analytical results are graphically illustrated in Figure 2.1, Appendix A2. Copies of room-by-room inspection sheets for the Former Dwelling are provided in Appendix D2.

2.2.1.1 Friable Materials

Friable ACMs are defined as materials that can be crumbled, pulverized and reduced to powder when dry using hand pressure. Typical friable materials include acoustical or decorative spray applications, fireproofing and thermal insulation.

2.2.1.1.1 Spray-Applied Fireproofing, Insulation and Texture Finishes

There were no spray-applied fireproofing, insulation or texture finishes observed within the Former Dwelling during the site visit; therefore, no samples of these materials were collected for analysis.

2.2.1.1.2 Thermal System Insulation

During the HBMA, one (1) sample (AS-06) of thermal insulation, consisting of fibreglass insulation and paper backing, was collected from an exterior wall in Room 3 (refer to Photo 25, Appendix B2). Asbestos was not detected in the fiberglass insulation/paper backing sample.

2.2.1.2 Non-Friable and Potentially Friable Materials

Non-friable ACMs are hard or manufactured products such as floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding, wherein the asbestos fibres are bound to the substrate. Note that although a product may be considered non-friable when new, the product may release fine dust when disturbed (e.g., deterioration, removal, renovations) and the free dust is considered friable.

2.2.1.2.1 Ceiling Tile

There were no ceiling tiles observed in the Former Dwelling during the site visit; therefore, no samples of ceiling tile were collected for analysis.

2.2.1.2.2 Drywall Joint Compound

During the HBMA, one (1) sample of drywall joint compound and gypsum (ASB-11) was collected from an interior wall in Room 5 and analyzed for asbestos content (refer to Photo 30, Appendix B2). Chrysotile asbestos (3%) was detected in the drywall joint compound in the sample at a level above the applicable NL Asbestos Abatement Regulations (111/98) (i.e., >1%). Asbestos was not detected in the gypsum in the sample.

There was limited drywall visible on the interior of the Former Dwelling (covering an area of approximately 6 m^2) and the drywall appeared to be generally intact and in fair condition (refer to Photo 9, Appendix B2).

Fallen paint chips and debris (including white dust) was observed on the wood floors and other surfaces throughout the main floor of the Former Dwelling (refer to Photo 49, Appendix B2). It is possible that some of the debris consists of gyproc/joint compound particulate that was deposited on these surfaces from the previous removal of drywall from the wood framing throughout the building.

2.2.1.2.3 Vinyl Flooring Products and Mastics

During the HBMA, one (1) sample of vinyl floor tile and mastic (ASB-09) was collected from Room 4 and analyzed for asbestos content (refer to Photo 28, Appendix B2). Asbestos was not detected in the vinyl floor tile/mastic sample.

2.2.1.2.4 Baseboard, Carpet and Stair Tread Adhesives/Mastics

There were no baseboard, carpet or stair tread adhesives/mastics observed in the Former Dwelling during the site visit; therefore, no samples of these types of adhesives/mastics were collected for analysis.

2.2.1.2.5 Roofing Products

During the HBMA, one (1) sample of asphalt shingle, felt and tar (ASB-01) was collected from the roof of the Former Dwelling and analyzed for asbestos content (refer to Photo 20, Appendix B2). Asbestos was not detected in the roofing material sample.

Due to height constraints, no samples of building materials around roof penetrations (e.g., caulking or sealants around the chimney or vent pipes) were collected for analysis during the HBMA (refer to Photos 1 and 2, Appendix B2). The roofing materials on the Former Dwelling may be original construction; therefore, based on the age of the building (i.e., 1960), any suspect roofing materials not sampled during this assessment should be considered to be ACMs, unless tested and proven otherwise.

2.2.1.2.6 Caulking

During the HBMA, two (2) samples of caulking were collected from a window frame (ASB-02) and a door frame (ASB-04) on the exterior of the Former Dwelling (refer to Photos 21 and 23, Appendix B2). It is important to note that caulking samples ASB-02 and ASB-04 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., ASB-02-A and ASB-04-A) and one subsample to be analyzed for PCB content (i.e., ASB-02-B and ASB-04-B). Asbestos was not detected in the caulking subsamples.

2.2.1.2.7 Mortar, Grout and Other Cementitious Materials

During the HBMA, one (1) sample of brick mortar (ASB-07) and one (1) sample of brick (ASB-08) collected from the chimney in Room 5 and analyzed for asbestos content (refer to Photos 26 and 27, Appendix B2). Asbestos was not detected in the chimney brick and mortar samples.

One (1) sample of concrete (ASB-03) was collected from the exterior foundation of the Former Dwelling and analyzed for asbestos content (refer to Photo 22, Appendix B2). Asbestos was not detected in the concrete sample.

2.2.1.2.8 Other Potential ACMs

During the HBMA, one (1) sample of wire casing (ASB-05) was collected from an electrical panel in Room 1 and analyzed for asbestos content (refer to Photo 24, Appendix B2). Asbestos was not detected in the wire casing sample.

One (1) sample of panel board (ASB-10) was collected from an interior wall in Room 4 and analyzed for asbestos content (refer to Photo 29, Appendix B2). Asbestos was not detected in the panel board sample.

One (1) sample of tar paper (ASB-12) was collected from underneath the floor boards in Room 6 and analyzed for asbestos content (refer to Photo 31, Appendix B2). Asbestos was not detected in the tar paper sample.

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, electrical and mechanical components and insulators such as wiring and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants (refer to Photos 6 and 13, Appendix B2).

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include caulking or sealants around the chimney or vent pipes, interior components of the furnace and brick chimney and possible fireproofing materials in the surrounding wall cavities, packing associated with cast iron pipe joints, other fire rated structures or building materials, concrete lining the interior of hot water boiler tanks and underground infrastructure and piping (refer to Photos 15 and 16, Appendix B2).

2.2.2 Paint Additives

Lead compounds have been used in paint as pigment and durability additives since the early 1800s. Mercury compounds have been used in paint as anti-microbial additives up until the 1990s. PCBs have been used in paint as plasticizers and corrosion resistance additives from the 1950s to the 1970s.

The condition of the paint visible on the exterior and on the interior of the Former Dwelling was generally peeling and flaking and observed to be in poor condition (refer to Photos 3, 7 and 11, Appendix B2).

During Amec Foster Wheeler's site visit on October 13, 2016, a total of nine (9) samples (PS-1 (DWELLING) to PS-9 (DWELLING)) were collected from painted surfaces of the Former Dwelling and analyzed for lead, mercury and PCB content (refer to Photos 33 to 41, Appendix B2). Sample descriptions and analytical results are summarized in Tables C2-2 to C2-4, Appendix C2. Sample locations and analytical results are graphically illustrated in Figure 2.1, Appendix A2.

The concentrations of lead detected in seven (7) of the nine (9) paint samples (PS-1 (DWELLING) to PS-7 (DWELLING)) analyzed exceeded the former Federal HPA criterion of 5,000 mg/kg for lead. In order to determine whether or not these paints would be considered hazardous waste upon removal from the site, it was recommended that these paints be tested for lead leachate using the TCLP. On December 9, 2016, Amec Foster Wheeler returned to the site and collected seven (7) additional paint samples (PS-1-A to PS-7-A) from the painted surfaces of the Former Dwelling where elevated levels of lead (i.e., >5,000 mg/kg) were identified (refer to Photos 42 to 48, Appendix B2). Where possible, a small section of the painted substrate (e.g., wood, aspenite, etc.) was included with the paint sample. The laboratory results for lead leachate in paint are presented in Table C2-5, Appendix C2.

2.2.2.1 Lead in Paint

The concentrations of lead in the paint samples ranged from 120 mg/kg to 110,000 mg/kg (refer to Table C2-2, Appendix C2). Two (2) paint samples (PS-8 (DWELLING) and PS-9 (DWELLING)) contained lead at concentrations above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg (refer to Photos 40 and 41, Appendix B2). Seven (7) paint samples (PS-1 (DWELLING) to PS-7 (DWELLING)) contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg (refer to Photos 33 to 39, Appendix B2).

2.2.2.2 Mercury in Paint

The concentrations of mercury in the paint samples ranged from non-detect (<1.0 mg/kg) to 5.8 mg/kg (refer to Table C2-3, Appendix C2). The nine (9) paint samples (PS-1 (DWELLING) to PS-9 (DWELLING)) analyzed were either non-detect for mercury (i.e., <1.0 mg/kg) or contained mercury at concentrations below the applicable Federal HPA criterion (i.e. 10 mg/kg).

2.2.2.3 PCBs in Paint

PCBs were non-detect (i.e., <10 mg/kg, <5.0 mg/kg and <0.50 mg/kg) in the nine (9) paint samples (PS-1 (DWELLING) to PS-9 (DWELLING)) analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C2-4, Appendix C2).

2.2.2.4 Leachable Lead in Paint

The concentrations of leachable lead in paint samples PS-1-A (2,900 µg/L), PS-2-A (3,400 µg/L), PS-5-A (3,900 µg/L) and PS-7-A (1,000 µg/L) were below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C2-5, Appendix C2). These paint samples were collected from the exterior wood trim (red over green over white paint), exterior concrete foundation (grey over white paint), wood floor in Room 6 (yellow and red over white paint) and brick chimney in Room 11 (red paint). Since the concentrations of leachable lead in these paint samples are at levels that are not considered to be hazardous, any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

The concentrations of leachable lead in paint samples PS-3-A (34,000 µg/L), PS-4-A (13,000 µg/L) and PS-6-A (5,400 µg/L) were above the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Photos 44, 45 and 47, Appendix B2 and Table C2-5, Appendix C2). Since the concentrations of leachable lead in these paints (including substrates for samples PS-3-A and PAS-4-A) are at levels considered to be hazardous, these painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. Alternatively, if the paints can be removed from the substrates, only the paints may have to be disposed of at a hazardous waste treatment facility, and not the substrates.

Paint sample PS-3-A (grey on white on blue paint) was collected from the wood ceiling in Room 1 and paint sample PS-4-A (white over dark green paint) was collected from the wood ceiling in Room 7. It was noted during the assessment that the paint on the ceilings in Rooms 2, 3, 4 and 5 appeared to be visually similar to the paint on the ceiling in Room 1 (i.e., location of paint sample PS-3-A) (refer to room-by-room inspection sheets in Appendix D2). It was also noted during the assessment that the paint on the ceilings in Rooms 6, 8, 9 and 10 appeared to be visually similar to the paint on the ceiling in Room 7 (i.e., location of paint sample PS-4-A) (refer to room-by-room inspection sheets in Appendix D2). The paint on the ceilings throughout the interior of the main floor (covering an area of approximately 140 m^2) was in poor condition (i.e., peeling and flaking) at the time of the site visits. Fallen paint chips and debris was observed on the wood floors and other surfaces throughout the main floor of the Former Dwelling (refer to Photo 49, Appendix B2).

Paint sample PS-6-A (white paint) was collected from the concrete foundation wall in Room 11 (i.e., furnace room in the basement). Most of the paint on the concrete foundation walls inside the basement (covering an area of approximately 130 m^2) is visually similar to the paint that was sampled from the concrete foundation wall in Room 11. Some areas of the concrete foundation walls appear to be unpainted or contain yellow paint that is visually similar to the paint that was sampled from the wood floor in Room 6 (i.e., samples PS-5 (DWELLING) and PS-5-A) (refer to Photo 17, Appendix B2). Fallen paint chips and debris was observed on the concrete floor and other surfaces throughout the basement of the Former Dwelling (refer to Photo 50, Appendix B2).

2.2.3 Urea Formaldehyde Foam Insulation (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Dwelling. The nature of the insulation in the walls and ceilings throughout the Former Dwelling could not be confirmed at the time of the site inspection; however, several walls were unfinished and open (e.g., exposed studs). Some fibreglass insulation with paper backing was observed in the exterior walls and ceilings in some areas (refer to Photo 10, Appendix B2). The Former Dwelling was constructed in 1960, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

2.2.4 Suspected Visible Mould Growth (SVG)

Amec Foster Wheeler inspected the interior areas of the Former Dwelling for visual or olfactory evidence of suspected mould. Dark-coloured water staining was observed on the surface of the wood floor in Room 3 and areas of dark-stained wood was observed on some exterior walls throughout the building (refer to Photos 4, 8, 51 and 52, Appendix B2). Sporadic areas of SVG was also noted on the interior ceiling surfaces at the time of the site visit.

2.2.5 Mercury-Containing Thermostats

Three (3) types of thermostats were identified inside the Former Dwelling during the site visit. Results of the thermostat inspection are summarized in Table 2-2.

Table 2-2: Thermostat Description

Description of Thermostat	Manufacturer	Location Observed	Photo No. (Appendix B2)	No. Observed	Thermostat Inspected (Yes/No)	Mercury Switch (Yes/No)
Beige rectangle casing, beige dial, wall-mounted	Honeywell	Room 1 Room 2 Room 3	52	3	Yes	No
White rectangle casing, white dial, wall-mounted	Dimplex	Room 4 Room 5	53	2	Yes	No
White rectangle casing, wall-mounted	Honeywell	Room 6	-	1	Yes	No

2.2.6 PCB-Containing Light Ballasts

No fluorescent light fixtures were observed in the Former Dwellling; therefore, no light ballasts were visually inspected for the presence or absence of PCB-containing dielectric fluid at the time of the site visit.

2.2.7 Potential Sources of ODSs and Halocarbons

During the HBMA, potential sources of ODSs were identified within the Former Dwelling. Results of the ODS inspection are summarized in Table 2-3.

Table 2-3: Potential Sources of ODSs

Item	Manufacturer	Model (Serial No.)	Location Observed	Photo No. (Appendix B2)	Refrigerant	Potential ODS
Refrigerator	Coldspot	-	Room 3	10	Unknown	Yes
Freezer	Belwood	-	Room 11	15	F-12	Yes

Based on information provided on the manufacturer's label, a potential ODS maybe present in the form of the refrigerant Freon 12 contained in a freezer identified inside the Former Dwelling (refer to Photo 54, Appendix B2). The refrigerant Freon 12 is a CFC and is regulated under the Federal Halocarbon Regulations (2003). The type of refrigerant contained in the refrigerator identified inside the Former Dwelling is unknown and should be treated as a potential ODS.

Three (3) fire extinguishers (dry chemical) were observed inside the Former Dwelling; however, the labels on these extinguishers did not indicate the presence of halon or other ODS ingredients (refer to Photos 55, 56 and 57, Appendix B2). Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

2.2.8 Other Potentially Hazardous Building Materials or Substances

Other potentially hazardous building materials or substances identified during this assessment are presented in the following sections.

2.2.8.1 Lead

Lead is typically associated with plumbing solder and older pipe materials (e.g., cast iron pipe joints), as well as products such as radiation protective shielding and lead-acid batteries.

Since the Former Dwelling was constructed in 1960, lead solder is likely to be present in plumbing and piping (i.e., cast iron and copper piping) in the building, as lead solder for use in potable water distribution pipes was not banned until the late 1980s (refer to Photo 58, Appendix B2).

No potential lead-acid batteries (i.e., emergency lighting fixtures and exit signs) were noted inside the Former Dwelling at the time of the site inspection.

2.2.8.2 Mercury

The light tubes in fluorescent light fixtures often contain limited quantities of mercury in a powder or vapour form. No fluorescent light fixtures or light tubes were observed in the Former Dwelling at the time of the site visit.

2.2.8.3 PCBs

According to the USEPA, PCB may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979. As previously stated, two (2) samples of caulking were collected from a window frame (ASB-02) and a door frame (ASB-04) on the exterior of the Former Dwelling (refer to Photos 21 and 23, Appendix B2). It is important to note that caulking samples ASB-02 and ASB-04 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., ASB-02-A and ASB-04-A) and one subsample to be analyzed for PCB content (i.e., ASB-02-B and ASB-04-B). Sample descriptions and analytical results are summarized in Table C2-4, Appendix C2. Sample locations and analytical results are graphically illustrated in Figure 2.1, Appendix A2.

PCBs were non-detect (i.e., <0.50 mg/kg) in the two (2) caulking samples analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C2-4, Appendix C2).

2.2.8.4 Treated Wood Chemicals

Suspected “pressure treated” inorganic preservatives (i.e., arsenic and chromium) appear to have been applied to the timber used to construct the decking on the exterior of the Former Dwelling (refer to Photos 1, 2 and 3, Appendix B2). One (1) sample of suspected treated timber (TT-01) was collected from the stairs on the side deck for TCLP analyses of arsenic, chromium, cresols, benzo(a)pyrene and pentachlorophenol to determine whether or not the treated wood would be considered hazardous waste upon removal from the site (refer to Photo 59, Appendix B2). The sample description and analytical results are summarized in Table C2-6, Appendix C2. The sample location and analytical results are graphically illustrated in Figure 2.1, Appendix A2.

The concentrations of leachable arsenic (170 µg/L) and leachable chromium (56 µg/L) in the treated timber sample were below the TCLP landfill disposal standards for leachable arsenic (2,500 µg/L) and leachable chromium (5,000 µg/L) provided in the NL Department of Environment and Conservation, 2015 Guidance Document for Treated Wood Waste Disposal (GD-PPD-075.1). Cresols, benzo(a)pyrene and pentachlorophenol were not detected in the sample leachate and therefore did not exceed the applicable TCLP landfill disposal standards. Since the concentrations of leachable arsenic and leachable chromium are at levels that are not considered to be hazardous, the suspected “pressure treated” timber in the exterior decking, if removed from the site, can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

2.2.8.5 Petroleum Hydrocarbon Storage Tanks

One (1) aboveground storage tank (AST) was identified during this assessment (refer to Photo 60, Appendix B2). The results of the visual inspection are summarized in Table 2-4.

Table 2-4: Storage Tank Descriptions

Name	Location	Storage Capacity	Type	Date Installed	Date on ULC Placard	Comments
Heating Oil Storage Tank (Grey)	Room 11	682 L	Steel, horizontal, single walled, secondary containment.	Unknown.	Not legible.	Significant corrosion visible on tank. Staining appeared to be visible on concrete floor surface near tank. Limited visibility in basement due to low lighting.

2.2.8.6 Silica

According to the CPWR (The Center for Construction Research and Training), many common construction materials contain silica including, asphalt, brick, cement, concrete, drywall, grout, mortar, stone, sand and tile. The dust created by cutting, grinding, drilling or otherwise disturbing these materials can contain crystalline silica particles.

Based on the HBMA site visit, silica is expected to be present in asphalt shingles, drywall and drywall joint compound, brick, mortar and concrete used in the construction of the Former Dwelling.

2.2.8.7 Radioactive Materials

During the HBMA, a disconnected smoke detector was observed on a table in Room 3 (refer to Photo 58, Appendix B2). The type of smoke detector observed commonly contains very small amounts of radioactive material (i.e., Americum 241). Smoke alarms that use radioactive material incorporated in an ionization chamber are called "ion chamber smoke alarms". The smoke detector should be removed intact, stored in a properly labeled container and transported, as per TDG regulations, to a licensed disposal facility.

2.2.8.8 Solid Waste and Potential Hazardous Products

Various types of waste, including but not limited to cardboard, pieces of wood and metal, cables, plastic beverage containers and metal paint cans were observed inside the water cistern in the basement of the Former Dwelling (refer to Photo 19, Appendix B2). A limited quantity of suspected heating oil was also observed inside a small plastic pail in Room 12 (refer to Photo 18, Appendix B2).

2.3 CONCLUSIONS AND RECOMMENDATIONS

Based on observations made and information gathered during the HBMA, the following conclusions and recommendations are made with respect to the potential and actual presence of hazardous building materials at the Former Dwelling.

2.3.1 ASBESTOS-CONTAINING MATERIALS (ACMS)

Building materials containing greater than 1% asbestos by dry weight, which are considered to be ACMs, are present in the form of drywall joint compound. There was limited drywall visible on the interior of the Former Dwelling (covering an area of approximately 6 m^2) and the drywall appeared to be generally intact and in fair condition. Fallen paint chips and debris (including white dust) was observed on the wood floors and other surfaces throughout the main floor of the Former Dwelling. It is possible that some of the debris consists of gyproc/joint compound particulate that was deposited on these surfaces from the previous removal of drywall from the wood framing throughout the building.

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, electrical and mechanical components and insulators such as wiring and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants.

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include caulking or sealants around the chimney or vent pipes, interior components of the furnace and brick chimney and possible fireproofing materials in the surrounding wall cavities, packing associated with cast iron pipe joints, other fire rated structures or building materials, concrete lining the interior of the hot water boiler tank and underground infrastructure and piping.

If other potential ACMs that were not sampled as part of this assessment are encountered in the future, these materials should be treated as ACMs or samples should be collected and tested to verify asbestos content. This should be done as soon as these materials are encountered and before these materials are disturbed. This includes materials that are currently concealed by walls and ceiling systems.

In accordance with the NL Asbestos Abatement Regulations (Reg. 111/98), which provide the legislative requirements for safe handling of ACMs in workplaces in the Province of NL, the following is recommended:

- Safe work procedures shall be established.
- All buildings constructed during the period when asbestos was readily used in construction must have a written assessment and management plan (where applicable) for potential ACMs.

- Prior to general disturbance activity (e.g., demolition, renovation or removal), all ACMs must be safely removed from the building and disposed of in accordance with appropriate environmental guidelines by an asbestos abatement contractor registered with the Department of Labour, Occupational Health and Safety Branch.

ACMs in good condition should be inspected on an annual basis. ACMs in poor condition should be removed from the building and transported off-site for proper disposal in accordance with the NL Asbestos Abatement Regulations (Reg. 111/98). ACMs can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.

The Former Dwelling may be transferred to the local development association (or another third party) and renovated for future use; therefore, the surface debris/dust should be sampled and analyzed for asbestos content to determine if additional asbestos abatement is required prior to renovation activities (i.e., removal of the surface debris/dust by a registered asbestos abatement contractor). If asbestos is not identified in these materials, consideration should be given to performing a thorough cleaning of the interior of the structure by a certified contractor prior to renovations being performed on the building.

2.3.2 LEAD, MERCURY AND PCBS IN PAINT

Results of the paint sampling and analytical program revealed the following lead, mercury and PCB containing paint finishes on the interior of the Former Dwelling:

Lead

- Two (2) paint samples (PS-8 (DWELLING) and PS-9 (DWELLING)) contained lead at concentrations above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg. Since these paint samples contained less than 5,000 mg/kg lead, these paints are not likely to be leachable for lead and may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval.
- Seven (7) paint samples (PS-1 (DWELLING) to PS-7 (DWELLING)) collected from the Former Dwelling contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg; therefore, additional samples were collected from these paints (PS-1-A to PS-7-A) and tested for lead leachate using the TCLP to determine whether or not the paint would be considered hazardous waste upon removal from the site.
- The concentrations of leachable lead in paint samples PS-1-A, PS-2-A, PS-5-A and PS-7-A were below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). These paint samples were collected from the exterior wood trim (red over green over white paint), exterior concrete foundation (grey over white paint), wood floor in Room 6 (yellow and red over white paint) and brick chimney in Room 11 (red paint). Since the concentrations of leachable lead in these paint samples are at levels that are not considered to be hazardous, any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

- The concentrations of leachable lead in paint samples PS-3-A, PS-4-A and PS-6-A were above the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since the concentrations of leachable lead in these paints (including substrates for samples PS-3-A and PAS-4-A) are at levels considered to be hazardous, these painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. Alternatively, if the paints can be removed from the substrates, only the paints may have to be disposed of at a hazardous waste treatment facility, and not the substrates.
- Paint sample PS-3-A (grey on white on blue paint) was collected from the wood ceiling in Room 1 and paint sample PS-4-A (white over dark green paint) was collected from the wood ceiling in Room 7. It was noted during the assessment that the paint on the ceilings in Rooms 2, 3, 4 and 5 appeared to be visually similar to the paint on the ceiling in Room 1 (i.e., location of paint sample PS-3-A). It was also noted during the assessment that the paint on the ceilings in Rooms 6, 8, 9 and 10 appeared to be visually similar to the paint on the ceiling in Room 7 (i.e., location of paint sample PS-4-A). The paint on the ceilings throughout the interior of the main floor (covering an area of approximately 140 m^2) was in poor condition (i.e., peeling and flaking) at the time of the site visits. Fallen paint chips and debris was observed on the wood floors and other surfaces throughout the main floor of the Former Dwelling.
- Paint sample PS-6-A (white paint) was collected from the concrete foundation wall in Room 11 (i.e., furnace room in the basement). Most of the paint on the concrete foundation walls inside the basement (covering an area of approximately 130 m^2) is visually similar to the paint that was sampled from the concrete foundation wall in Room 11. Some areas of the concrete foundation walls appear to be unpainted or contain yellow paint that is visually similar to the paint that was sampled from the wood floor in Room 6. Fallen paint chips and debris was observed on the concrete floor and other surfaces throughout the basement of the Former Dwelling.

Mercury

- The nine (9) paint samples (PS-1 (DWELLING) to PS-9 (DWELLING)) analyzed were either non-detect for mercury (i.e., <1.0 mg/kg) or contained mercury at concentrations below the applicable Federal HPA criterion (i.e., 10 mg/kg). Since all nine (9) paint samples contained less than 50 mg/kg mercury, these paints are not likely to be leachable for mercury. However, the concentrations of leachable lead in three (3) paint samples (PS-3-A, PS-4-A and PS-6-A) collected from the same areas as PS-3 (DWELLING), PS-4 (DWELLING) and PS-6 (DWELLING) are at levels considered to be hazardous; therefore, these paints, if removed from the site, must be disposed of at a hazardous waste treatment facility.

PCB

- PCBs were non-detect (i.e., <10 mg/kg, <5.0 mg/kg and <0.50 mg/kg) in the nine (9) paint samples (PS-1 (DWELLING) to PS-9 (DWELLING)) analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since all nine (9) paint samples contained less than 50 mg/kg of PCBs, these paints are not classified by the TDG Regulations as PCB solids. However, the concentrations of leachable lead in three (3) paint samples (PS-3-A, PS-4-A and PS-6-A) collected from the same areas as PS-3 (DWELLING), PS-4 (DWELLING) and PS-6 (DWELLING) are at levels considered to be hazardous; therefore, these paints, if removed from the site, must be disposed of at a hazardous waste treatment facility.

There are potential adverse human health impacts associated with disturbing (e.g., scraping) lead containing paint finishes. As a precautionary measure, Amec Foster Wheeler recommends handling these paint finishes, as follows:

- In areas of minor peeling or flaking, the paint should be removed using wet scraping techniques.
- In areas of extensive peeling and flaking, the paint should be removed and more extensive particulate control measures may be required.
- In areas where lead containing paint finishes are present and in poor condition, an experienced contractor should be utilized for decommissioning/demolition activities. Prior to demolition or renovation activities, all areas of extensive peeling and flaking of lead containing paint finishes and paint debris/dust should be removed and/or remediated to ensure that building occupants/workers are protected from associated dust/particulate.
- Steps should be taken to ensure that workers and anyone present in and around areas being dismantled or demolished are protected. The contractor should also ensure that dust generation and migration is minimized.

Precautions should be taken to prevent/reduce exposure to paint dust during any disturbance of lead containing paint finishes, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

If potential lead, mercury or PCB containing paint finishes that were not sampled during this assessment are encountered in future, samples should be obtained and tested to verify concentrations of lead, mercury and PCB. This should be done as soon as the paint is encountered and before it is disturbed. This includes materials that are currently concealed by walls and ceiling systems.

It is important to note that if the Former Dwelling is transferred to the local development association (or another third party), any residual lead based paint will need to be managed in the future by the future owners.

2.3.3 UREA FORMALDEHYDE FOAM INSULATION (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Dwelling. The nature of the insulation in the walls and ceilings throughout the Former Dwelling could not be confirmed at the time of the site inspection; however, several walls were unfinished and open (e.g., exposed studs). Some fibreglass insulation with paper backing was observed in the exterior walls and ceilings in some areas. The Former Dwelling was constructed in 1960, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

It can be inferred that any UFFI present within the building is unlikely to affect the indoor air quality due to the amount of time that has passed since the insulation was likely installed (i.e., 1960) along with the likelihood that formaldehyde has off-gassed over this period of time. It should be noted that, the presence and concentration of formaldehyde cannot be determined or quantified without conducting site-specific testing for formaldehyde.

Based on discussions with the NL Department of Environment and Climate Change, for the purposes of disposal of UFFI, this material is permitted to be bagged and transported to an approved Waste Disposal Site (WDS) and disposed in the special waste area (unlined area) of the site.

2.3.4 MOULD

Dark-coloured water staining was observed on the surface of the wood floor in Room 3 and areas of dark-stained wood was observed on some exterior walls throughout the building. Sporadic areas of SVG was also noted on the interior ceiling surfaces at the time of the site visit. Existing conditions in the Former Dwelling (e.g., suspected water infiltration due to leaks) may potentially contribute to or enhance mould growth inside the building.

Workers on-site should don proper personal protective equipment (PPE) to prevent/reduce exposure to mould while working within the Former Dwelling or during any disturbance /demolition of building materials that may be impacted by mould growth.

2.3.5 OZONE DEPLETING SUBSTANCES

Suspected ODS are present in the Former Dwelling in the form of refrigerants in the refrigerator and freezer. The refrigerants may be regulated under the Federal Halocarbon Regulations.

Three (3) fire extinguishers (dry chemical) were observed inside the Former Dwelling; however, the labels on these extinguishers did not indicate the presence of halon or other ODS ingredients. Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

All ODS, if present, should be removed by an approved contractor prior to disposing of any cooling and/or refrigeration equipment from the building. The use, storage, operation, maintenance, decommissioning, and disposal of ODS containing equipment, in general, is

regulated at both a Provincial and Federal level and must comply with the most recent NL Halocarbon Regulations and the Federal Halocarbon Regulations. The status of the potential ODS containing equipment should be confirmed through a mechanical contractor or consultant.

2.3.6 LEAD-CONTAINING MATERIALS/EQUIPMENT

Lead solder is likely to be present in plumbing and piping in the building (i.e., solder was observed on copper piping connected to the hot water tank).

The disturbance, control or disposal of lead-containing material/equipment should be carried out in accordance with applicable criteria/regulations (refer to Section 1.5). The presence/absence of lead in these materials should be confirmed through a contractor or consultant prior to disturbance or disposal of these materials. Typically these materials are sent to a metal recycling facility and not a landfill.

2.3.7 PCB-CONTAINING MATERIALS/EQUIPMENT

No fluorescent light fixtures were observed in the Former Dwelling; therefore, no light ballasts were visually inspected for the presence or absence of PCB-containing dielectric fluid at the time of the site visit.

According to the USEPA, PCBs may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979. Therefore, two (2) caulking samples (ASB-02-A and ASB-04-A) were collected and analyzed for PCB content. PCBs were non-detect (i.e., <0.50 mg/kg) in the two (2) caulking samples and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since the caulking samples analyzed did not exceed the CCME CSQG for PCBs in soil at an industrial site, these materials may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval.

2.3.8 TREATED WOOD

The concentrations of leachable arsenic and leachable chromium in the treated timber sample (TT-01) collected from the side deck on the exterior of the Former Dwelling were below the TCLP landfill disposal standards for leachable arsenic (2,500 µg/L) and leachable chromium (5,000 µg/L) provided in the NL Department of Environment and Conservation, 2015 Guidance Document for Treated Wood Waste Disposal (GD-PPD-075.1). Cresols, benzo(a)pyrene and pentachlorophenol were not detected in the sample leachate and therefore did not exceed the applicable TCLP landfill disposal standards. Since the concentrations of leachable arsenic and leachable chromium in the suspected treated wood that was sampled are at levels that are not considered to be hazardous, this wood can be disposed of at an approved landfill facility pending Provincial regulatory and landfill operator approval.

2.3.9 PETROLEUM HYDROCARBON STORAGE TANKS

A steel, horizontal, single-walled, heating oil AST (682 L) with secondary containment was observed in the basement of the Former Dwelling. The requirements for regulatory compliance of the AST on-site have not been determined by this assessment. The tank appeared to be in poor condition (i.e., significant corrosion); however, the condition and status of the AST can only be confirmed through test methods, such as magnetic testing, pressure testing or visual inspection.

Prior to demolition or renovation of the building, any petroleum products in the on-site AST and any associated fuel lines/equipment should be removed and the AST and associated fuel lines/equipment at the site should be purged of all vapours, cleaned and then removed from the site in accordance with applicable regulations (refer to Section 1.5).

2.3.10 SILICA DUST

Silica is expected to be present in asphalt shingles, drywall and drywall joint compound, brick, mortar and concrete used in the construction of the Former Dwelling.

Precautions should be taken to prevent/reduce exposure to silica dust during any disturbance /demolition of silica-containing products, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

2.3.11 RADIOACTIVE MATERIALS

A smoke detector was observed in the Former Dwelling which is similar to the type of detector that commonly contains very small amounts of radioactive material (i.e., Americum 241). The smoke detector should be removed intact, stored in a properly labeled container and transported, as per TDG regulations, to a licensed disposal facility.

2.3.12 SOLID WASTE AND POTENTIAL HAZARDOUS PRODUCTS

The solid waste and any potential hazardous products (i.e., paints, heating oil, etc.) observed inside the basement of the Former Dwelling should be properly disposed of in accordance with applicable regulations (refer to Section 1.5).

2.3.13 SUMMARY OF FINDINGS

Hazardous materials identified at the Former Dwelling during this HBMA are summarized in Table 2-5.

Table 2-5: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Drywall Joint Compound	NL Asbestos Abatement Regulations (Reg. 111/98)	Room 5	6 m^2 (drywall including joint compound) Note: Asbestos-containing drywall joint compound debris may be present throughout building.	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based and Lead Leachable Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1)	Rooms 1 – 10 Rooms 11 and 12	140 m^2 (paint on ceilings on main floor) 130 m^2 (paint on concrete foundation walls in basement)	These painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed and treated as hazardous waste prior to renovation/ demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Various locations throughout building interior (e.g., floor, exterior walls, ceilings)	Dark-coloured water staining on floor surface Areas of dark-stained wood on exterior walls Sporadic areas of SVG on ceiling surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Potential ODS	Federal Hydrocarbon Regulations (SOR/2003-289)	Rooms 3 and 11	Refrigerants (refrigerator and freezer)	Materials containing ODS should be received by a contractor or facility that has the proper approvals to remove, handle and/or dispose of ozone depleting substances.
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Rooms 5 and 11	Fire Extinguishers (3)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.

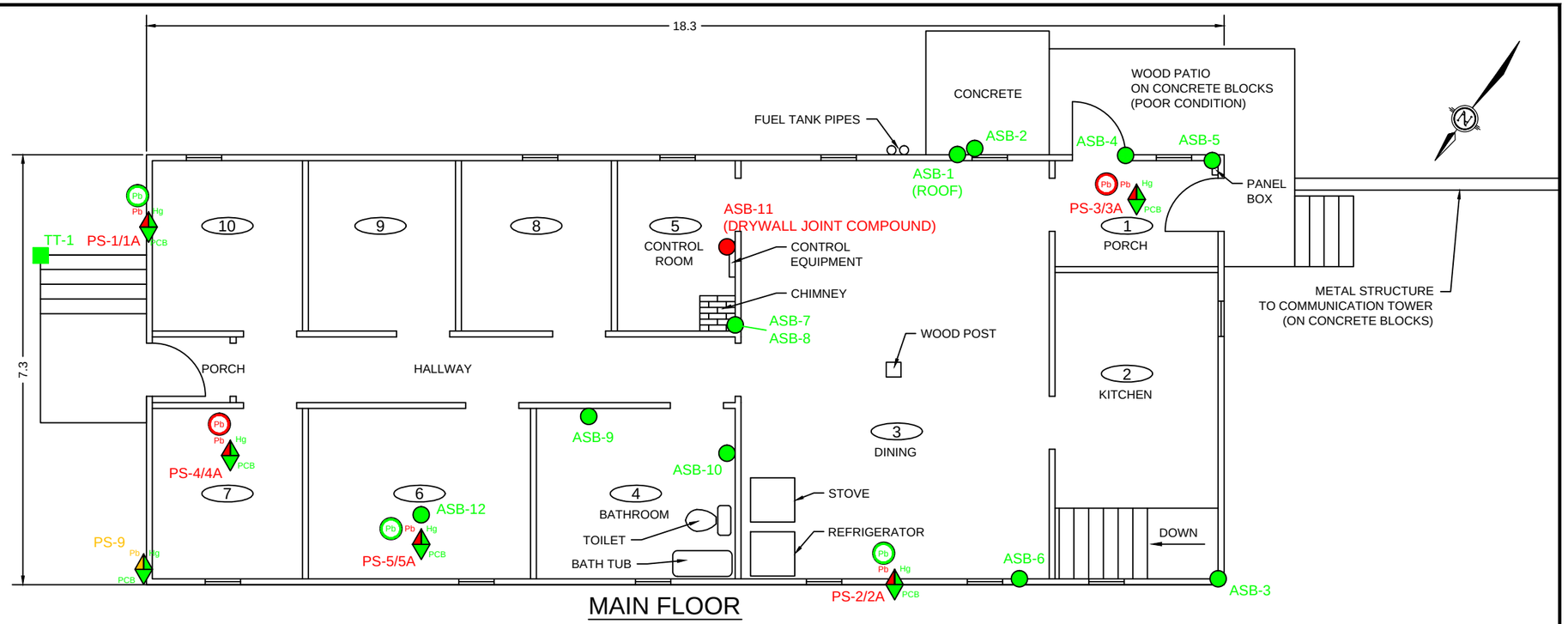
Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Building interior	Piping/solder	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.
Treated Wood Materials	NL Department of Environment and Conservation, 2015 Guidance Document for Treated Wood Waste Disposal (GD-PPD-075.1)	Building exterior	Pressure Treated Decking	The treated timber sample collected from the side deck on the exterior of the building was not leachable for arsenic or chromium, and is not considered to be hazardous. This treated timber can be disposed of at an approved landfill facility pending Provincial regulatory and landfill operator approval.
Petroleum Hydrocarbon Storage Tank	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 11	Petroleum hydrocarbons (if present in AST/fuel lines)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2016	Building interior/ exterior	Asphalt shingles, drywall and drywall joint compound, brick, mortar and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing drywall joint compound.
Radioactive Materials	Federal Transportation of Dangerous Goods Act (1992, c. 34)	Room 3	Smoke Detector (1)	Smoke detectors that contain low level radioactive materials must be transported, as per Federal TDG Regulations, to a licensed disposal facility.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 11 and 12	Various types of waste, including but not limited to cardboard, pieces of wood and metal, cables, plastic beverage containers, metal paint cans, possible heating oil.	Some of these materials or products (i.e., heating oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., drywall debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

APPENDIX A2

FIGURES

LEGEND:

- ASBESTOS SAMPLE --- LOCATION — ASBESTOS NOT DETECTED AND PCB NOT DETECTED WHERE APPLICABLE (ASB-2 AND ASB-4)
- ASBESTOS SAMPLE --- LOCATION — ASBESTOS > 1% (CONSIDERED ASBESTOS CONTAINING MATERIAL)
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 90 mg/kg BUT LESS THAN 5000 mg/kg. NO CRITERIA EXCEEDANCE FOR MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 5000 mg/kg. NO CRITERIA EXCEEDANCE FOR MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEACHABLE LEAD CONCENTRATION BELOW 5.00 mg/L
- PAINT SAMPLE --- LOCATION — LEACHABLE LEAD CONCENTRATION EXCEEDS 5.00 mg/L
- TIMBER SAMPLE --- LOCATION — NO CRITERIA EXCEEDANCE FOR TREATED WOOD PARAMETERS
- 1 — ROOM NUMBER



NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PWGSC AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.

Client:
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Drawn by: T. Rideout
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Scale: N.T.S

Project: HAZARDOUS BUILDING MATERIAL ASSESSMENT
CAPE RACE LIGHT STATION

Title: SAMPLE LOCATION PLAN - FORMER DWELLING

Date: February 2017
Project No. TF16076698
Rev. No. 0
Figure No. 2.1

APPENDIX B2

PHOTOGRAPHIC RECORD

Photo 1: View of the south side of the Former Dwelling. Note side deck on the right.

Photo 2: View of the north side of the Former Dwelling.

Photo 3: View of the west side of the Former Dwelling. Note main deck and metal structure leading from building to a communications tower.

Photo 4: View of the attic in the Former Dwelling. Note dark-stained wood on exterior wall.

Photo 5: View of the attic in the Former Dwelling.

Photo 6: View of the porch (Room 1) in the Former Dwelling. Note electrical panels and wiring.

Photo 7: View of the ceiling in the porch (Room 1) of the Former Dwelling.

Photo 8: View of exposed piping in the kitchen (Room 2) of the Former Dwelling. Note dark-stained wood on exterior wall.

Photo 9: View of the dining room (Room 3) in the Former Dwelling. Note drywall near brick chimney in the adjacent control room (Room 5).

Photo 10: View of the dining room (Room 3) in the Former Dwelling. Note insulation in the wall on the left.

Photo 11: View of the ceiling in the dining room (Room 3) of the Former Dwelling.

Photo 12: View of the bathroom (Room 4) in the Former Dwelling.

Photo 13: View of radio control equipment in the control room (Room 5) of the Former Dwelling.

Photo 14: View of the heating oil aboveground storage tank (left) in the basement (Room 11) of the Former Dwelling.

Photo 15: View of the oil fired warm air furnace (right) and freezer (left) in the basement (Room 11) of the Former Dwelling.

Photo 16: View of the brick chimney and furnace in the basement (Room 11) of the Former Dwelling.

Photo 17: View of the basement (Room 12) of the Former Dwelling.

Photo 18: View of the trench in the basement (Room 12) of the Former Dwelling. Note suspected heating oil in pail.

Photo 19: View inside the water cistern in the basement (Room 12) of the Former Dwelling.

Photo 20: View of location of shingle, felt and tar sample ASB-01 (roof).

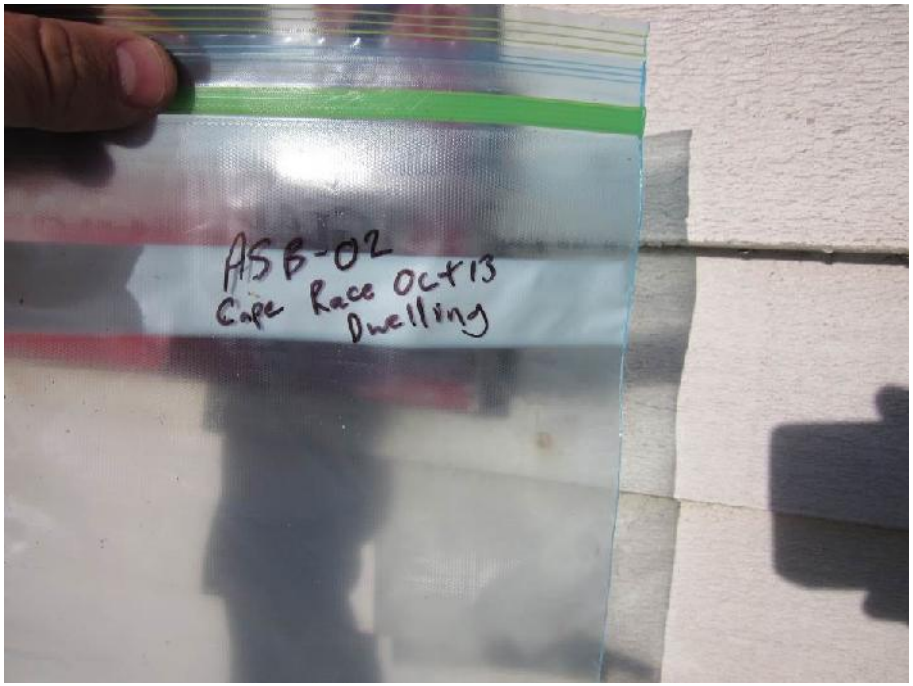


Photo 21: View of location of caulking sample ASB-02 (exterior window frame).

Photo 22: View of location of concrete sample ASB-03 (exterior foundation wall).

Photo 23: View of location of caulking sample ASB-04 (exterior door frame).

Photo 24: View of location of wire casing sample ASB-05 (Room 1).

Photo 25: View of location of fiberglass insulation/paper backing sample ASB-06 (Room 3).

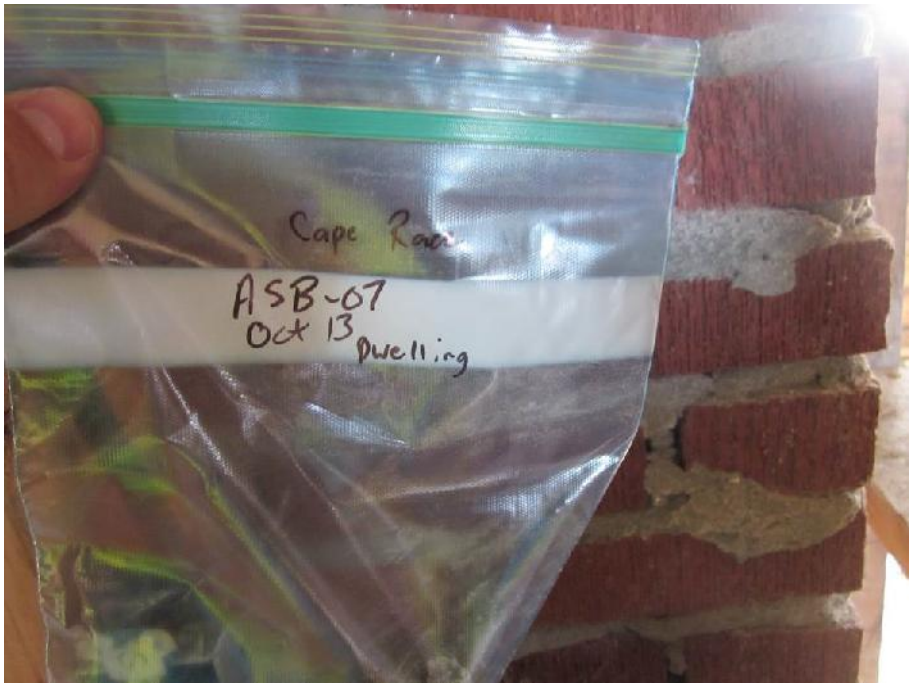


Photo 26: View of location of brick mortar sample ASB-07 (Room 5).

Photo 27: View of location of brick sample ASB-08 (Room 5).

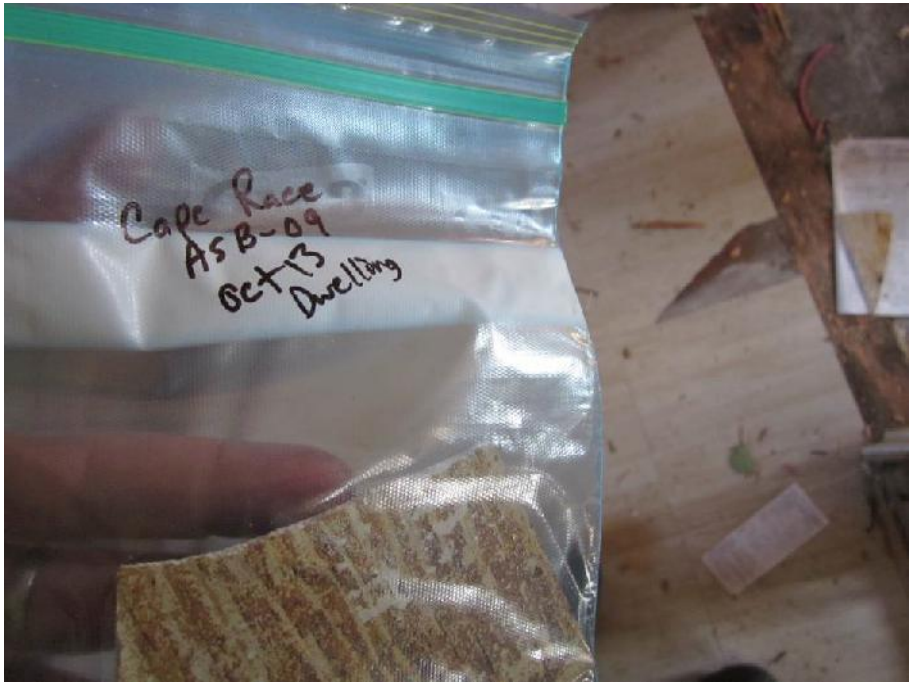


Photo 28: View of location of vinyl floor tile/mastic sample ASB-09 (Room 4).

Photo 29: View of location of panel board sample ASB-10 (Room 4).

Photo 30: View of location of gypsum and drywall joint compound sample ASB-11 (Room 5).

Photo 31: View of location of tar paper sample ASB-12 (also paint sample PS-05) (Room 6).

Photo 32: View of red paint on the floor in Room 5 (not sampled).

Photo 33: View of location of paint sample PS-01 on exterior wall.

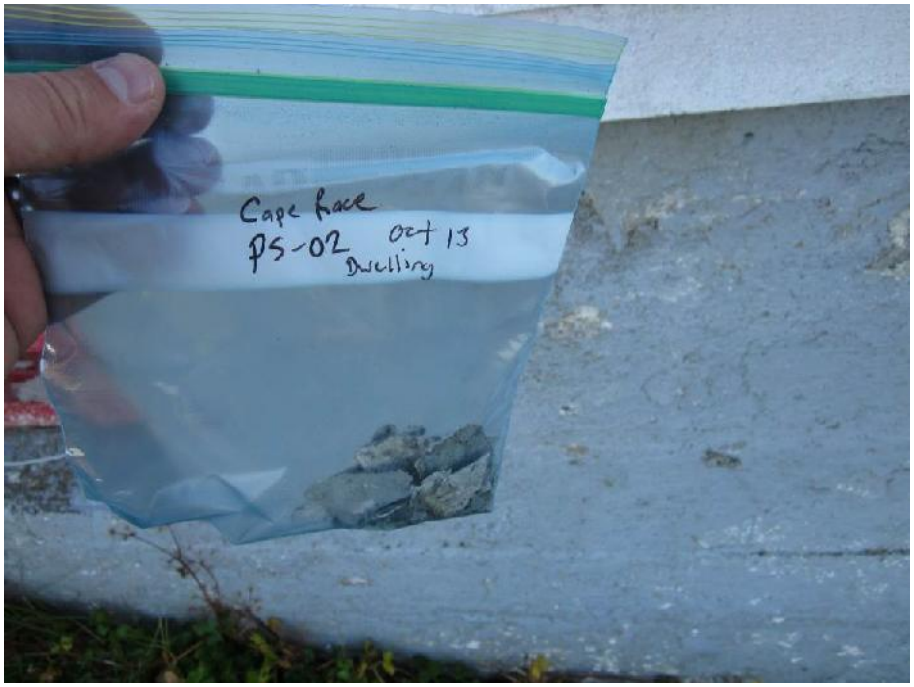


Photo 34: View of location of paint sample PS-02 on exterior foundation wall.

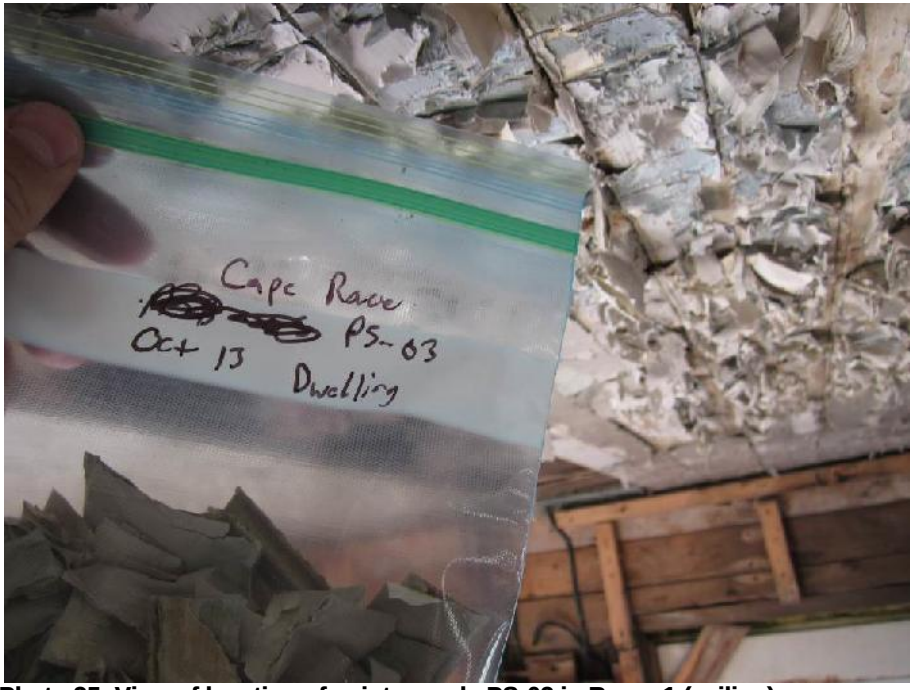


Photo 35: View of location of paint sample PS-03 in Room 1 (ceiling).

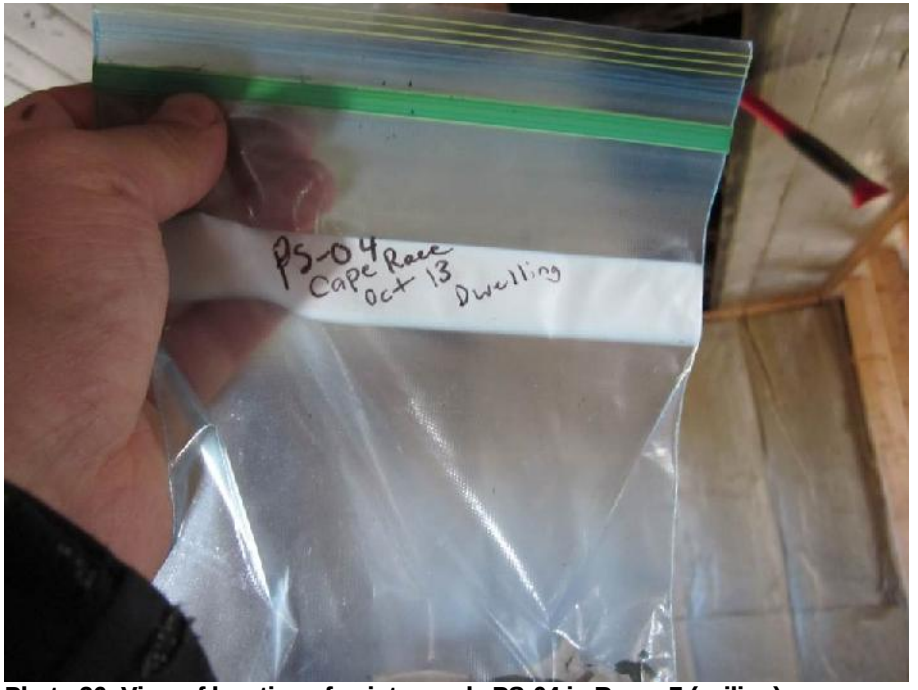


Photo 36: View of location of paint sample PS-04 in Room 7 (ceiling).

Photo 37: View of location of paint sample PS-05 (also tar paper sample AS-12) in Room 6 (floor).

Photo 38: View of location of paint sample PS-06 in Room 11 (wall).

Photo 39: View of location of paint sample PS-07 in Room 11 (chimney).

Photo 40: View of location of paint sample PS-08 in Room 11 (floor).

Photo 41: View of location of paint sample PS-09 (mislabeled PS-08 in the field) (exterior wall).

Photo 42: View of location of paint sample PS-1-A (including wood substrate) (exterior wall).

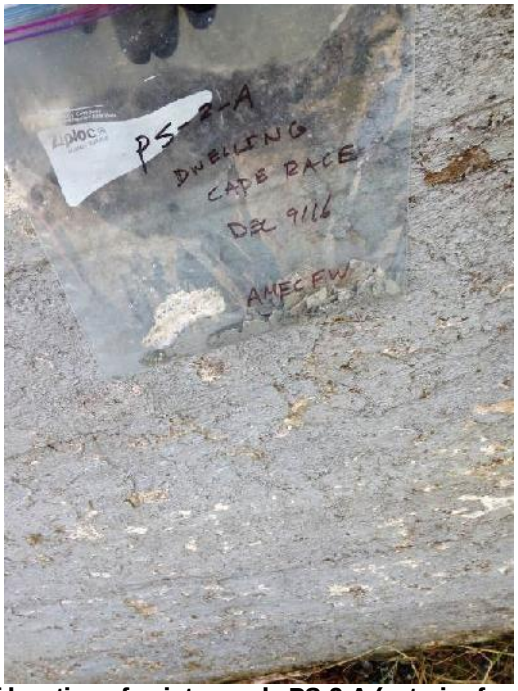


Photo 43: View of location of paint sample PS-2-A (exterior foundation wall).

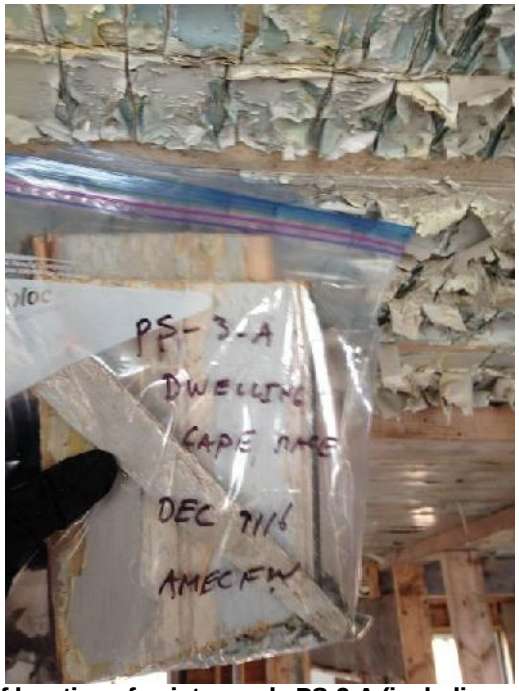


Photo 44: View of location of paint sample PS-3-A (including wood substrate) in Room 1 (ceiling).

Photo 45: View of location of paint sample PS-4-A (including wood substrate) in Room 7 (ceiling).

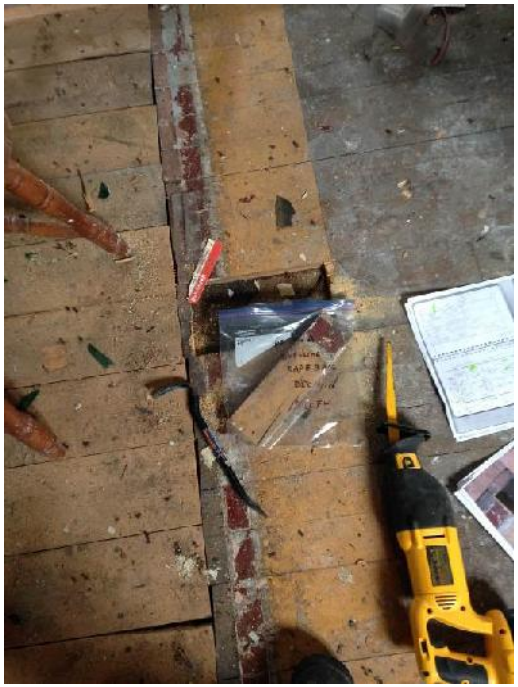


Photo 46: View of location of paint sample PS-5-A (including wood substrate) in Room 6 (floor).

Photo 47: View of location of paint sample PS-6-A in Room 11 (foundation wall).

Photo 48: View of location of paint sample PS-7-A in Room 11 (chimney).

Photo 49: View of paint chips and debris on the floor in Room 3.

Photo 50: View of paint chips and debris on floor in Room 11 near the base of the brick chimney.

Photo 51: View of dark-coloured water staining on the surface of the wood floor in Room 3.

Photo 52: View of beige Honeywell thermostat.

Photo 53: View of white Dimplex thermostat.

Photo 54: View of manufacturer's label on the freezer.

Photo 55: View of dry chemical fire extinguisher.

Photo 56: View of dry chemical fire extinguisher.

Photo 57: View of dry chemical fire extinguisher.

Photo 58: View of copper piping in Room 3. Note smoke detector on table.

Photo 59: View of location of treated timber sample TT-01 (exterior side deck).

Photo 60: View of heating oil aboveground storage tank in the basement (Room 11).

APPENDIX C2

SAMPLE AND ANALYTICAL SUMMARY TABLES

Table C2-1: Bulk Sample Descriptions and Asbestos Analytical Results (Former Dwelling)

Sample ID	Material (Layer) Analyzed	Detailed Material Description	Sample Location / Room No (Photo No.)	Analytical Result
ASB-01	Shingle / Felt / Tar	Red shingle over black shingle over black felt over tar from roof	Former Dwelling / Exterior (20)	ND
ASB-02-A	Caulking	Grey caulking painted white from window frame	Former Dwelling / Exterior (21)	ND
ASB-03	Concrete	Concrete painted grey from foundation	Former Dwelling / Exterior (22)	ND
ASB-04-A	Caulking	White caulking painted grey from door frame	Former Dwelling / Exterior (23)	ND
ASB-05	Wire Casing	Green wire casing from electrical panel	Former Dwelling / Room 1 (24)	ND
ASB-06-Paper Backing	Paper Backing	Brown paper backing on pink fibreglass insulation from exterior wall	Former Dwelling / Room 3 (25)	ND
ASB-06-Insulation	Fibreglass Insulation	Pink fibreglass insulation from exterior wall	Former Dwelling / Room 3 (25)	ND
ASB-07	Brick Mortar	Grey brick mortar from chimney	Former Dwelling / Room 5 (26)	ND
ASB-08	Brick	Red brick from chimney	Former Dwelling / Room 5 (27)	ND
ASB-09-Floor Tile	Vinyl Floor Tile	Vinyl floor tile with white and black streaks	Former Dwelling / Room 4 (28)	ND
ASB-09-Floor Tile	Mastic	Brown mastic from vinyl floor tile with white and black streaks	Former Dwelling / Room 4 (28)	ND
ASB-10	Panel Board	Decorative (floral pattern) panel board	Former Dwelling / Room 4 (29)	ND
ASB-11-Drywall Joint Compound	Drywall Joint Compound	Drywall joint compound from interior wall located behind chimney	Former Dwelling / Room 5 (30)	3% Chrysotile
ASB-11-Gypsum	Gypsum	Gypsum from interior wall located behind chimney	Former Dwelling / Room 5 (30)	ND
ASB-12	Tar Paper	Black tar paper from under floor board	Former Dwelling / Room 6 (31)	ND

Notes:

A: Caulking sample was also analyzed for PCBs

ND: Non-detect

ND = <1% asbestos

Shaded results greater than 1% asbestos by dry weight are considered to be asbestos-containing materials (ACMs) as outlined in the Newfoundland and Labrador Asbestos Abatement Regulations (Reg. 111/98)

Table C2-2: Paint Sample Descriptions and Lead Analytical Results (Former Dwelling)

Sample ID	Colour Description	Substrate	Sample Location / Room No. (Photo No.)	RDL (mg/kg)	Total Lead (mg/kg)
PS-1 (DWELLING)	Red over green over white	Wood (window trim, door trim, builidng gable ends)	Former Dwelling Exterior (33)	5.0	**18,000**
PS-2 (DWELLING)	Grey over white	Concrete foundation	Former Dwelling Exterior (34)	5.0	**14,000**
PS-3 (DWELLING)	Grey over white over blue	Wood (ceiling)	Former Dwelling Room 1 (35)	5.0	**74,000**
PS-4 (DWELLING)	White over dark green	Wood (ceiling)	Former Dwelling Room 7 (36)	5.0	**110,000**
PS-5 (DWELLING)*	Yellow and red over white	Wood (floor)	Former Dwelling Room 6 (37)	5.0	**51,000**
PS-6 (DWELLING)	White	Concrete (foundation wall)	Former Dwelling Room 11 (38)	5.0	**7,200**
PS-6 (DWELLING) Lab-Dup	White	Concrete (foundation wall)	Former Dwelling Room 11 (38)	5.0	**5,800**
PS-7 (DWELLING)	Red	Brick (chimney)	Former Dwelling Room 11 (39)	5.0	**13,000**
PS-8 (DWELLING)	Grey	Concrete (floor)	Former Dwelling Room 11 (40)	5.0	**1,300**
PS-9 (DWELLING)*	White	Wood (wall trim)	Former Dwelling Exterior (41)	5.0	**120**

Notes

* Paint sample included substrate

Lab-Dup: Laboratory Duplicate

Bold and underlined results indicate that lead concentration is above the Federal HPA criterion of 90 mg/kg.

Shaded results indicate that lead concentration is above the former Federal HPA criterion of 5,000 mg/kg.

Table C2-3: Paint Sample Descriptions and Mercury Analytical Results (Former Dwelling)

Sample ID	Colour Description	Substrate	Sample Location (Room No.)	RDL (mg/kg)	Total Mercury (mg/kg)
PS-1 (DWELLING)	Red over green over white	Wood (window trim, door trim, builidng gable ends)	Former Dwelling Exterior (33)	1.0	<1.0
PS-2 (DWELLING)	Grey over white	Concrete foundation	Former Dwelling Exterior (34)	1.0	<1.0
PS-3 (DWELLING)	Grey over white over blue	Wood (ceiling)	Former Dwelling Room 1 (35)	1.0	<1.0
PS-4 (DWELLING)	White over dark green	Wood (ceiling)	Former Dwelling Room 7 (36)	1.0	5.8
PS-5 (DWELLING)*	Yellow and red over white	Wood (floor)	Former Dwelling Room 6 (37)	1.0	1.2
PS-6 (DWELLING)	White	Concrete foundation wall	Former Dwelling Room 11 (38)	1.0	2.0
PS-6 (DWELLING) Lab-Dup	White	Concrete foundation wall	Former Dwelling Room 11 (38)	1.0	1.8
PS-7 (DWELLING)	Red	Brick (chimney)	Former Dwelling Room 11 (39)	1.0	2.1
PS-8 (DWELLING)	Grey	Concrete (floor)	Former Dwelling Room 11 (40)	1.0	1.8
PS-9 (DWELLING)*	White	Wood (wall trim)	Former Dwelling Exterior (41)	1.0	<1.0

Notes

* Paint sample included substrate

<X: non detect

Lab-Dup: Laboratory duplicate

Bold and underlined results indicate that mercury concentration is above the Federal HPA criterion of 10 mg/kg.

Shaded results indicate that mercury concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for mercury in soil at an industrial site (50 mg/kg).

Table C2-4: Sample Descriptions and PCB Analytical Results (Former Dwelling)

		Paint				
Sample ID		PS-1 (Dwelling)	PS-2 (Dwelling)	PS-3 (Dwelling)	PS-4 (Dwelling)	PS-5 (Dwelling)
Sample Location and Room No.		Former Dwelling Exterior	Former Dwelling Exterior	Former Dwelling Room 1	Former Dwelling Room 6	Former Dwelling Room 5
Colour Description		Red over green over white	Grey over white	Grey over white over blue	White over dark green	Yellow and red over white
Substrate		Wood	Concrete	Wood	Wood	Wood
Location (Photo No.)		Window trim, door trim, builidng gable ends (33)	Concrete foundation (34)	Ceiling (35)	Ceiling (36)	Floor (37)
Parameter	**RDL (mg/kg)**	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1221	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1232	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1248	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1242	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1254	5.0	<5.0	<5.0	<10	<10	<0.50
Aroclor 1260	5.0	<5.0	<5.0	<10	<10	<0.50
Total PCB (Calculated)	5.0	<5.0	<5.0	<10	<10	<0.50

Notes:

^Paint sample included substrate

B: Sample was also analyzed for asbestos

RDL: Reportable detection limit

<X: Non-detect

Shaded results indicate that PCB concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for PCBs in soil at an industrial site (33 mg/kg).

Table C2-4: Sample Descriptions and PCB Analytical Results (Former Dwelling) (Continued)

		Paint				Caulking	
Sample ID		PS-6 (DWELLING)	PS-7 (DWELLING)	PS-8 (DWELLING)	PS-9 (DWELLING)*	ASB-02-B	ASB-04-B
Sample Location and Room No.		Former Dwelling Room 11	Former Dwelling Room 11	Former Dwelling Room 11	Former Dwelling Exterior	Former Dwelling Exterior	Former Dwelling Exterior
Colour Description		White	Red	Grey	White	Grey painted white	White painted grey
Substrate		Concrete	Brick	Concrete	Wood	Wood	Wood
Location (Photo No.)		Foundation wall (38)	Chimney (39)	Floor (40)	Wall trim (41)	Window Frame (21)	Door Frame (23)
Parameter	**RDL (mg/kg)**	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1221	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1232	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1248	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1242	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1254	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Aroclor 1260	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50
Total PCB (Calculated)	5.0	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50

Notes:

* Paint sample included substrate

B: Sample was also analyzed for asbestos

RDL: Reportable detection limit

<X: Non-detect

Shaded results indicate that PCB concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for PCBs in soil at an industrial site (33 mg/kg).

Table C2-5: Paint Sample Descriptions and Leachable Lead Analytical Results (Former Dwelling)

		Data				Guidelines
Sample ID		PS-1-A*	PS-2-A	PS-3-A*	PS-4-A*	ENVC Guidance Document Leachable Toxic Waste, Testing and Disposal Revised November 2003 (GD-PPD-26.1)
Sample Location and Room No.		Former Dwelling Exterior	Former Dwelling Exterior	Former Dwelling Room 1	Former Dwelling Room 7	
Colour Description		Red over green over white	Grey over white	Grey on white on blue	White over dark green	
Location (Photo No.)		Window trim, door trim, builidng gable ends (42)	Concrete foundation (43)	Ceiling (44)	Ceiling (45)	
Parameters	**RDL (µg/L)**	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Schedule II (Interprovincial Movement of Hazardous Waste Regulations (pending)) (µg/L)
Leachable Lead (Pb)	5.0	2,900	3,400	34,000	13,000	5,000

Notes:

* Paint sample included substrate

RDL: Reportable detection limit

TCLP: Toxicity Characteristic Leaching Procedure

ENVC: Newfoundland and Labrador Department of Environment and Conservation

Shaded results indicate that TCLP concentration exceeds Schedule II TCLP limits provided in the Leachable Toxic Waste Guidance Document.

Table C2-5: Paint Sample Descriptions and Leachable Lead Analytical Results (Former Dwelling) (Continued)

		Data			Guidelines
Sample ID		PS-5-A*	PS-6-A	PS-7-A	ENVC Guidance Document Leachable Toxic Waste, Testing and Disposal Revised November 2003 (GD-PPD-26.1)
Sample Location and Room No.		Former Dwelling Room 6	Former Dwelling Room 11	Former Dwelling Room 11	
Detailed Material Description		Yellow and red over white	White	Red	
Location (Photo No.)		Floor (46)	Foundation wall (47)	Chimney (48)	
Parameters	**RDL (µg/L)**	(µg/L)	(µg/L)	(µg/L)	Schedule II (Interprovincial Movement of Hazardous Waste Regulations (pending)) (µg/L)
Leachable Lead (Pb)	5.0	3,900	5,400	1,000	5,000

Notes:

* Paint sample included substrate

RDL: Reportable detection limit

TCLP: Toxicity Characteristic Leaching Procedure

ENVC: Newfoundland and Labrador Department of Environment and Conservation

Shaded results indicate that TCLP concentration exceeds Schedule II TCLP limits provided in the Leachable Toxic Waste Guidance Document.

Table C2-6: Bulk Sample Descriptions and Leachable Treated Wood Parameter Analytical Results (Former Dwelling)

		Data		Guidelines		
Sample ID		TT-01	TT-01 Lab-Dup	ENVC Guidance Document Treated Wood Waste Disposal Amended September 2015 (GD-PPD-075.1)		ENVC Guidance Document Leachable Toxic Waste, Testing and Disposal Revised November 2003 (GD-PPD-26.1)
Sample Location and Room No.		Former Dwelling Exterior Deck	Former Dwelling Exterior Deck			
Detailed Material Description		Treated Wood	Treated Wood			
Location (Photo No.)		Side Deck (59)	Side Deck (59)			
Parameters	**RDL (µg/L)**	(µg/L)	(µg/L)	Column 2: TCLP Limits (CEPA) (µg/L)	Column 3: Double TCLP Limits (µg/L)	Schedule II (Interprovincial Movement of Hazardous Waste Regulations (pending)) (µg/L)
Leachable Arsenic (As)	20	170	170	2,500	5,000	2,500
Leachable Chromium (Cr)	20	56	56	5,000	10,000	5,000
Leachable Benzo(a)pyrene	0.10	<0.10	<0.10	1	2	1
Leachable m/p-Cresol	2.5	<2.5	<2.5	-	-	200,000
Leachable o-Cresol	2.5	<2.5	<2.5	-	-	200,000
Leachable Cresol Total	2.5	<2.5	<2.5	200,000	400,000	200,000
Leachable Pentachlorophenol	2.5	<2.5	<2.5	6,000	6,000	6,000

Notes:

Lab-Dup: Laboratory duplicate
RDL: Reportable detection limit
ENVC: Newfoundland and Labrador Department of Environment and Conservation
TCLP: Toxicity Characteristic Leaching Procedure
CEPA: Canadian Environmental Protection Act
TWW: Treated Wood Waste
-: Value Not Established
Shaded results indicate that TCLP concentration exceeds Column 2 TCLP limits provided in the TWW Disposal Guidance Document.
Bold results indicate that TCLP concentration exceeds Schedule II TCLP limits provided in the Leachable Toxic Waste Guidance Document.
Underlined results indicate that TCLP concentration exceeds Column 3 TCLP limits provided in the TWW Disposal Guidance Document.

APPENDIX D2

ROOM-BY-ROOM INSPECTION SHEETS

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FORMER DWELLING	outside	–	outside	7.5 x 18.5m

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	concrete foundation painted grey concrete at front also	fair to poor		PS-2 ASB-3
Walls	windows - ext grey chalking painted white plastic windows - sliding.			ASB-2
Ceiling / Roof	Red shingle over black shingle over blank felt & Tar.	moderate		ASB-1
Paint (collect adequate amount for leachate analysis)	Walls – white Ceiling white clapboard & trim Floor Other Trim - Red (window & door trim) red paint on wood green over white	fair poor poor		PS-8 PS-1
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)				
Piping / Mechanical Equipment				
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #:	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)				
Thermostats (eg. Honeywell, etc.)	Manufacturer Dial Colour Casing Shape Wall/Floor Mounted		Total #: # Checked:	Mercury Switch:
LCMs **(saudering, pipes batteries, exit/ emerg lighting,)**				
Mould / Water Staining	Area impacted			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) wooden step - not pressure treated, painted red poor condition.			
Photos	EXT DOOR white chalking			ASB-4

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

TT-1 → Red wood on steps.

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
Former dwelling	1	Main	Porch	~ 6 x 8 ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	plywood (no paint)	fair – poor		
Walls	studs (2x4s) & board.			
Ceiling	Board - painted white & grey.	poor		
Paint (collect adequate amount for leachate analysis)	Walls No paint Ceiling grey on white on blue Floor no paint multiple layers! Other	poor.		PS-3
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	NO			
Piping / Mechanical Equipment	• one 3ft base board heater white. • panel box, various wires green wire casing to panel box			ASB-5
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: NO	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	Incandescent.			
Thermostats (eg. Honeywell, etc.)	Manufacturer Honeywell Dial Colour beige Casing Shape rect. plastic Wall/Floor Mounted wall electric		Total #: 1 # Checked:	Mercury Switch: NO
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	NO.			
Mould / Water Staining	Area impacted NO.			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) → wooden spool. → vent from basement.			
Photos	panel box, various wires			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	2	main	Kitchen	~ 8' x 12 ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	wood (not painted) (AS porch)	fair - poor		
Walls	wood (not painted) (AS porch	fair - poor		
Ceiling	AS porch	fair - poor		
Paint (collect adequate amount for leachate analysis)	Walls Ceiling Floor Other AS porch			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	NO - small amount of fibre glass near stairway under paper backing.			
Piping / Mechanical Equipment	4ft baseboard heater			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #:	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)				
Thermostats (eg. Honeywell, etc.)	Manufacturer ~~Honeywell~~ ~~Dial~~ Colour beige Casing plastic Shape rect Wall/Floor Mounted electric		Total #: 1 # Checked:	Mercury Switch: NO
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	copper piping from ceiling through floor painted white & green.			
Mould / Water Staining	Area impacted NO			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums)			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	3	Main	DINING	18 ft x 25 ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	Board (not painted	fair		
Walls	Board.	fair		
Ceiling	Same as porch	very poor.		
Paint (collect adequate amount for leachate analysis)	Walls - None Ceiling - same as porch Floor - None Other			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	small amount of pink insulation with brown paper backing Some in ceiling + wall			ASB-6
Piping / Mechanical Equipment	copper piping.			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: No.	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	Incandescent x 2.			
Thermostats (eg. Honeywell, etc.)	Manufacturer Honeywell Dial No Colour beige Casing Shape rect plastic Wall/Floor Mounted wall		Total #: 1 # Checked:	Mercury Switch: No.
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	copper piping in wall			
Mould / Water Staining	Area impacted No.			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) Fridge (possible ODS), stove, microwave, table, lamp. 4 ft baseboard heater.			
Photos	5 floor vents → chimney in attached room - ASB-7 - mortar (grey) ASB-8 - brick (red)			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	4	Main	Bathroom	8 x 8 ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	1x1 vinyl floor tile, with white & brown streaks & brown mastic			ASB-9
Walls	· Studs & panel board not painted. · Floral panel board behind where sink would have been			ASB-10
Ceiling	As porch			
Paint (collect adequate amount for leachate analysis)	Walls - ND Ceiling - As porch Floor - Tile Other -			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	As dining & kitchen			
Piping / Mechanical Equipment	Same as kitchen various wires			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: ND	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	2 incandescent			
Thermostats (eg. Honeywell, etc.)	Manufacturer DC Dimplex Dial Colour white Casing plastic Shape rect Wall/Floor Mounted wall		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	piping to kitchen - copper?			
Mould / Water Staining	Area impacted			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) tub, toilet, 4ft baseboard heater			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	5	Main	control Room	~8x 6ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	Board.			
Walls	Drywall behind chimney & control equipment mostly board.			ASB-11
Ceiling	As porch.			
Paint (collect adequate amount for leachate analysis)	Walls - None Ceiling - As porch Floor - small amount of red on board Other			8x 1ft
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)				
Piping / Mechanical Equipment				
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #:	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	one			
Thermostats (eg. Honeywell, etc.)	Manufacturer Simplex Dial No Colour white Casing plastic Shape rect Wall/Floor Mounted wall		Total #: # Checked:	Mercury Switch:
LCMs **(saudering, pipes batteries, exit/ emerg lighting,)**				
Mould / Water Staining	Area impacted			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) 2 fire exts, vent, lift baseboard heater.			
Photos	Radio control equipment, wires. Fire exts - pyrene, ABC, class 3-A 10-BC, 109331 x 2.			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	6	Main	Bedroom?	11 x 9 ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	Board - painted yellow in small 16x 1 Ft section. Black tar paper under board			PS-5 ~~5~~ ASB-12
Walls				
Ceiling	board- white over dark green paint			PS-4
Paint (collect adequate amount for leachate analysis)	Walls Ceiling Floor - yellow on board (16x 1Ft) PS-5 Other			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	pink, fiberglass under green paper backing. Some in walls & ceiling.			
Piping / Mechanical Equipment	1 4ft base board heater			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: No	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	1 incan.			
Thermostats (eg. Honeywell, etc.)	Manufacturer Honeywell Dial Colour white Casing Shape rect plastic Wall/Floor Mounted wall		Total #: 1 # Checked:	Mercury Switch: NO
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	NO			
Mould / Water Staining	Area impacted possible mould on ceiling - Scattered throughout			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) 1 Floor vent			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Rooms 6 - 10 - same as this description

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	11	Basement	Furnace Room	~30 x 24ft

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	concrete - painted grey			
Walls	concrete - painted white			
Ceiling	wood			
Paint (collect adequate amount for leachate analysis)	Walls - white on concrete Ceiling Floor - grey on concrete Other - Red on brick			PS-6 PS-8 PS-7.
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	No.			
Piping / Mechanical Equipment	Furnace in concrete berm. AST painted grey Lots of metal ducting, no sealant			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #:	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	2 incon.			
Thermostats (eg. Honeywell, etc.)	Manufacturer Colour Shape Wall/Floor Mounted Dial Casing		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	• Copper piping + saulder for HW tank • Copper pipe for water			
Mould / Water Staining	Area impacted			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) - Freezer - ODSs - Hot water tank			
Photos	- fire ext x 1 - The williams corp, 6-A, 80-BC, 24725 c. A-B-C			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FD	12	base	Mic.	~ 30 x 24

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	As furnace room			
Walls	As furnace but on concrete Some paint - yellow - PS-4			
Ceiling	As furnace			
Paint (collect adequate amount for leachate analysis)	Walls As furnace ↓ Ceiling Floor Other			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	NO			
Piping / Mechanical Equipment	No			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: NO	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	2 incand.			
Thermostats (eg. Honeywell, etc.)	Manufacturer Dial Colour Casing Shape NO Wall/Floor Mounted		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	NO			
Mould / Water Staining	Area impacted No.			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) Ducting			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

SECTION 3.0 EXECUTIVE SUMMARY

Hazardous materials identified at the Former Fog Horn Building during the HMBA are summarized in Table E-3.

Table E-3: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Drywall Joint Compound and Asphalt Shingles	NL Asbestos Abatement Regulations (Reg. 111/98)	Rooms 1 and 2 Building exterior	135 m^2 (drywall including joint compound) Note: Asbestos-containing drywall joint compound debris may be present throughout building. 120 m^2 (asphalt shingles)	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based and Lead Leachable Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1);	Building exterior	130 m^2 (paint on exterior clapboard and wood trim)	These painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed and treated as hazardous waste prior to renovation/demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Rooms 1 and 2	Sporadic areas of SVG on drywall surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 1	Fire Extinguisher (1)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Rooms 1 and 2	Piping/solder Battery	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.
Petroleum Hydrocarbon Storage Tanks	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 2	Petroleum hydrocarbons (if present in ASTs/fuel lines/equipment)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2010	Building interior/ exterior	Asphalt shingles, drywall and drywall joint compound and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing drywall joint compound and asphalt shingles.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 1 and 2	Various types of waste, including but not limited to cardboard, pieces of wood, metal parts, chains and paint cans, cables, hoses, plastic containers, windows and fuel oil.	Some of these materials or products (i.e., fuel oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., drywall debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

TABLE OF CONTENTS

APPENDICES

3.0 FORMER FOG HORN BUILDING

The Former Fog Horn Building is located approximately 20 km from Route 10 via the gravel access road to Cape Race (refer to Figure 1.2, Appendix A1 and Photos 1, 2 and 4, Appendix B1). Based on information available on the Directory of Federal Real Property website, the Former Fog Horn Building (Building No. 106791) at the Cape Race Lightstation was constructed in 1965.

3.1 BUILDING DESCRIPTION

A description of the Former Fog Horn Building is outlined in Table 3-1. Photographs of the Former Fog Horn Building are provided in Appendix B3.

Table 3-1: Site Building Description

Building Name	Former Fog Horn Building	Photo (Appendix B3)
Number of Stories	One	Photos 1, 2, 3 and 4
Attic	Yes	Photo 6
Basement	No	-
Type of Structure	Wood Frame	Photos 6 and 8
Type of Foundation	Concrete	Photos 3 and 5
Exterior	Painted Clapboard	Photos 1, 2, 3 and 4
Window/Door Frames	Painted Wood Frames/Trim	Photos 1, 2 and 4
	Metal Frame	Photo 3
Exterior Doors	Painted Wood Door	Photo 1
Roofing Materials	Asphalt Shingles	Photos 2 and 4
Interior Walls Finishes	Painted Drywall	Photos 5, 7 and 11
Ceiling Finishes	Painted Drywall	Photos 6 and 13
Floor Finishes	Painted Concrete	Photos 5 and 7
Interior Doors	Painted Wood Door	Photo 9
Interior Lighting	Fluorescent	Photos 6 and 13
Exterior Lighting	None	Photos 1, 2, 3 and 4
Heating	Electrical Baseboard Heaters	Photos 5 and 10

3.2 FINDINGS

The findings documented in this section are based on observations made by Amec Foster Wheeler personnel at the time of the site visit and laboratory analyses of samples collected from the Former Fog Horn Building.

3.2.1 Asbestos-Containing Materials (ACMs)

There are over 3,000 ACMs that are commercially available, which can be divided into two broad categories: friable and non-friable. ACMs were discontinued from use in Canada in the late 1970s/early 1980s, although non-friable asbestos is still found in many more recent buildings.

During the HBMA, a total of nine (9) building material samples (FH-ASB-01 to FH-ASB-09) were collected from the Former Fog Horn Building and analyzed for asbestos content (refer to Photos 14 to 22, Appendix B3). It is important to note that samples FH-ASB-02, FH-ASB-04 and FH-ASB-05 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., FH-ASB-02-A, FH-ASB-04-A and FH-ASB-05-A) and one subsample to be

analyzed for PCB content (i.e., FH-ASB-02-B, FH-ASB-04-B and FH-ASB-05-B). It should also be noted that select samples were separated into sub-samples representing distinct material layers and re-labeled by the laboratory prior to analysis (i.e., FH-ASB-01-Red Shingle, FH-ASB-01-Black Shingle, FH-ASB-02-A-Caulking, FH-ASB-02-A-Felt, FH-ASB-07-Paper Backing and FH-ASB-07-Insulation). Sample descriptions and analytical results are summarized in Table C3-1, Appendix C3. Sample locations and analytical results are graphically illustrated in Figure 3.1, Appendix A3. Copies of room-by-room inspection sheets for the Former Fog Horn Building are provided in Appendix D3.

3.2.1.1 Friable Materials

Friable ACMs are defined as materials that can be crumbled, pulverized and reduced to powder when dry using hand pressure. Typical friable materials include acoustical or decorative spray applications, fireproofing and thermal insulation.

3.2.1.1.1 Spray-Applied Fireproofing, Insulation and Texture Finishes

There were no spray-applied fireproofing, insulation or texture finishes observed within the Former Fog Horn Building during the site visit; therefore, no samples of these materials were collected for analysis.

3.2.1.1.2 Thermal System Insulation

During the HBMA, one (1) sample (FH-ASB-07) of thermal insulation, consisting of fibreglass insulation and paper backing, was collected from an interior wall in Room 1 (refer to Photo 20, Appendix B3). Asbestos was not detected in the fiberglass insulation/paper backing sample.

3.2.1.2 Non-Friable and Potentially Friable Materials

Non-friable ACMs are hard or manufactured products such as floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding, wherein the asbestos fibres are bound to the substrate. Note that although a product may be considered non-friable when new, the product may release fine dust when disturbed (e.g., deterioration, removal, renovations) and the free dust is considered friable.

3.2.1.2.1 Ceiling Tile

There were no ceiling tiles observed in the Former Fog Horn Building during the site visit; therefore, no samples of ceiling tile were collected for analysis.

3.2.1.2.2 Drywall Joint Compound

During the HBMA, one (1) sample of drywall joint compound (FH-ASB-06) was collected from an interior wall in Room 1 and one (1) sample of gyprock (FH-ASB-08) was collected from an exterior wall in Room 2 and analyzed for asbestos content (refer to Photos 19 and 21, Appendix B3). Chrysotile asbestos (2%) was detected in the drywall joint compound sample at a level above the applicable NL Asbestos Abatement Regulations (111/98) (i.e., >1%). Asbestos was not detected in the gyprock sample.

The drywall (or gyprock) visible on the interior of the Former Fog Horn Building (covering an area of approximately 135 m^2) appeared to vary from fair to poor condition (refer to Photos 5 and 9, Appendix B3). Some of the drywall seems to have been previously removed from the ceiling and exterior walls in Room 1 (refer to Photos 6, 7 and 8, Appendix B3).

Paint chips and debris (including white dust) was observed on the concrete floor and other surfaces in Room 1 of the Former Fog Horn Building (refer to Photos 5 and 6, Appendix B3). It is possible that some of the debris consists of gyproc/joint compound particulate that was deposited on these surfaces from the previous removal of drywall from the wood framing in Room 1. Some minor areas of damaged drywall and suspected fallen debris were also observed on the concrete floor in Room 2 (refer to Photo 9, Appendix B3).

3.2.1.2.3 Vinyl Flooring Products and Mastics

There were no vinyl flooring products or associated mastics observed in the Former Fog Horn Building during the site visit; therefore, no samples of these materials were collected for analysis.

3.2.1.2.4 Baseboard, Carpet and Stair Tread Adhesives/Mastics

There were no baseboard, carpet or stair tread adhesives/mastics observed in the Former Fog Horn Building during the site visit; therefore, no samples of these types of adhesives/mastics were collected for analysis.

3.2.1.2.5 Roofing Products

During the HBMA, one (1) sample of asphalt shingles (two layers; red shingles over black shingles) was collected from the roof of the Former Fog Horn Building and analyzed for asbestos content (refer to Photo 14, Appendix B3). Chrysotile asbestos (3%) was detected in the red asphalt shingle in the sample at a level above the applicable NL Asbestos Abatement Regulations (111/98) (i.e., >1%). Asbestos was not detected in the black asphalt shingle in the sample.

The asphalt shingles visible on the roof of the Former Fog Horn Building (covering an area of approximately 120 m^2), as observed from the ground surface, appeared to be generally in poor condition (i.e., weathered, detached and missing in some areas) (refer to Photo 4, Appendix B3).

3.2.1.2.6 Caulking

During the HBMA, three (3) samples of caulking were collected from a window frame (FH-ASB-02) and from a window (FH-ASB-04 and FH-ASB-05) on the exterior of the Former Fog Horn Building (refer to Photos 15, 17 and 18, Appendix B3). It is important to note that caulking samples FH-ASB-02, FH-ASB-04 and FH-ASB-05 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., FH-ASB-02-A, FH-ASB-04-A and FH-ASB-05-A) and one subsample to be analyzed for PCB content (i.e., FH-ASB-02-B, FH-ASB-04-B and FH-ASB-05-B). Asbestos was not detected in the caulking subsamples.

3.2.1.2.7 Mortar, Grout and Other Cementitious Materials

During the HBMA, one (1) sample of concrete (FH-ASB-09) was collected from the exterior foundation of the Former Fog Horn Building and analyzed for asbestos content (refer to Photo 22, Appendix B3). Asbestos was not detected in the concrete sample.

3.2.1.2.8 Other Potential ACMs

During the HBMA, one (1) sample of felt (FH-ASB-02-A) and one (1) sample of tar paper (FH-ASB-03) were collected from underneath the exterior clapboard and analyzed for asbestos content (refer to Photos 15 and 16, Appendix B3). Asbestos was not detected in the felt or tar paper samples.

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, electrical and mechanical components and insulators such as wiring, cables/conduits and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants (refer to Photos 7, 11 and 12, Appendix B3).

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include interior components of the generator and compressors, possible fireproofing materials in the surrounding wall cavities, packing associated with cast iron pipe joints, other fire rated structures or building materials, and underground infrastructure and piping (refer to Photos 7 and 10, Appendix B3).

3.2.2 Paint Additives

Lead compounds have been used in paint as pigment and durability additives since the early 1800s. Mercury compounds have been used in paint as anti-microbial additives up until the 1990s. PCBs have been used in paint as plasticizers and corrosion resistance additives from the 1950s to the 1970s.

The condition of the paint visible on the exterior clapboard and concrete foundation/floor of the Former Fog Horn Building was generally peeling and flaking and observed to be in poor condition (refer to Photos 1 to 4, Appendix B3). The condition of the paint visible on the interior walls and

ceilings of the Former Fog Horn Building was somewhat intact, with some areas of peeling and flaking paint, and observed to be in fair condition (refer to Photos 5, 6, 9 and 12, Appendix B3).

During Amec Foster Wheeler's site visit on October 13, 2016, a total of four (4) samples (FH-PS-1 to FH-PS-4) were collected from painted surfaces of the Former Fog Horn Building and analyzed for lead, mercury and PCB content (refer to Photos 23 to 26, Appendix B3). Sample descriptions and analytical results are summarized in Tables C3-2 to C3-4, Appendix C3. Sample locations and analytical results are graphically illustrated in Figure 3.1, Appendix A3.

The concentrations of lead detected in three (3) of the four (4) paint samples (FH-PS-1 to FH-PS-3) analyzed exceeded the former Federal HPA criterion of 5,000 mg/kg for lead. In order to determine whether or not these paints would be considered hazardous waste upon removal from the site, it was recommended that these paints be tested for lead leachate using the TCLP. On December 9, 2016, Amec Foster Wheeler returned to the site and collected three (3) additional paint samples (PS-1-A to PS-3-A) from the painted surfaces of the Former Fog Horn Building where elevated levels of lead (i.e., >5,000 mg/kg) were identified (refer to Photos 27 to 29, Appendix B3). Where possible, a small section of the painted substrate (e.g., wood, aspenite, etc.) was included with the paint sample. The laboratory results for lead leachate in paint are presented in Table C3-5, Appendix C3.

3.2.2.1 Lead in Paint

The concentrations of lead in the paint samples ranged from 1,400 mg/kg to 42,000 mg/kg (refer to Table C3-2, Appendix C3). One (1) paint sample (FH-PS-4), plus the laboratory duplicate of sample FH-PS-4 (FH-PS-4 Lab-Dup), contained lead at concentrations above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg (refer to Photo 26, Appendix B3). Three (3) paint samples (FH-PS-1 to FH-PS-3) contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg (refer to Photos 23 to 25, Appendix B3).

3.2.2.2 Mercury in Paint

The concentrations of mercury in the paint samples ranged from non-detect (<1.0 mg/kg) to 20 mg/kg (refer to Table C3-3, Appendix C3). Two (2) paint samples (FH-PS-3 and FH-PS-4), plus the laboratory duplicate of sample FH-PS-4 (FH-PS-4 Lab-Dup), contained mercury at concentrations above the Federal HPA criterion of 10 mg/kg but below the CCME CSQG of 50 mg/kg for mercury in soil at an industrial site. The other two (2) paint samples (FH-PS-1 and FH-PS-2) were either non-detect for mercury (i.e., <1.0 mg/kg), or where detected, had mercury concentrations below the applicable Federal HPA criterion (i.e., 10 mg/kg).

3.2.2.3 PCBs in Paint

The concentrations of PCBs in the paint samples ranged from non-detect (<5.0 mg/kg and <10 mg/kg) to 3.4 mg/kg (refer to Table C3-4, Appendix C3). The paint samples (FH-PS-1 to FH-PS-4) were either non-detect for PCBs (i.e., (<5.0 mg/kg and <10 mg/kg), or where detected, had a Total PCB concentration below the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site

and the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C3-4, Appendix C3).

3.2.2.4 Leachable Lead in Paint

The concentration of leachable lead in paint sample PS-3-A (2,000 µg/L) was below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C3-5, Appendix C3). This paint sample was collected from the concrete floor in Room 1 (grey over blue over white over grey paint). Since the concentration of leachable lead in this paint sample is at a level that is not considered to be hazardous, any building materials containing this paint can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

The concentrations of leachable lead in paint samples PS-1-A (10,000 µg/L) and PS-2-A (7,100 µg/L) were above the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Photos 27 and 28, Appendix B3 and Table C3-5, Appendix C3). Since the concentrations of leachable lead in these paints (including substrates) are at levels considered to be hazardous, these painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. Alternatively, if the paints can be removed from the substrates, only the paints may have to be disposed of at a hazardous waste treatment facility, and not the substrates.

Paint sample PS-1-A was collected from the exterior clapboard (red paint) and paint sample PS-2-A was collected from the exterior wood trim (white paint). The paint on the exterior clapboard and wood trim (covering an area of approximately 130 m^2) was in poor condition (i.e., peeling and flaking) at the time of the site visits (refer to Photos 1 to 4, Appendix B3).

3.2.3 Urea Formaldehyde Foam Insulation (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Fog Horn Building. The nature of the insulation in the walls and ceilings throughout the Former Fog Horn Building could not be confirmed at the time of the site inspection; however, some fibreglass insulation with paper backing was observed in the interior partition wall between Room 1 and Room 2 (refer to Photo 20, Appendix B3). The Former Fog Horn Building was constructed in 1965, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

3.2.4 Suspected Visible Mould Growth (SVG)

Amec Foster Wheeler inspected the interior areas of the Former Fog Horn Building for visual or olfactory evidence of suspected mould. Sporadic areas of SVG were noted throughout the interior of the building on drywall surfaces at the time of the site visit. One (1) sample of painted drywall paper (FH-MS-01) was collected from the interior partition wall between Room 1 and Room 2 and analyzed for mould growth (refer to Figure 3.1, Appendix A3 and Photo 30, Appendix B3). The laboratory results confirmed that abundant mould growth was present in the sample (refer to Table C3-6, Appendix C3). The type of mould identified in the sample was *Cladosporium*.

3.2.5 Mercury-Containing Thermostats

No thermostats were identified inside the Former Fog Horn Building during the site visit.

3.2.6 PCB-Containing Light Ballasts

There were fluorescent light fixtures observed inside the Former Fog Horn Building during the site visit (refer to Photos 6, 12 and 13, Appendix B3). The light ballasts in the light fixtures were not inspected for the presence or absence of PCB-containing dielectric fluid during the HBMA, as these fixtures were energized at the time of the site visit.

3.2.7 Potential Sources of ODSs and Halocarbons

One (1) fire extinguisher (dry chemical) was observed inside the Former Fog Horn Building; however, the label on this extinguisher did not indicate the presence of halon or other ODS ingredients (refer to Photo 12, Appendix B3). Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

3.2.8 Other Potentially Hazardous Building Materials or Substances

Other potentially hazardous building materials or substances identified during this assessment are presented in the following sections.

3.2.8.1 Lead

Lead is typically associated with plumbing solder and older pipe materials (e.g., cast iron pipe joints), as well as products such as radiation protective shielding and lead-acid batteries.

Since the Former Fog Horn Building was constructed in 1965, lead solder is likely to be present in plumbing and piping (i.e., cast iron and copper piping) in the building, as lead solder for use in potable water distribution pipes was not banned until the late 1980s (refer to Photo 11, Appendix B3).

One (1) potential lead-acid battery was observed near the generator in Room 2 (refer to Photo 10, Appendix B3). No other potential lead-acid batteries (i.e., emergency lighting fixtures and exit signs) were noted inside the Former Fog Horn Building at the time of the site inspection.

3.2.8.2 Mercury

There were fluorescent light fixtures and a box of fluorescent light tubes observed inside the Former Fog Horn Building during the site visit (refer to Photos 6, 12, 13 and 31, Appendix B3). The light tubes in fluorescent light fixtures often contain limited quantities of mercury in a powder or vapour form.

3.2.8.3 PCBs

According to the USEPA, PCB may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979.

As previously stated, three (3) samples of caulking were collected from a window frame (FH-ASB-02) and from a window (FH-ASB-04 and FH-ASB-05) on the exterior of the Former Fog Horn Building (refer to Photos 15, 17 and 18, Appendix B3). It is important to note that caulking samples FH-ASB-02, FH-ASB-04 and FH-ASB-05 were split into two (2) subsamples (A and B) to allow one subsample to be analyzed for asbestos content (i.e., FH-ASB-02-A, FH-ASB-04-A and FH-ASB-05-A) and one subsample to be analyzed for PCB content (i.e., FH-ASB-02-B, FH-ASB-04-B and FH-ASB-05-B). Sample descriptions and analytical results are summarized in Table C3-4, Appendix C3. Sample locations and analytical results are graphically illustrated in Figure 3.1, Appendix A3.

PCBs were non-detect (i.e., <0.50 mg/kg and <0.66 mg/kg) in the three (3) caulking samples analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C3-4, Appendix C3).

3.2.8.4 Treated Wood Chemicals

There were no treated timber materials observed on the exterior or interior of the Former Fog Horn Building during the site visit; therefore, no samples of these types of materials were collected for analysis.

3.2.8.5 Petroleum Hydrocarbon Storage Tanks

Two (2) ASTs were identified during this assessment (refer to Photos 32, 33 and 34, Appendix B3). The results of the visual inspection are summarized in Table 3-2.

Table 3-2: Storage Tank Descriptions

Name	Location	Storage Capacity	Type	Date Installed	Date on ULC Placard	Comments
Fuel Oil Storage Tank (Grey)	Room 2	909 L (Approx.)	Steel, horizontal, single walled, secondary containment.	Unknown.	Not visible.	Corrosion visible on tank.
Fuel Oil Storage Tank (Grey)	Room 2	228 L (Approx.)	Steel, horizontal, single walled, on metal frame.	Unknown.	Not visible.	Fuel lines near tank appear to be leaking (i.e., paint tray used as drip pan).

3.2.8.6 Silica

According to the CPWR (The Center for Construction Research and Training), many common construction materials contain silica including, asphalt, brick, cement, concrete, drywall, grout, mortar, stone, sand and tile. The dust created by cutting, grinding, drilling or otherwise disturbing these materials can contain crystalline silica particles.

Based on the HBMA site visit, silica is expected to be present in asphalt shingles, drywall and drywall joint compound and concrete used in the construction of the Former Fog Horn Building.

3.2.8.7 Radioactive Materials

No smoke detectors were observed inside the Former Fog Horn Building at the time of the site visit. Smoke alarms that use very small amounts of radioactive material (i.e., Americum 241) incorporated in an ionization chamber are called "ion chamber smoke alarms". Smoke detectors of this type, if identified, should be removed intact, stored in a properly labeled container and transported, as per TDG regulations, to a licensed disposal facility.

3.2.8.8 Solid Waste and Potential Hazardous Products

Various types of waste, including but not limited to cardboard, pieces of wood, metal parts, chains and paint cans, cables, hoses, plastic containers and windows were observed inside the Former Fog Horn Building (refer to Photos 5 and 7, Appendix B3). A limited quantity of suspected fuel oil was also observed inside a plastic paint tray in Room 12 (refer to Photo 34, Appendix B3).

3.3 CONCLUSIONS AND RECOMMENDATIONS

Based on observations made and information gathered during the HBMA, the following conclusions and recommendations are made with respect to the potential and actual presence of hazardous building materials at the Former Fog Horn Building:

3.3.1 ASBESTOS-CONTAINING MATERIALS (ACMS)

Building materials containing greater than 1% asbestos by dry weight, which are considered to be ACMs, are present in the form of drywall joint compound and asphalt shingles (non-friable). The drywall (or gyprock) visible on the interior of the Former Fog Horn Building (covering an area of approximately 135 m^2) appeared to vary from fair to poor condition. Some of the drywall seems to have been previously removed from the interior of the building. The asphalt shingles visible on the roof of the Former Fog Horn Building (covering an area of approximately 120 m^2), as observed from the ground surface, appeared to be generally in poor condition (i.e., weathered, detached and missing in some areas). Paint chips and debris (including white dust) was observed on the concrete floor and other surfaces in Room 1 of the Former Fog Horn Building. It is possible that some of the debris consists of gyproc/joint compound particulate that was deposited on these surfaces from the previous removal of drywall from the wood framing in Room 1. Some minor areas of damaged drywall and suspected fallen debris were also observed on the concrete floor in Room 2.

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, electrical and mechanical components and insulators such as wiring, cables/conduits and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants.

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include interior components of the generator and compressors, possible fireproofing materials in the surrounding wall cavities, packing associated with cast iron pipe joints, other fire rated structures or building materials, and underground infrastructure and piping.

If other potential ACMs that were not sampled as part of this assessment are encountered in the future, these materials should be treated as ACMs or samples should be collected and tested to verify asbestos content. This should be done as soon as these materials are encountered and before these materials are disturbed. This includes materials that are currently concealed by walls and ceiling systems.

In accordance with the NL Asbestos Abatement Regulations (Reg. 111/98), which provide the legislative requirements for safe handling of ACMs in workplaces in the Province of NL, the following is recommended:

- Safe work procedures shall be established.
- All buildings constructed during the period when asbestos was readily used in construction must have a written assessment and management plan (where applicable) for potential ACMs.

- Prior to general disturbance activity (e.g., demolition, renovation or removal), all ACMs must be safely removed from the building and disposed of in accordance with appropriate environmental guidelines by an asbestos abatement contractor registered with the Department of Labour, Occupational Health and Safety Branch.

ACMs in good condition should be inspected on an annual basis. ACMs in poor condition should be removed from the building and transported off-site for proper disposal in accordance with the NL Asbestos Abatement Regulations (Reg. 111/98). ACMs can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.

The Former Fog Horn Building may be transferred to the local development association (or another third party) and renovated for future use; therefore, the surface debris/dust should be sampled and analyzed for asbestos content to determine if additional asbestos abatement is required prior to renovation activities (i.e., removal of the surface debris/dust by a registered asbestos abatement contractor). If asbestos is not identified in these materials, consideration should be given to performing a thorough cleaning of the interior of the structure by a certified contractor prior to renovations being performed on the building.

3.3.2 LEAD, MERCURY AND PCBS IN PAINT

Results of the paint sampling and analytical program revealed the following lead, mercury and PCB containing paint finishes on the interior of the Former Fog Horn Building:

Lead

- One (1) paint sample (FH-PS-4), plus the laboratory duplicate of sample FH-PS-4 (FH-PS-4 Lab-Dup), contained lead at concentrations above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg. Since these paint samples contained less than 5,000 mg/kg lead, this paint is not likely to be leachable for lead and may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval.
- Three (3) paint samples (FH-PS-1 to FH-PS-3) contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg; therefore, additional samples were collected from these paints (PS-1-A to PS-3-A) and tested for lead leachate using the TCLP to determine whether or not the paint would be considered hazardous waste upon removal from the site.
- The concentration of leachable lead in paint sample PS-3-A was below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). This paint sample was collected from the concrete floor in Room 1 (grey over blue over white over grey paint). Since the concentration of leachable lead in this paint sample is at a level that is not considered to be hazardous, any building materials containing this paint can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

- The concentrations of leachable lead in paint samples PS-1-A and PS-2-A were above the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since the concentrations of leachable lead in these paints (including substrates) are at levels considered to be hazardous, these painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. Alternatively, if the paints can be removed from the substrates, only the paints may have to be disposed of at a hazardous waste treatment facility, and not the substrates.
- Paint sample PS-1-A was collected from the exterior clapboard (red paint) and paint sample PS-2-A was collected from the exterior wood trim (white paint). The paint on the exterior clapboard and wood trim (covering an area of approximately 130 m^2) was in poor condition (i.e., peeling and flaking) at the time of the site visits.

Mercury

- Two (2) paint samples (FH-PS-3 and FH-PS-4), plus the laboratory duplicate of sample FH-PS-4 (FH-PS-4 Lab-Dup), contained mercury at concentrations above the Federal HPA criterion of 10 mg/kg but below the CCME CSQG of 50 mg/kg for mercury in soil at an industrial site. The other two (2) paint samples (FH-PS-1 and FH-PS-2) were either non-detect for mercury (i.e., <1.0 mg/kg), or where detected, had mercury concentrations below the applicable Federal HPA criterion (i.e., 10 mg/kg). Since all four (4) paint samples contained less than 50 mg/kg mercury, these paints are not likely to be leachable for mercury. However, the concentrations of leachable lead in two (2) paint samples (PS-1-A and PS-2-A) collected from the same areas as FH-PS-1 and FH-PS-2 are at levels considered to be hazardous; therefore, these paints, if removed from the site, must be disposed of at a hazardous waste treatment facility.

PCB

- The paint samples (FH-PS-1 to FH-PS-4) were either non-detect for PCBs (i.e., (<5.0 mg/kg and <10 mg/kg), or where detected, had a Total PCB concentration below the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site and the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since all four (4) paint samples contained less than 50 mg/kg of PCBs, these paints are not classified by the TDG Regulations as PCB solids. However, the concentrations of leachable lead in two (2) paint samples (PS-1-A and PS-2-A) collected from the same areas as FH-PS-1 and FH-PS-2 are at levels considered to be hazardous; therefore, these paints, if removed from the site, must be disposed of at a hazardous waste treatment facility.

There are potential adverse human health impacts associated with disturbing (e.g., scraping) lead containing paint finishes. As a precautionary measure, Amec Foster Wheeler recommends handling these paint finishes, as follows:

- In areas of minor peeling or flaking, the paint should be removed using wet scraping techniques.
- In areas of extensive peeling and flaking, the paint should be removed and more extensive particulate control measures may be required.
- In areas where lead containing paint finishes are present and in poor condition, an experienced contractor should be utilized for decommissioning/demolition activities. Prior to demolition or renovation activities, all areas of extensive peeling and flaking of lead containing paint finishes and paint debris/dust should be removed and/or remediated to ensure that building occupants/workers are protected from associated dust/particulate.
- Steps should be taken to ensure that workers and anyone present in and around areas being dismantled or demolished are protected. The contractor should also ensure that dust generation and migration is minimized.

Precautions should be taken to prevent/reduce exposure to paint dust during any disturbance of lead containing paint finishes, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

If potential lead, mercury or PCB containing paint finishes that were not sampled during this assessment are encountered in future, samples should be obtained and tested to verify concentrations of lead, mercury and PCB. This should be done as soon as the paint is encountered and before it is disturbed. This includes materials that are currently concealed by walls and ceiling systems.

3.3.3 UREA FORMALDEHYDE FOAM INSULATION (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Fog Horn Building. The nature of the insulation in the walls and ceilings throughout the Former Fog Horn Building could not be confirmed at the time of the site inspection; however, some fibreglass insulation with paper backing was observed inside an interior partition wall. The Former Fog Horn Building was constructed in 1965, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

It can be inferred that any UFFI present within the building is unlikely to affect the indoor air quality due to the amount of time that has passed since the insulation was likely installed (i.e., 1965) along with the likelihood that formaldehyde has off-gassed over this period of time. It should be noted that, the presence and concentration of formaldehyde cannot be determined or quantified without conducting site-specific testing for formaldehyde.

Based on discussions with the NL Department of Environment and Climate Change, for the purposes of disposal of UFFI, this material is permitted to be bagged and transported to an approved Waste Disposal Site (WDS) and disposed in the special waste area (unlined area) of the site.

3.3.4 MOULD

Sporadic areas of SVG was noted on the interior drywall surfaces at the time of the site visit. One (1) sample of painted drywall paper (FH-MS-01) was collected from an interior partition wall and analyzed for mould growth. Results of the mould sampling program revealed that abundant mould growth was present in the sample. Existing conditions in the Former Fog Horn Building (e.g., inadequate heating, changes in temperature) may potentially contribute to or enhance mould growth inside the building.

Workers on-site should don proper personal protective equipment (PPE) to prevent/reduce exposure to mould while working within the Former Fog Horn Building or during any disturbance /demolition of building materials that may be impacted by mould growth.

3.3.5 OZONE DEPLETING SUBSTANCES

One (1) fire extinguisher (dry chemical) was observed inside the Former Fog Horn Building; however, the label on this extinguisher did not indicate the presence of halon or other ODS ingredients. Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

All ODS, if present, should be removed by an approved contractor prior to disposing of any cooling and/or refrigeration equipment from the building. The use, storage, operation, maintenance, decommissioning, and disposal of ODS containing equipment, in general, is regulated at both a Provincial and Federal level and must comply with the most recent NL Halocarbon Regulations and the Federal Halocarbon Regulations. The status of the potential ODS containing equipment should be confirmed through a mechanical contractor or consultant.

3.3.6 LEAD-CONTAINING MATERIALS/EQUIPMENT

Lead solder is likely to be present in plumbing and piping in the building. One (1) potential lead-acid battery was also observed near the generator at the time of the site inspection.

The disturbance, control or disposal of lead-containing material/equipment should be carried out in accordance with applicable criteria/regulations (refer to Section 1.5). The presence/absence of lead in these materials should be confirmed through a contractor or consultant prior to disturbance or disposal of these materials. Typically these materials are sent to a metal recycling facility and not a landfill.

Removal of lead-containing batteries should be completed in a manner that ensures structural integrity and no loss of fluid from the batteries. Should disposal be required, disposal of lead-containing batteries should be completed in accordance with hazardous waste procedures/ guidelines (i.e. at an approved facility).

3.3.7 MERCURY-CONTAINING MATERIALS/EQUIPMENT

Mercury may be present in fluorescent light tubes used in light fixtures and stored inside the Former Fog Horn Building.

Mercury-containing fluorescent light tubes should be removed intact and returned to the manufacturer for recycling, or disposed of at an approved hazardous waste disposal facility. The disturbance, control or disposal of mercury-containing materials/equipment should be carried out in accordance with applicable criteria/regulations (refer to Section 1.5). The presence/ absence of mercury in these materials should be confirmed through a contractor or consultant prior to disturbance or disposal of these materials. Typically these materials are sent to a recycling or hazardous waste disposal facility and not a landfill.

3.3.8 PCB-CONTAINING MATERIALS/EQUIPMENT

There were fluorescent light fixtures observed inside the Former Fog Horn Building during the site visit. The light ballasts in the light fixtures were not inspected for the presence or absence of PCB-containing dielectric fluid during the HBMA, as these fixtures were energized at the time of the site visit.

The PCB content in all light ballasts should be confirmed prior to disposal. Any leaking light ballasts identified, whether PCB containing or not, should be removed and replaced to avoid potential concerns with electrical equipment in the future. All ballasts that are removed should be placed in a proper storage container(s). Leaks or stained areas should be cleaned and/or removed in accordance with applicable regulations or industry standards.

According to the USEPA, PCBs may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979. Therefore, three (3) caulking samples (FH-ASB-02-B, FH-ASB-04-B and FH-ASB-05-B) were collected and analyzed for PCB content. PCBs were non-detect (i.e., <0.50 mg/kg and <0.66 mg/kg) in the three (3) caulking samples and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since the caulking samples analyzed did not exceed the CCME CSQG for PCBs in soil at an industrial site, these materials may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval.

All PCB-containing materials/equipment should be handled, decontaminated, transported and disposed of as per current Federal and Provincial acts and regulations. Any PCB-containing materials/equipment requiring removal from the building should be transported and disposed of by a registered hazardous waste transporter in accordance with applicable regulations.

3.3.9 PETROLEUM HYDROCARBON STORAGE TANKS

A steel, horizontal, single-walled, fuel oil AST (approx. 909 L) with secondary containment and a steel, horizontal, single-walled, fuel oil AST (approx. 228 L) were observed in Room 2 of the Former Fog Horn Building. The requirements for regulatory compliance of the ASTs on-site have not been determined by this assessment. The larger tank appeared to be in poor condition (i.e., corrosion) and the fuel lines near the smaller tank (on a metal frame) appeared to be leaking (i.e., paint tray used for drip pan); however, the condition and status of the ASTs/fuel lines can only be confirmed through test methods, such as magnetic testing, pressure testing or visual inspection.

Prior to demolition or renovation of the building, any petroleum products in the on-site ASTs and any associated fuel lines/equipment should be removed and the ASTs and associated fuel lines/equipment at the site should be purged of all vapours, cleaned and then removed from the site in accordance with applicable regulations (refer to Section 1.5).

3.3.10 SILICA DUST

Silica is expected to be present in asphalt shingles, drywall and drywall joint compound and concrete used in the construction of the Former Fog Horn Building.

Precautions should be taken to prevent/reduce exposure to silica dust during any disturbance /demolition of silica-containing products, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

3.3.11 SOLID WASTE AND POTENTIAL HAZARDOUS PRODUCTS

The solid waste and any potential hazardous products (i.e., paints, fuel oil, etc.) observed inside the Former Fog Horn Building should be properly disposed of in accordance with applicable regulations (refer to Section 1.5).

3.3.12 SUMMARY OF FINDINGS

Hazardous materials identified at the Former Fog Horn Building during this HBMA are summarized in Table 3-3.

Table 3-3: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Drywall Joint Compound and Asphalt Shingles	NL Asbestos Abatement Regulations (Reg. 111/98)	Rooms 1 and 2 Building exterior	135 m^2 (drywall including joint compound) Note: Asbestos-containing drywall joint compound debris may be present throughout building. 120 m^2 (asphalt shingles)	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based and Lead Leachable Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1);	Building exterior	130 m^2 (paint on exterior clapboard and wood trim)	These painted materials, if removed from the site, must be disposed of at a hazardous waste treatment facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed and treated as hazardous waste prior to renovation/demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Rooms 1 and 2	Sporadic areas of SVG on drywall surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 1	Fire Extinguisher (1)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Rooms 1 and 2	Piping/solder Battery	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.

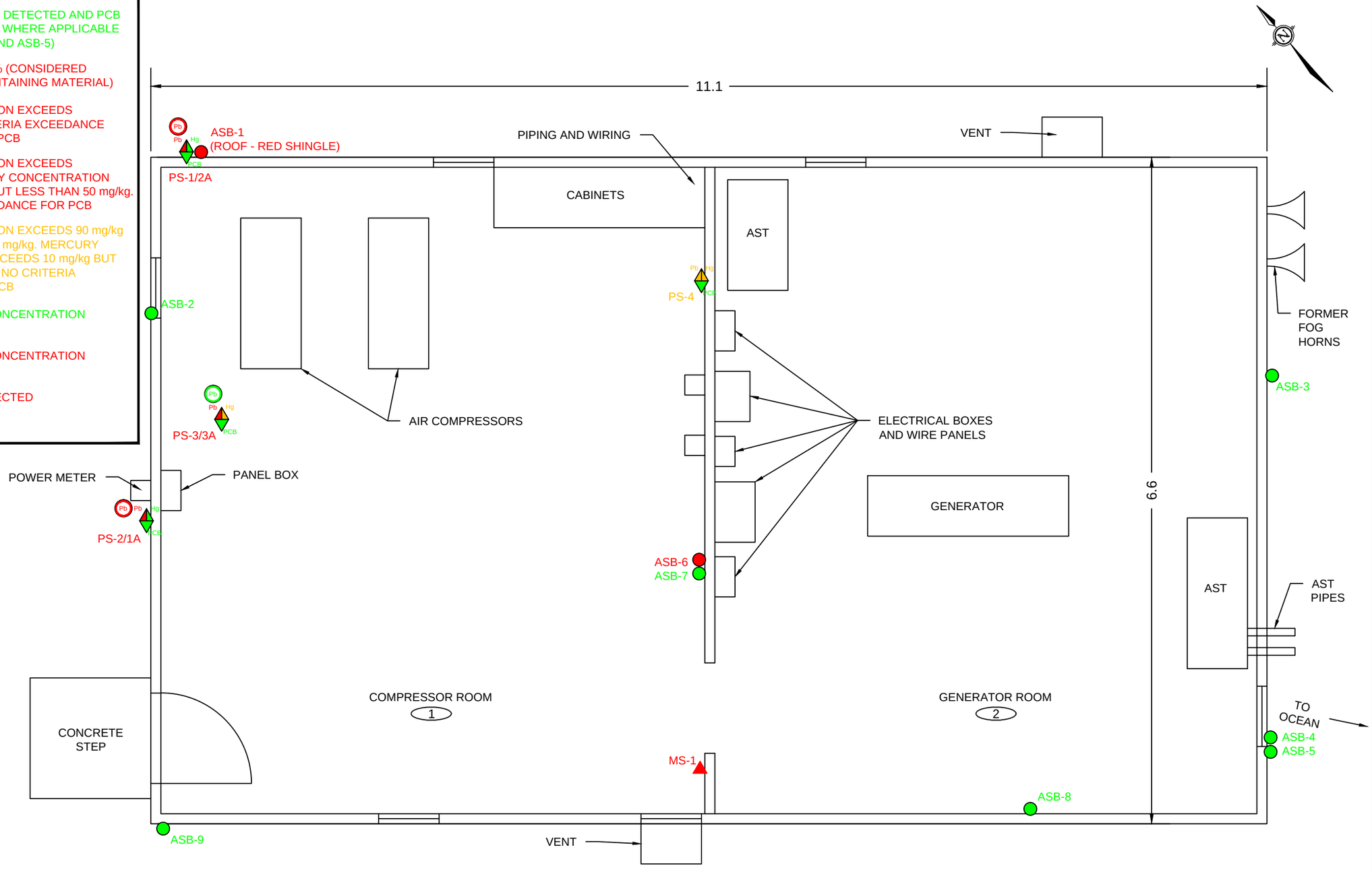
Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Petroleum Hydrocarbon Storage Tanks	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 2	Petroleum hydrocarbons (if present in ASTs/fuel lines/equipment)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2010	Building interior/ exterior	Asphalt shingles, drywall and drywall joint compound and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing drywall joint compound and asphalt shingles.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 1 and 2	Various types of waste, including but not limited to cardboard, pieces of wood, metal parts, chains and paint cans, cables, hoses, plastic containers, windows and fuel oil.	Some of these materials or products (i.e., fuel oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., drywall debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

APPENDIX A3

FIGURES

LEGEND:

- ASBESTOS SAMPLE --- LOCATION — ASBESTOS NOT DETECTED AND PCB NOT DETECTED WHERE APPLICABLE (ASB-2, ASB-4 AND ASB-5)
- ASBESTOS SAMPLE --- LOCATION — ASBESTOS > 1% (CONSIDERED ASBESTOS CONTAINING MATERIAL)
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 5000 mg/kg. NO CRITERIA EXCEEDANCE FOR MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 5000 mg/kg. MERCURY CONCENTRATION EXCEEDS 10 mg/kg BUT LESS THAN 50 mg/kg. NO CRITERIA EXCEEDANCE FOR PCB
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 90 mg/kg BUT LESS THAN 5000 mg/kg. MERCURY CONCENTRATION EXCEEDS 10 mg/kg BUT LESS THAN 50 mg/kg. NO CRITERIA EXCEEDANCE FOR PCB
- PAINT SAMPLE --- LOCATION — LEACHABLE LEAD CONCENTRATION BELOW 5.00 mg/L
- PAINT SAMPLE --- LOCATION — LEACHABLE LEAD CONCENTRATION EXCEEDS 5.00 mg/L
- ABUNDANT MOULD OBSERVED/DETECTED
- 1 — ROOM NUMBER



NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PWGSC AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.

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Scale: N.T.S

Project: HAZARDOUS BUILDING MATERIAL ASSESSMENT
CAPE RACE LIGHT STATION

Title: SAMPLE LOCATION PLAN - FORMER FOG HORN BUILDING

Date: March 2017

Project No. TF16076698

Rev. No. 0

Figure No. 3.1

APPENDIX B3

PHOTOGRAPHIC RECORD

Photo 1: View of the northwest side of the Former Fog Horn Building.

Photo 2: View of the northeast side of the Former Fog Horn Building.

Photo 3: View of the southeast and northeast sides of the Former Fog Horn Building.

Photo 4: View of the southwest side of the Former Fog Horn Building.

Photo 5: View of the compressor room (Room 1) of the Former Fog Horn Building.

Photo 6: View of the ceiling in the compressor room (Room 1) of the Former Fog Horn Building.

Photo 7: View of the air compressors in the compressor room (Room 1) of the Former Fog Horn Building.

Photo 8: View of an exterior wall in the compressor room (Room 1) of the Former Fog Horn Building.

Photo 9: View of the aboveground fuel storage tank in the Generator Room (Room 2) of the Former Fog Horn Building.

Photo 10: View of the generator in the generator room (Room 2) of the Former Fog Horn Building. Note: Potential lead-acid battery.

Photo 11: View of the raised fuel storage tank in the generator room (Room 2) of the Former Fog Horn Building. Note: Piping on wall.

Photo 12: View of electrical boxes and panels in the generator room (Room 2) of the Former Fog Horn Building. Note: fire extinguisher in background.

Photo 13: View of fluorescent lighting in the generator room (Room 2) of the Former Fog Horn Building.

Photo 14: View of location of red shingle and black shingle sample FH-ASB-01 (roof).

Photo 15: View of location of caulking and felt sample FH-ASB-02 (exterior wall).

Photo 16: View of location of tar paper sample FH-ASB-03 (exterior wall).

Photo 17: View of location of caulking sample FH-ASB-04 (exterior window frame).

Photo 18: View of location of caulking sample FH-ASB-05 (exterior window frame).

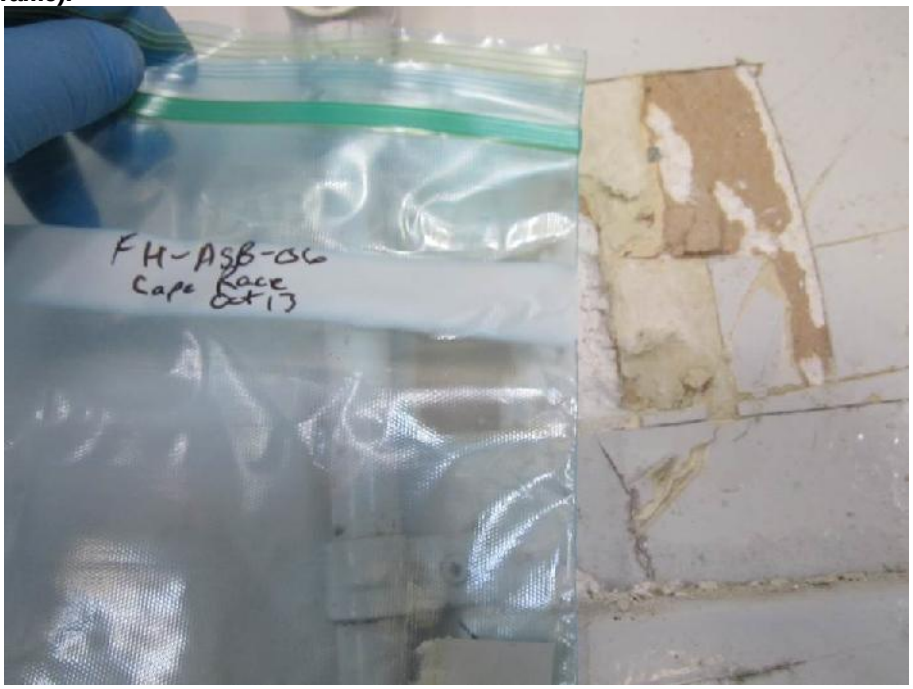

Photo 19: View of location of drywall joint compound and tape sample FH-ASB-06 (interior wall).

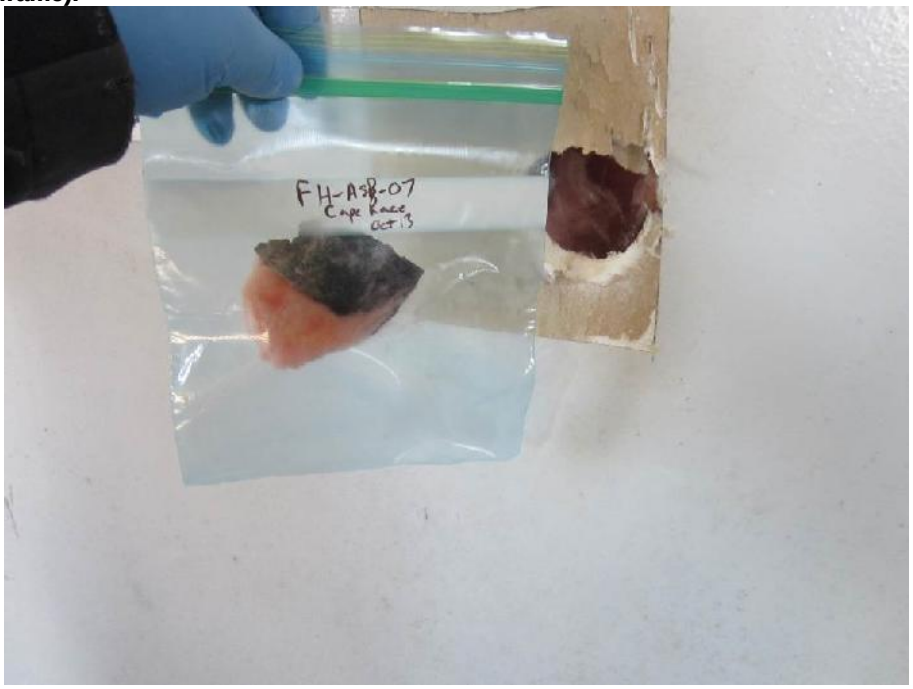

Photo 20: View of location of fiberglass and paper backing sample FH-ASB-07 (interior wall).

Photo 21: View of location of gyprock sample FH-ASB-08 (wall).

Photo 22: View of location of concrete sample FH-ASB-09 (exterior wall).

Photo 23: View of location of paint sample FH-PS-01 (exterior wall).

Photo 24: View of location of paint sample FH-PS-02 (exterior wall).

Photo 25: View of location of paint sample FH-PS-03 (floor).

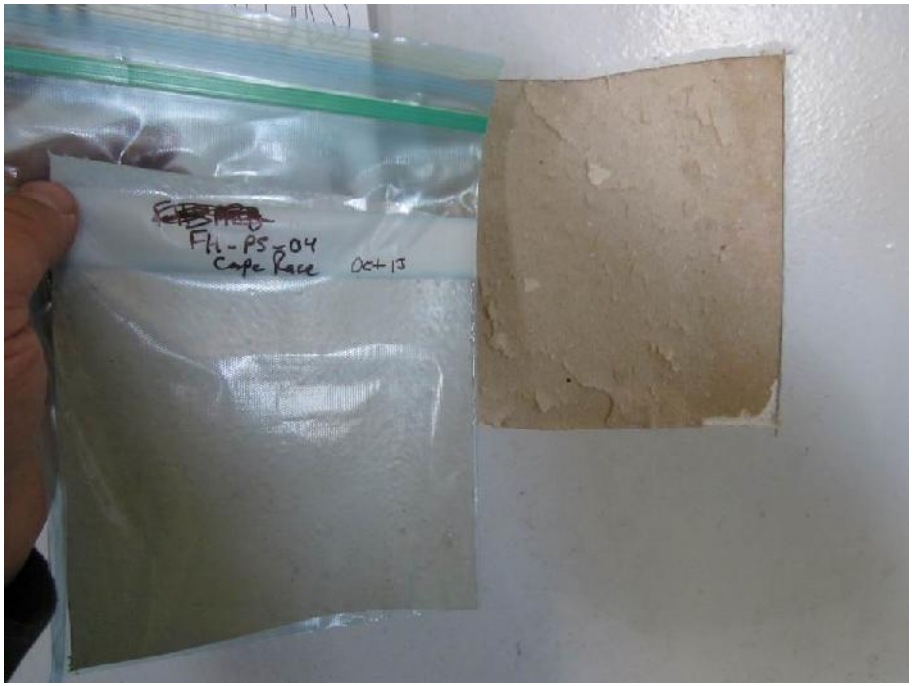

Photo 26: View of location of paint sample FH-PS-04 (interior wall).

Photo 27: View of location of paint sample PS-2-A (exterior wall). Note: Sample mislabeled PS-2-A in the field; it should have been labeled PS-1-A.

Photo 28: View of location of paint sample PS-1-A (exterior wall). Note: Sample mislabeled PS-1-A in the field; it should have been labeled PS-2-A.

Photo 29: View of location of paint sample PS-3-A (floor).

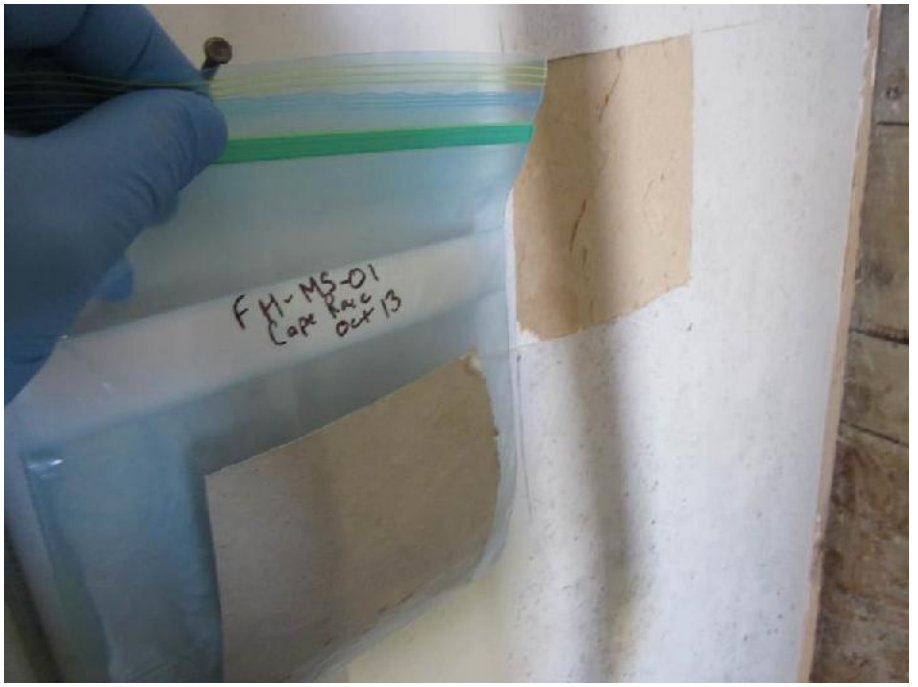

Photo 30: View of location of mould sample FH-MS-01 (interior wall).

Photo 31: View of box of fluorescent light tubes in Room 2.

Photo 32: View of the generator and aboveground fuel storage tank in Room 2.

Photo 33: View of aboveground fuel storage tank on a metal frame in Room 2.

Photo 34: View of paint tray used to collect oil from fuel lines near the aboveground fuel storage tank on a metal frame in Room 2.

APPENDIX C3

SAMPLE AND ANALYTICAL SUMMARY TABLES

Table C3-1: Bulk Sample Descriptions and Asbestos Analytical Results (Former Fog Horn Building)

Sample ID	Material (Layer) Analyzed	Detailed Material Description	Sample Location / Room No. (Photo No.)	Analytical Result
FH-ASB-01-Red Shingle	Shingle	Red shingle over black shingle from roof	Former Fog Horn Building Exterior (14)	3% Chrysotile
FH-ASB-01-Black Shingle	Shingle	Black shingle under red shingle from roof	Former Fog Horn Building Exterior (14)	ND
FH-ASB-02-A-Caulking	Caulking	White caulking (painted white) from window edge	Former Fog Horn Building Exterior (15)	ND
FH-ASB-02-A-Felt	Felt	Black felt (painted red) from under clapboard	Former Fog Horn Building Exterior (15)	ND
FH-ASB-03	Tar Paper	Black tar paper from under clapboard	Former Fog Horn Building Exterior (16)	ND
FH-ASB-04-A	Caulking	Black caulking from metal window frame	Former Fog Horn Building Exterior (17)	ND
FH-ASB-05-A	Caulking	White caulking (painted red) from metal window frame	Former Fog Horn Building Exterior (18)	ND
FH-ASB-06	Drywall Joint Compound	White drywall joint compound and tape from interior wall	Former Fog Horn Building Room 1 (19)	2% Chrysotile
FH-ASB-07-Paper Backing	Paper Backing	Black to brown paper backing on pink fibreglass insulation	Former Fog Horn Building Room 1 (20)	ND
FH-ASB-07-Insulation	Insulation	Pink fibreglass insulation from interior wall	Former Fog Horn Building Room 1 (20)	ND
FH-ASB-08	Gyprock	White gyprock on exterior wall	Former Fog Horn Building Room 2 (21)	ND
FH-ASB-09	Concrete	Concrete (painted grey) from foundation	Former Fog Horn Building Exterior (22)	ND

Notes:

A: Caulking sample was also analyzed for PCBs

ND: Non-detect

ND = <1% asbestos

Shaded results greater than 1% asbestos by dry weight are considered to be asbestos-containing materials (ACMs) as outlined in the Newfoundland and Labrador Asbestos Abatement Regulations (Reg. 111/98)

Table C3-2: Paint Sample Descriptions and Lead Analytical Results (Former Fog Horn Building)

Sample ID	Colour Description	Substrate	Sample Location / Room No. (Photo No.)	RDL (mg/kg)	Total Lead (mg/kg)
FH-PS-1	White	Wood (trim on windows, door and eaves)	Former Fog Horn Building Exterior (23)	5.0	**42,000**
FH-PS-2	Red	Wood (clapboard)	Former Fog Horn Building Exterior (24)	5.0	**16,000**
FH-PS-3	Grey over blue over white over grey	Concrete floor (foundation)	Former Fog Horn Building Room 1 (25)	5.0	**31,000**
FH-PS-4*	White	Drywall	Former Fog Horn Building Room 1 (26)	5.0	**1,600**
FH-PS-4 Lab-Dup*	White	Drywall	Former Fog Horn Building Room 1 (26)	5.0	**1,400**

Notes

* Sample includes substrate

Lab-Dup: Laboratory Duplicate

Bold and underlined results indicate that lead concentration is above the Federal HPA criterion of 90 mg/kg.

Shaded results indicate that lead concentration is above the former Federal HPA criterion of 5,000 mg/kg.

Table C3-3: Paint Sample Descriptions and Mercury Analytical Results (Former Fog Horn Building)

Sample ID	Colour Description	Substrate	Sample Location / Room No. (Photo No.)	RDL (mg/kg)	Total Mercury (mg/kg)
FH-PS-1	White	Wood (trim on windows, door and eaves)	Former Fog Horn Building Exterior (23)	1.0	3.5
FH-PS-2	Red	Wood (clapboard)	Former Fog Horn Building Exterior (24)	1.0	<1.0
FH-PS-3	Grey	Concrete floor (foundation)	Former Fog Horn Building Room 1 (25)	1.0	**16**
FH-PS-4*	White	Drywall	Former Fog Horn Building Room 1 (26)	1.0	**20**
FH-PS-4 Lab-Dup*	White	Drywall	Former Fog Horn Building Room 1 (26)	1.0	**20**

Notes

* Sample includes substrate

Lab-Dup: Laboratory duplicate

Bold and underlined results indicate that mercury concentration is above the Federal HPA criterion of 10 mg/kg.

Shaded results indicate that mercury concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for mercury in soil at an industrial site (50 mg/kg).

Table C3-4: Sample Descriptions and PCB Analytical Results (Former Fog Horn Building)

		Paint				
Sample ID		FH-PS-1	FH-PS-1 Lab-Dup	FH-PS-2	FH-PS-3	FH-PS-4*
Sample Location and Room No.		Former Fog Horn Building Exterior	Former Fog Horn Building Exterior	Former Fog Horn Building Exterior	Former Fog Horn Building Room 1	Former Fog Horn Building Room 1
Colour Description		White	White	Red	Grey	White
Substrate		Wood	Wood	Wood	Concrete	Drywall
Location (Photo No.)		Exterior trim on windows, door and eaves (23)	Exterior trim on windows, door and eaves (23)	Exterior wall clapboard (24)	Floor foundation (25)	Interior wall (26)
Parameter	**RDL (mg/kg)**	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	5.0	<5.0	<5.0	<5.0	<10	<0.50
Aroclor 1221	5.0	<5.0	<5.0	<5.0	<10	<0.50
Aroclor 1232	5.0	<5.0	<5.0	<5.0	<10	<0.50
Aroclor 1248	5.0	<5.0	<5.0	<5.0	<10	<0.50
Aroclor 1242	5.0	<5.0	<5.0	<5.0	<10	1.7
Aroclor 1254	5.0	<5.0	<5.0	<5.0	<10	0.97
Aroclor 1260	5.0	<5.0	<5.0	<5.0	<10	0.74
Total PCB (Calculated)	5.0	<5.0	-	<5.0	<10	3.4

Notes:

B: Sample also analzyed for asbestos

* Sample includes substrate

Lab-Dup: Laboratory duplicate

RDL: Reportable detection limit

<X: Non-detect

Shaded results indicate that PCB concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for PCBs in soil at an industrial site (33 mg/kg).

Table C3-4: Sample Descriptions and PCB Analytical Results (Former Fog Horn Building) (Continued)

		Caulking			
Sample ID		FH-ASB-02-B	FH-ASB-02-B Lab-Dup	FH-ASB-04-B	FH-ASB-05-B
Sample Location and Room Number		Former Fog Horn Building Exterior	Former Fog Horn Building Exterior	Former Fog Horn Building Exterior	Former Fog Horn Building Exterior
Colour Description		White caulking painted white	White caulking painted white	Black caulking	White caulking painted red
Substrate		Wood	Wood	Wood	Wood
Location (Photo No.)		Around window edge (15)	Around window edge (15)	Around metal window frame (17)	Around metal window frame (18)
Parameter	**RDL (mg/kg)**	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1221	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1232	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1248	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1242	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1254	5.0	<0.50	<0.50	<0.50	<0.66
Aroclor 1260	5.0	<0.50	<0.50	<0.50	<0.66
Total PCB (Calculated)	5.0	<0.50	-	<0.50	<0.66

Notes:

B: Sample also analzyed for asbestos

Lab-Dup: Laboratory duplicate

RDL: Reportable detection limit

<X: Non-detect

Shaded results indicate that PCB concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for PCBs in soil at an industrial site (33 mg/kg).

Table C3-5: Paint Sample Descriptions and Leachable Lead Analytical Results (Former Fog Horn Building)

		Data			Guidelines
Sample ID		PS-1-A*	PS-2-A*	PS-3-A*	ENVC Guidance Document Leachable Toxic Waste, Testing and Disposal Revised November 2003 (GD-PPD-26.1)
Sample Location and Room No.		Former Fog Horn Building Exterior	Former Fog Horn Building Exterior	Former Fog Horn Building Room 1	
Colour Description		Red	White	Grey over blue over white over grey	
Location (Photo No.)		Wood (clapboard) (28)	Wood (trim on windows, door and eaves) (27)	Concrete (floor) (29)	
Parameters	**RDL (µg/L)**	(µg/L)	(µg/L)	(µg/L)	Schedule II (Interprovincial Movement of Hazardous Waste Regulations (pending)) (µg/L)
Leachable Lead (Pb)	5.0	10,000	7,100	2,000	5,000

Notes:

* Paint sample includes substrate

RDL: Reportable detection limit

TCLP: Toxicity Characteristic Leaching Procedure

ENVC: Newfoundland and Labrador Department of Environment and Conservation

Shaded results indicate that TCLP concentration exceeds Schedule II TCLP limits provided in the Leachable Toxic Waste Guidance Document.

Table C3-6: Mould Sample Descriptions and Analytical Results (Former Fog Horn Building)

Sample ID	Detailed Material Description	Sample Location / Room No. (Photo No.)	Mould Identified	Analytical Result
FH-MS-01	Black mould on drywall (painted white)	Former Fog Horn Building Room 1 (30)	*Cladosporium*	Abundant

Notes:

1. Mould growth is subjectively assessed with description terms sparse, moderate and abundant.
2. The presence of spores (lacking other fungal structures associated) is assessed as following: a few spores (< 10 spores average per microscopic field at 400X), some spores (10 - 100 spores average per microscopic field at 400X), many spores (> 100 spores average per microscopic field at 400X).
3. The presence of a few spores generally represents settled spores on the surface of the sample rather than indicating mould growth.

APPENDIX D3

ROOM-BY-ROOM INSPECTION SHEETS

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
Fog Horn (FH)	outside	–	Outside	11-1 x

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	concrete foundation. painted blue			
Walls	wooden clap board painted red windows wooden. Black Tar paper under clapboard			ASB-3
Ceiling / Roof	red Shingle on black			ASB-1
Paint (collect adequate amount for leachate analysis)	Walls wooden clapboard painted red Ceiling Floor - grey on concrete Other white trim on windows & door and eve			PS-2 PS-1
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	–			
Piping / Mechanical Equipment	steel piping on outside for electrical ?			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: –	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	–			
Thermostats (eg. Honeywell, etc.)	Manufacturer Colour Shape Wall/Floor Mounted Dial Casing –		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	–			
Mould / Water Staining	Area impacted –			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) white			
Photos	window chaulking & black felt			ASB-2

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

ASB-4 - Black chaulking / window (metal)

ASB-5 - white chaulking / window (metal)

ASB-9 - Concrete.

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FH	1	–	Compressor Room	

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	concrete			
Walls	• gyp rock over wood on 3 wood on other • mould on gyprock			MS-1
Ceiling	gyp rock on wood partially			
Paint (collect adequate amount for leachate analysis)	Walls – white on gyprock Ceiling – Floor – grey on concrete Other –			PS-4 PS-3
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)				
Piping / Mechanical Equipment	• 200 amp feed • various wire & electrical boxes			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: • 1 4ft fluor • 2 bulbs	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	–			
Thermostats (eg. Honeywell, etc.)	Manufacturer Colour Shape Wall/Floor Mounted Dial Casing No		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	un-used Lead Solder on spool			
Mould / Water Staining	Area impacted mould on gyp rock.			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) • 1 4ft baseboard heater - beige.			
Photos	• wooden cabinets. DJC - tape white. → ASB-6			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments: mould on gyprock areas.

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
FH	2	–	Generator Room	

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	grey painted concrete			
Walls	• white paint gyproch • white gyproch behind wall			ASB-8
Ceiling	• white paint gyproch • water damage on ceiling along gyproch seams			
Paint (collect adequate amount for leachate analysis)	Walls – white on gyp Ceiling – " Floor – grey on concrete Other			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	pink fiber glass			
Piping / Mechanical Equipment	• electrical panels & various equipment & switches • copper piping			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: 4 ft fluor x 3 (2 bulbs)	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	–			
Thermostats (eg. Honeywell, etc.)	Manufacturer Colour Shape Wall/Floor Mounted Dial Casing –		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	copper piping			
Mould / Water Staining	Area impacted on gyproch			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) • 200 gallon AST • 50 gall AST			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

SECTION 4.0 EXECUTIVE SUMMARY

Hazardous materials identified at the Former Generator Building during the HMBA are summarized in Table E-4.

Table E-4: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Asphalt Shingles	NL Asbestos Abatement Regulations (Reg. 111/98)	Building exterior (roof)	80 m^2	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34)	Building exterior/ interior	Clapboard/trim; Concrete floor/ foundation	These painted materials, if removed from the site, may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed prior to renovation/ demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Rooms 1 and 2	Green-coloured staining on floor surface Sporadic areas of SVG on interior surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 1	Fire Extinguisher (1)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Building interior	Piping/solder	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Petroleum Hydrocarbon Storage Tank	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 2	Petroleum hydrocarbons (if present in pails and/or possible abandoned fuel lines/equipment)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2016	Building interior/ exterior	Asphalt shingles and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing asphalt shingles.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 1 and 2	Various types of waste, including but not limited to cardboard, rope and tarps, pieces of wood and metal, paint cans and trays, metal parts, bags of cement, plastic and glass containers, and hydraulic oil.	Some of these materials or products (i.e., hydraulic oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., asphalt shingle debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

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APPENDICES

4.0 FORMER GENERATOR BUILDING

The Former Generator Building is located approximately 20 km from Route 10 via the gravel access road to Cape Race (refer to Figure 1.2, Appendix A1 and Photos 1, 2 and 3, Appendix B1). Based on information available on the Directory of Federal Real Property website, the Former Generator Building (Building No. 107690) at the Cape Race Lightstation was constructed in 1965.

4.1 BUILDING DESCRIPTION

A description of the Former Generator Building is outlined in Table 4-1. Photographs of the Former Generator Building are provided in Appendix B4.

Table 4-1: Site Building Description

Building Name	Former Generator Building	Photo (Appendix B4)
Number of Stories	One	Photos 1, 2, 3 and 4
Attic	Yes	Photo 5
Basement	No	-
Type of Structure	Wood Frame	Photo 5
Type of Foundation	Concrete Slab	Photos 7 and 11
Exterior	Painted Clapboard	Photos 1, 2, 3 and 4
Window/Door Frames	Painted Wood Frames/Trim	Photos 1, 2 and 4
Exterior Doors	Painted Wood Door	Photo 9
Roofing Materials	Asphalt Shingles and Tar	Photos 1 and 3
Interior Walls Finishes	Painted Plywood	Photos 8 and 10
Ceiling Finishes	Painted Plywood	Photo 6
Floor Finishes	Painted Concrete	Photos 7 and 11
Interior Doors	Painted Wood Door (Metal Door on Floor)	Photo 9
Interior Lighting	Incandescent	Photos 6 and 10
Exterior Lighting	Incandescent	Photos 1 and 4
Heating	Electrical Baseboard Heaters	Photo 14

4.2 FINDINGS

The findings documented in this section are based on observations made by Amec Foster Wheeler personnel at the time of the site visit and laboratory analyses of samples collected from the Former Generator Building.

4.2.1 Asbestos-Containing Materials (ACMs)

There are over 3,000 ACMs that are commercially available, which can be divided into two broad categories: friable and non-friable. ACMs were discontinued from use in Canada in the late 1970s/early 1980s, although non-friable asbestos is still found in many more recent buildings.

During the HBMA, a total of three (3) building material samples (EQ-ASB-01 to EQ-ASB-03) were collected from the Former Generator Building and analyzed for asbestos content (refer to Photos 16, 17 and 18, Appendix B4). It should be noted that select samples were separated into sub-samples representing distinct material layers and re-labeled by the laboratory prior to analysis (i.e., EQ-ASB-01-Shingle and EQ-ASB-01-Tar). Sample descriptions and analytical results are summarized in Table C4-1, Appendix C4. Sample locations and analytical results are graphically

illustrated in Figure 4.1, Appendix A4. Copies of room-by-room inspection sheets for the Former Generator Building are provided in Appendix D4.

4.2.1.1 Friable Materials

Friable ACMs are defined as materials that can be crumbled, pulverized and reduced to powder when dry using hand pressure. Typical friable materials include acoustical or decorative spray applications, fireproofing and thermal insulation.

4.2.1.1.1 Spray-Applied Fireproofing, Insulation and Texture Finishes

There were no spray-applied fireproofing, insulation or texture finishes observed within the Former Generator Building during the site visit; therefore, no samples of these materials were collected for analysis.

4.2.1.1.2 Thermal System Insulation

During the HBMA, one (1) sample (EQ-ASB-02) of thermal insulation, consisting of yellow fibreglass insulation, was collected from above the ceiling in Room 1 (refer to Photos 5 and 17, Appendix B4). Asbestos was not detected in the yellow fiberglass insulation sample.

As observed from the access hatch to the attic, there also appeared to be another type of thermal insulation visible on an exterior wall in the attic, consisting of pink fiberglass insulation with grey paper backing. Due to height and confined space constraints, no samples of these materials were collected for analysis during the HBMA (refer to Photo 5, Appendix B4). This thermal insulation may be original construction; therefore, based on the age of the Former Generator Building (i.e., 1965), any suspect materials not sampled during this assessment should be considered to be ACMs, unless tested and proven otherwise.

4.2.1.2 Non-Friable and Potentially Friable Materials

Non-friable ACMs are hard or manufactured products such as floor tiles, fire blankets, pre-formed manufactured cementitious insulation and wallboards, pipes, and siding, wherein the asbestos fibres are bound to the substrate. Note that although a product may be considered non-friable when new, the product may release fine dust when disturbed (e.g., deterioration, removal, renovations) and the free dust is considered friable.

4.2.1.2.1 Ceiling Tile

There were no ceiling tiles observed in the Former Generator Building during the site visit; therefore, no samples of ceiling tile were collected for analysis.

4.2.1.2.2 Drywall Joint Compound

There was no drywall observed in the Former Generator Building during the site visit; therefore, no samples of drywall joint compound were collected for analysis.

4.2.1.2.3 Vinyl Flooring Products and Mastics

There were no vinyl flooring products or associated mastics observed in the Former Generator Building during the site visit; therefore, no samples of these materials were collected for analysis.

4.2.1.2.4 Baseboard, Carpet and Stair Tread Adhesives/Mastics

There were no baseboard, carpet or stair tread adhesives/mastics observed in the Former Generator Building during the site visit; therefore, no samples of these types of adhesives/mastics were collected for analysis.

4.2.1.2.5 Roofing Products

During the HBMA, one (1) sample of asphalt shingle and tar was collected from the roof of the Former Generator Building and analyzed for asbestos content (refer to Photo 16, Appendix B4). Chrysotile asbestos (2%) was detected in the asphalt shingle in the sample at a level above the applicable NL Asbestos Abatement Regulations (111/98) (i.e., >1%). Asbestos was not detected in the tar in the sample.

The asphalt shingles visible on the roof of the Former Generator Building (covering an area of approximately 80 m^2), as observed from the ground surface, appeared to be generally in poor condition (i.e., weathered, moss-covered and missing in some areas) (refer to Photo 3, Appendix B4).

4.2.1.2.6 Caulking

There was no caulking observed on the Former Generator Building during the site visit; therefore, no samples of caulking were collected for analysis.

4.2.1.2.7 Mortar, Grout and Other Cementitious Materials

An attempt was made to sample the concrete foundation at the time of the site visit; however, it was difficult to obtain a sufficient sample with the tools used during the HBMA (i.e., non-powered hand tools). The concrete foundation is likely to be original construction; therefore, based on the age of the Former Generator Building (i.e., 1965), any suspect concrete materials not sampled during this assessment should be considered to be ACMs, unless tested and proven otherwise.

Other than the concrete foundation, there were no mortar, grout or other cementitious materials observed in the Former Generator Building during the site visit; therefore, no samples of these types of materials were collected for analysis.

4.2.1.2.8 Other Potential ACMs

One (1) sample of tar paper (EQ-ASB-03) was collected from underneath the exterior clapboard and analyzed for asbestos content (refer to Photo 18, Appendix B4). Asbestos was not detected in the tar paper sample.

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, the concrete foundation, possible fire-rated door(s), pink fiberglass insulation with grey paper backing (attic), electrical and mechanical components and insulators such as wiring and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants (refer to Photos 9, 10, 12 and 15, Appendix B4).

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include possible fireproofing materials in the wall cavities, other fire rated structures or building materials, and underground infrastructure and piping.

4.2.2 Paint Additives

Lead compounds have been used in paint as pigment and durability additives since the early 1800s. Mercury compounds have been used in paint as anti-microbial additives up until the 1990s. PCBs have been used in paint as plasticizers and corrosion resistance additives from the 1950s to the 1970s.

The condition of the paint visible on the exterior clapboard and concrete foundation of the Former Generator Building was generally peeling and flaking and observed to be in poor condition (refer to Photos 2, 7 and 20, Appendix B4). The condition of the paint visible on the interior walls and ceilings of the Former Generator Building was generally intact and observed to be in good condition (refer to Photos 6, 8 and 10, Appendix B4).

During Amec Foster Wheeler's site visit on October 13, 2016, a total of five (5) samples (EQ-PS-1 to EQ-PS-5) were collected from painted surfaces of the Former Generator Building and analyzed for lead, mercury and PCB content (refer to Photos 19 to 22, Appendix B4). Sample descriptions and analytical results are summarized in Tables C4-2 to C4-4, Appendix C4. Sample locations and analytical results are graphically illustrated in Figure 4.1, Appendix A4.

The concentrations of lead detected in three (3) of the five (5) paint samples (EQ-PS-2, EQ-PS-3 and EQ-PS-4) analyzed exceeded the former Federal HPA criterion of 5,000 mg/kg for lead. In order to determine whether or not these paints would be considered hazardous waste upon removal from the site, it was recommended that these paints be tested for lead leachate using the TCLP. On December 9, 2016, Amec Foster Wheeler returned to the site and collected three (3) additional paint samples (PS-2-A, PS-3-A and PS-4-A) from the painted surfaces of the Former Generator Building where elevated levels of lead (i.e., >5,000 mg/kg) were identified (refer to Photos 23, 24 and 25, Appendix B4). Where possible, a small section of the painted substrate

(e.g., wood, aspenite, etc.) was included with the paint sample. The laboratory results for lead leachate in paint are presented in Table C4-5, Appendix C4.

4.2.2.1 Lead in Paint

The concentrations of lead in the paint samples ranged from 32 mg/kg to 13,000 mg/kg (refer to Table C4-2, Appendix C4). One (1) paint sample (EQ-PS-5) contained lead at a concentration below the Federal HPA criterion of 90 mg/kg and one (1) paint sample (EQ-PS-1) contained lead at a concentration above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg (refer to Photos 19 and 22, Appendix B4). Three (3) paint samples (EQ-PS-2, EQ-PS-3 and EQ-PS-4) contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg (refer to Photos 19, 20 and 21, Appendix B4).

4.2.2.2 Mercury in Paint

The concentrations of mercury in the paint samples ranged from non-detect (<1.0 mg/kg) to 4.4 mg/kg (refer to Table C4-3, Appendix C4). The five (5) paint samples (EQ-PS-1 to EQ-PS-5) analyzed were either non-detect for mercury (i.e., <1.0 mg/kg) or contained mercury at concentrations below the applicable Federal HPA criterion (i.e. 10 mg/kg).

4.2.2.3 PCBs in Paint

PCBs were non-detect (i.e., <20 mg/kg, <5.0 mg/kg and <0.50 mg/kg) in the five (5) paint samples (EQ-PS-1 to EQ-PS-5) analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C4-4, Appendix C4).

4.2.2.4 Leachable Lead in Paint

The concentrations of leachable lead in paint samples PS-2-A (1,200 µg/L), PS-3-A (2,000 µg/L) and PS-4-A (<5.0 µg/L), including the laboratory duplicates PS-2-A Lab-Dup (1,800 µg/L) and PS-2-A Lab-Dup 2 (2,800 µg/L), were below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) (refer to Table C4-5, Appendix C4). These paint samples were collected from the exterior clapboard (multiple layers of red paint) and the concrete floor in Room 1 (grey over grey over red paint; grey over green over yellow paint). Since the concentrations of leachable lead in these paint samples are at levels that are not considered to be hazardous, any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

4.2.3 Urea Formaldehyde Foam Insulation (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Generator Building. The nature of the insulation in the walls and ceilings throughout the Former Generator Building could not be confirmed at the time of the site inspection; however, fibreglass

insulation was observed in an exterior wall and in the attic (refer to Photos 5 and 22, Appendix B4). The Former Generator Building was constructed in 1965, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

4.2.4 Suspected Visible Mould Growth (SVG)

Amec Foster Wheeler inspected the interior areas of the Former Generator Building for visual or olfactory evidence of suspected mould. Green-coloured staining (possible mildew) was observed on the surface of the concrete floor in Room 2 (refer to Photo 12, Appendix B4). Sporadic areas of SVG were also noted on some of the painted interior and exterior surfaces at the time of the site visit (refer to Photos 9 and 19, Appendix B4).

4.2.5 Mercury-Containing Thermostats

One (1) type of thermostat was identified inside the Former Generator Building during the site visit. Results of the thermostat inspection are summarized in Table 4-2.

Table 4-2: Thermostat Description

Description of Thermostat	Manufacturer	Location Observed	Photo No. (Appendix B4)	No. Observed	Thermostat Inspected (Yes/No)	Mercury Switch (Yes/No)
White rectangle casing, white dial, wall-mounted	Honeywell	Room 1 Room 2	26 and 27	2	Yes	No

4.2.6 PCB-Containing Light Ballasts

No fluorescent light fixtures were observed in the Former Generator Building; therefore, no light ballasts were visually inspected for the presence or absence of PCB-containing dielectric fluid at the time of the site visit.

4.2.7 Potential Sources of ODSs and Halocarbons

One (1) fire extinguisher (dry chemical) was observed inside the Former Generator Building; however, the label on this extinguisher did not indicate the presence of halon or other ODS ingredients (refer to Photo 28, Appendix B4). Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

4.2.8 Other Potentially Hazardous Building Materials or Substances

Other potentially hazardous building materials or substances identified during this assessment are presented in the following sections.

4.2.8.1 Lead

Lead is typically associated with plumbing solder and older pipe materials (e.g., cast iron pipe joints), as well as products such as radiation protective shielding and lead-acid batteries.

A capped metal pipe (extending into the concrete slab) was observed in Room 2 of the Former Generator Building (refer to Photo 12, Appendix B4). It is not known what the pipe was used for during the operation of the Former Generator Building, however, it may have been a fuel pipe associated with a former generator located inside the building and a former fuel storage tank located above or below ground near the building.

No potential lead-acid batteries (i.e., emergency lighting fixtures and exit signs) were noted inside the Former Generator Building at the time of the site inspection.

4.2.8.2 Mercury

The light tubes in fluorescent light fixtures often contain limited quantities of mercury in a powder or vapour form. No fluorescent light fixtures or light tubes were observed in the Former Generator Building at the time of the site visit.

4.2.8.3 PCBs

According to the USEPA, PCB may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979. The Former Generator Building was constructed in 1965, therefore, it is possible that PCB may be present in caulking used in the construction of this building. There was no caulking observed on the Former Generator Building during the site visit; therefore, no samples of caulking were collected for analysis.

4.2.8.4 Treated Wood Chemicals

There were no treated timber materials observed on the exterior or interior of the Former Generator Building during the site visit; therefore, no samples of these types of materials were collected for analysis.

4.2.8.5 Petroleum Hydrocarbon Storage Tanks

There were no petroleum hydrocarbon storage tanks identified during this assessment; however, several 5 gallon pails, labelled as containing hydraulic oil, were observed inside the Former Generator Building (refer to Photos 12 and 13, Appendix B4). As mentioned previously, a capped metal pipe (extending into the concrete slab) was observed in Room 2 (refer to Photo 12, Appendix B4). It is not known what the pipe was used for during the operation of the Former Generator Building, however, it may have been a fuel pipe associated with a former generator located inside the building and a former fuel storage tank located above or below ground near the building.

4.2.8.6 Silica

According to the CPWR (The Center for Construction Research and Training), many common construction materials contain silica including, asphalt, brick, cement, concrete, drywall, grout, mortar, stone, sand and tile. The dust created by cutting, grinding, drilling or otherwise disturbing these materials can contain crystalline silica particles.

Based on the HBMA site visit, silica is expected to be present in asphalt shingles and concrete used in the construction of the Former Generator Building.

4.2.8.7 Radioactive Materials

No smoke detectors were observed inside the Former Generator Building at the time of the site visit. Smoke alarms that use very small amounts of radioactive material (i.e., Americum 241) incorporated in an ionization chamber are called "ion chamber smoke alarms". Smoke detectors of this type, if identified, should be removed intact, stored in a properly labeled container and transported, as per TDG regulations, to a licensed disposal facility.

4.2.8.8 Solid Waste and Potential Hazardous Products

Various types of waste, including but not limited to cardboard, rope and tarps, pieces of wood and metal, paint cans and trays, metal parts, bags of cement, and plastic and glass containers were observed inside the Former Generator Building (refer to Photos 7, 8, 9, 11 and 12, Appendix B4). As mentioned previously, several 5 gallon pails, labelled as containing hydraulic oil, were observed inside the Former Generator Building (refer to Photos 12 and 13, Appendix B4). A 45 gallon metal drum, labelled as containing one (1) box of garbage bags and two (2) packs of absorbent pads, was also observed near the 5 gallon pails; however, the materials listed on the drum label are supplies commonly used in an emergency oil spill kit.

4.3 CONCLUSIONS AND RECOMMENDATIONS

Based on observations made and information gathered during the HBMA, the following conclusions and recommendations are made with respect to the potential and actual presence of hazardous building materials at the Former Generator Building.

4.3.1 ASBESTOS-CONTAINING MATERIALS (ACMS)

Building materials containing greater than 1% asbestos by dry weight, which are considered to be ACMs, are present in the form of non-friable asphalt shingles. The asphalt shingles visible on the roof of the Former Generator Building (covering an area of approximately 80 m^2), as observed from the ground surface, appeared to be generally in poor condition (i.e., weathered, moss-covered and missing in some areas).

Other potential ACMs were observed and were not sampled due to the nature of the materials and/or hazards associated with sampling these materials. These materials included, but are not limited to, the concrete foundation, possible fire-rated door(s), pink fiberglass insulation with grey paper backing (attic), electrical and mechanical components and insulators such as wiring and gaskets inside electrical panels, electronic and/or mechanical equipment or piping/pipe joint sealants.

Other possible hidden and inaccessible ACMs have the potential to be present at the site but were not identified during the site visit. These possible ACMs could include possible fireproofing materials in the wall cavities, other fire rated structures or building materials, and underground infrastructure and piping.

If other potential ACMs that were not sampled as part of this assessment are encountered in the future, these materials should be treated as ACMs or samples should be collected and tested to verify asbestos content. This should be done as soon as these materials are encountered and before these materials are disturbed. This includes materials that are currently concealed by walls and ceiling systems.

In accordance with the NL Asbestos Abatement Regulations (Reg. 111/98), which provide the legislative requirements for safe handling of ACMs in workplaces in the Province of NL, the following is recommended:

- Safe work procedures shall be established.
- All buildings constructed during the period when asbestos was readily used in construction must have a written assessment and management plan (where applicable) for potential ACMs.
- Prior to general disturbance activity (e.g., demolition, renovation or removal), all ACMs must be safely removed from the building and disposed of in accordance with appropriate environmental guidelines by an asbestos abatement contractor registered with the Department of Labour, Occupational Health and Safety Branch.

ACMs in good condition should be inspected on an annual basis. ACMs in poor condition should be removed from the building and transported off-site for proper disposal in accordance with the NL Asbestos Abatement Regulations (Reg. 111/98). ACMs can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.

4.3.2 LEAD, MERCURY AND PCBS IN PAINT

Results of the paint sampling and analytical program revealed the following lead, mercury and PCB containing paint finishes on the interior of the Former Generator Building:

Lead

- One (1) paint sample (EQ-PS-5) contained lead at a concentration below the Federal HPA criterion of 90 mg/kg and one (1) paint sample (EQ-PS-1) contained lead at a concentration above the Federal HPA criterion of 90 mg/kg but below the former Federal HPA criterion of 5,000 mg/kg. Since these paint samples contained less than 5,000 mg/kg lead, these paints are not likely to be leachable for lead and may be disposed of at an approved landfill facility, pending landfill and Provincial regulatory approval.
- Three (3) paint samples (EQ-PS-2, EQ-PS-3 and EQ-PS-4) collected from the Former Generator Building contained lead at concentrations above the former Federal HPA criterion of 5,000 mg/kg; therefore, additional samples were collected from these paints (PS-2-A, PS-3-A and PS-4-A) and tested for lead leachate using the TCLP to determine whether or not the paint would be considered hazardous waste upon removal from the site.
- The concentrations of leachable lead in paint samples PS-2-A, PS-3-A and PS-4-A were below the Schedule II leachate criterion for lead (5,000 µg/L) provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). These paint samples were collected from the exterior clapboard (multiple layers of red paint) and the concrete floor in Room 1 (grey over grey over red paint; grey over green over yellow paint). Since the concentrations of leachable lead in these paint samples are at levels that are not considered to be hazardous, any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

Mercury

- The five (5) paint samples (EQ-PS-1 to EQ-PS-5) analyzed were either non-detect for mercury (i.e., <1.0 mg/kg) or contained mercury at concentrations below the applicable Federal HPA criterion (i.e. 10 mg/kg). Since all five (5) paint samples contained less than 50 mg/kg mercury, these paints are not likely to be leachable for mercury and any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

PCB

- PCBs were non-detect (i.e., <20 mg/kg, <5.0 mg/kg and <0.50 mg/kg) in the five (5) paint samples (EQ-PS-1 to EQ-PS-5) analyzed and therefore did not exceed the CCME CSQG of 33 mg/kg for PCBs in soil at an industrial site or the criterion of 50 mg/kg for PCB solid provided in the NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1). Since all five (5) paint samples contained less than 50 mg/kg of PCBs, these paints are not classified by the TDG Regulations as PCB solids and any building materials containing these paints can be disposed of at an approved landfill facility, pending Provincial regulatory and landfill operator approval.

There are potential adverse human health impacts associated with disturbing (e.g., scraping) lead containing paint finishes. As a precautionary measure, Amec Foster Wheeler recommends handling these paint finishes, as follows:

- In areas of minor peeling or flaking, the paint should be removed using wet scraping techniques.
- In areas of extensive peeling and flaking, the paint should be removed and more extensive particulate control measures may be required.
- In areas where lead containing paint finishes are present and in poor condition, an experienced contractor should be utilized for decommissioning/demolition activities. Prior to demolition or renovation activities, all areas of extensive peeling and flaking of lead containing paint finishes and paint debris/dust should be removed and/or remediated to ensure that building occupants/workers are protected from associated dust/particulate.
- Steps should be taken to ensure that workers and anyone present in and around areas being dismantled or demolished are protected. The contractor should also ensure that dust generation and migration is minimized.

Precautions should be taken to prevent/reduce exposure to paint dust during any disturbance of lead containing paint finishes, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

If potential lead, mercury or PCB containing paint finishes that were not sampled during this assessment are encountered in future, samples should be obtained and tested to verify concentrations of lead, mercury and PCB. This should be done as soon as the paint is encountered and before it is disturbed. This includes materials that are currently concealed by walls and ceiling systems.

It is important to note that if the Former Generator Building is transferred to the local development association (or another third party), any residual lead based paint will need to be managed in the future by the future owners.

4.3.3 UREA FORMALDEHYDE FOAM INSULATION (UFFI)

Visual indicators suggesting the potential presence of UFFI were not observed in the Former Generator Building. The nature of the insulation in the walls and ceilings throughout the Former Generator Building could not be confirmed at the time of the site inspection; however, fibreglass insulation was observed in an exterior wall and in the attic. The Former Generator Building was constructed in 1965, therefore, it is possible that UFFI may be present in the building since the sale and installation of UFFI was not banned until 1980.

It can be inferred that any UFFI present within the building is unlikely to affect the indoor air quality due to the amount of time that has passed since the insulation was likely installed (i.e., 1965) along with the likelihood that formaldehyde has off-gassed over this period of time. It should be

noted that, the presence and concentration of formaldehyde cannot be determined or quantified without conducting site-specific testing for formaldehyde.

Based on discussions with the NL Department of Environment and Climate Change, for the purposes of disposal of UFFI, this material is permitted to be bagged and transported to an approved Waste Disposal Site (WDS) and disposed in the special waste area (unlined area) of the site.

4.3.4 MOULD

Green-coloured staining (possible mildew) was observed on the surface of the concrete floor in Room 2. Sporadic areas of SVG were also noted on some of the painted interior and exterior surfaces at the time of the site visit. Existing conditions in the Former Generator Building (e.g., suspected water infiltration due to leaks, inadequate heating, changes in temperature) may potentially contribute to or enhance mould growth inside the building.

Workers on-site should don proper personal protective equipment (PPE) to prevent/reduce exposure to mould while working within the Former Generator Building or during any disturbance/demolition of building materials that may be impacted by mould growth.

4.3.5 OZONE DEPLETING SUBSTANCES

One (1) fire extinguisher (dry chemical) was observed inside the Former Generator Building; however, the label on this extinguisher did not indicate the presence of halon or other ODS ingredients. Fire extinguishers are considered a hazardous waste material and must be disposed of at a hazardous waste treatment facility.

All ODS, if present, should be removed by an approved contractor prior to disposing of any cooling and/or refrigeration equipment from the building. The use, storage, operation, maintenance, decommissioning, and disposal of ODS containing equipment, in general, is regulated at both a Provincial and Federal level and must comply with the most recent NL Halocarbon Regulations and the Federal Halocarbon Regulations. The status of the potential ODS containing equipment should be confirmed through a mechanical contractor or consultant.

4.3.6 LEAD-CONTAINING MATERIALS/EQUIPMENT

A capped metal pipe (extending into the concrete slab) was observed in the Former Generator Building. It is not known what the pipe was used for during the operation of the Former Generator Building, however, it may have been a fuel pipe associated with a former generator located inside the building and a former fuel storage tank located above or below ground near the building.

The disturbance, control or disposal of lead-containing material/equipment should be carried out in accordance with applicable criteria/regulations (refer to Section 1.5). The presence/absence of lead in these materials should be confirmed through a contractor or consultant prior to disturbance

or disposal of these materials. Typically these materials are sent to a metal recycling facility and not a landfill.

4.3.7 PCB-CONTAINING MATERIALS/EQUIPMENT

No fluorescent light fixtures were observed in the Former Generator Building; therefore, no light ballasts were visually inspected for the presence or absence of PCB-containing dielectric fluid at the time of the site visit.

According to the USEPA, PCBs may be present in caulking used in windows, door frames, masonry columns and other building materials in buildings built or renovated between 1950 and 1979. The Former Generator Building was constructed in 1965, therefore, it is possible that PCB may be present in caulking used in the construction of this building. There was no caulking observed on the Former Generator Building during the site visit; therefore, no samples of caulking were collected for analysis.

4.3.8 PETROLEUM HYDROCARBON STORAGE TANKS

There were no petroleum hydrocarbon storage tanks identified during this assessment; however, several 5 gallon pails, labelled as containing hydraulic oil, were observed inside the Former Generator Building. A capped metal pipe (extending into the concrete slab) was also observed in the Former Generator Building. It is not known what the pipe was used for during the operation of the Former Generator Building, however, it may have been a fuel pipe associated with a former generator located inside the building and a former fuel storage tank located above or below ground near the building.

Prior to demolition or renovation of the building, any petroleum products stored inside the building, or in any existing/abandoned fuel lines/equipment on-site, should be removed and disposed of in accordance with applicable regulations (refer to Section 1.5). Abandoned fuel lines/equipment (if present) should also be purged of all vapours, cleaned and then removed from the site in accordance with applicable regulations (refer to Section 1.5).

4.3.9 SILICA DUST

Silica is expected to be present in asphalt shingles and concrete used in the construction of the Former Generator Building.

Precautions should be taken to prevent/reduce exposure to silica dust during any disturbance /demolition of silica-containing products, such as wetting the surface of the materials to prevent dust emissions, donning respiratory protection, and cleaning tools and clothing prior to exiting work areas.

4.3.10 SOLID WASTE AND POTENTIAL HAZARDOUS PRODUCTS

The solid waste and any potential hazardous products (i.e., paints, hydraulic oil, etc.) observed inside the Former Generator Building should be properly disposed of in accordance with applicable regulations (refer to Section 1.5).

4.3.11 SUMMARY OF FINDINGS

Hazardous materials identified at the Former Generator Building during this HBMA are summarized in Table 4-3.

Table 4-3: Hazardous Material Description

Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Asbestos-Containing Asphalt Shingles	NL Asbestos Abatement Regulations (Reg. 111/98)	Building exterior (roof)	80 m^2	Asbestos-containing materials cannot be disposed of at a Construction & Demolition Site; however, these materials can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.
Lead-Based Paint	Federal Transportation of Dangerous Goods Act (1992, c. 34)	Building exterior/ interior	Clapboard; Concrete floor	These painted materials, if removed from the site, may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. The paint was in poor condition and flaking at the time of the site visit. Flaking/deteriorated paint and paint debris/dust should be removed prior to renovation/ demolition activities being performed.
Potential UFFI	Federal Hazardous Products Act (R.S.1985, c. H-3)	-	None identified	UFFI is permitted to be bagged and transported to an approved WDS and disposed in the special waste area of the site.
Mould	Mould Guidelines for the Canadian Construction Industry, Canadian Construction Industry, 2004; Mould Abatement Guidelines, Environmental Abatement Council of Ontario (EACO), 2010	Rooms 1 and 2	Green-coloured staining on floor surface Sporadic areas of SVG on interior surfaces	All mould impacted materials may be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility.

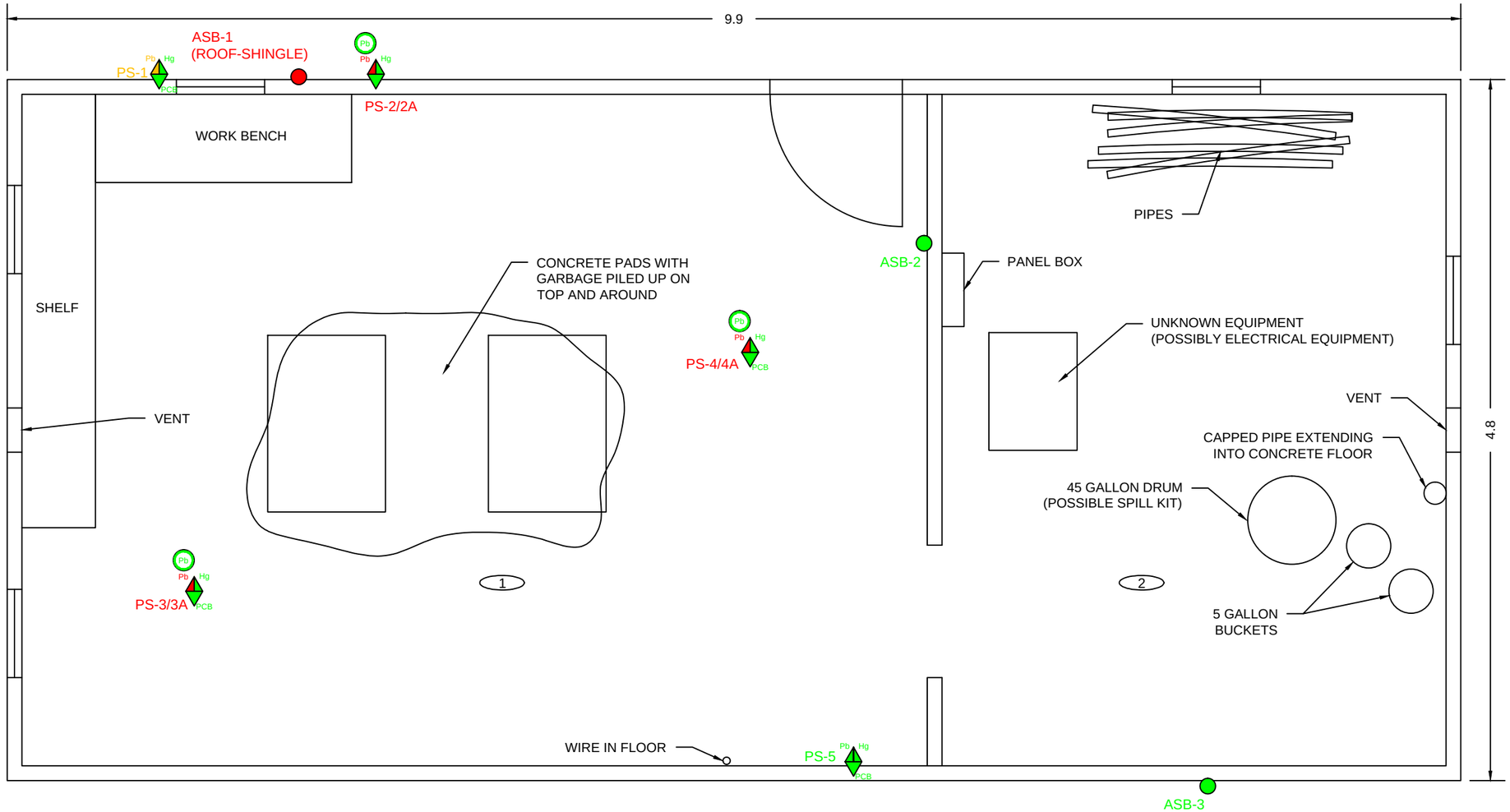
Hazardous Material	Regulatory Guidelines	Location	Quantity (Approx.)	Disposal
Fire Extinguishers	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 1	Fire Extinguisher (1)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company.
Potential Lead-Containing Materials/ Equipment	Federal Hazardous Products Act (R.S.1985, c. H-3)	Building interior	Piping/solder	These materials can be disposed of at a metal recycling or hazardous waste disposal facility, provided permission is obtained from the facility.
Petroleum Hydrocarbon Storage Tank	Federal Hazardous Products Act (R.S.1985, c. H-3)	Room 2	Petroleum hydrocarbons (if present in pails and/or possible abandoned fuel lines/equipment)	These materials are considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act.
Silica-Containing Materials	American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), 2016	Building interior/ exterior	Asphalt shingles and concrete	These materials can be disposed of at a Construction & Demolition Site or at a Regional Solid Waste Disposal Facility. Note: See above for asbestos-containing asphalt shingles.
Solid Waste and Potential Hazardous Products	NL Asbestos Abatement Regulations (Reg. 111/98); Federal Hazardous Products Act (R.S.1985, c. H-3); NL Department of Environment 2003 Guidance Document for Leachable Toxic Waste and Disposal (GD-PPD-26.1); Federal Transportation of Dangerous Goods Act (1992, c. 34)	Rooms 1 and 2	Various types of waste, including but not limited to cardboard, rope and tarps, pieces of wood and metal, paint cans and trays, metal parts, bags of cement, plastic and glass containers, and hydraulic oil.	Some of these materials or products (i.e., hydraulic oil) may be considered hazardous wastes and must be disposed according to NL policy and the Solid Waste Management Authority by an approved hazardous waste disposal company and transported under the federal Transportation of Dangerous Goods Act. Any asbestos-containing materials (i.e., asphalt shingle debris) can be disposed of at a Regional Solid Waste Landfill, provided permission is obtained from the facility. Paints and metals can be sent to a recycling facility.

APPENDIX A4

FIGURES

LEGEND:

- ASBESTOS SAMPLE --- LOCATION — ASBESTOS NOT DETECTED
- ASBESTOS SAMPLE --- LOCATION — ASBESTOS > 1% (CONSIDERED ASBESTOS CONTAINING MATERIAL)
- PAINT SAMPLE --- LOCATION — NO CRITERIA EXCEEDANCE FOR LEAD MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 90 mg/kg BUT LESS THAN 5000 mg/kg. NO CRITERIA EXCEEDANCE FOR MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEAD CONCENTRATION EXCEEDS 5000 mg/kg. NO CRITERIA EXCEEDANCE FOR MERCURY AND PCB
- PAINT SAMPLE --- LOCATION — LEACHABLE LEAD CONCENTRATION BELOW 5.00 mg/L
- (1) ROOM NUMBER



NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PWGSC AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.

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Project: HAZARDOUS BUILDING MATERIAL ASSESSMENT
CAPE RACE LIGHT STATION

Title: SAMPLE LOCATION PLAN - FORMER GENERATOR BUILDING

Date: March 2017

Project No. TF16076698

Rev. No. 0

Figure No. 4.1

APPENDIX B4

PHOTOGRAPHIC RECORD

Photo 1: View of the northwest side of the Former Generator Building.

Photo 2: View of the southwest side of the Former Generator Building.

Photo 3: View of the southeast side of the Former Generator Building. Note: Missing roofing materials.

Photo 4: View of the northwest and northeast sides of the Former Generator Building.

Photo 5: View of the attic in the Former Generator Building. Note: Pink fiberglass insulation on exterior wall in background (not sampled).

Photo 6: View of the ceiling and lighting (incandescent) in the Former Generator Building.

Photo 7: View of Room 1 in the Former Generator Building.

Photo 8: View of Room 1 in the Former Generator Building.

Photo 9: View of Room 1 in the Former Generator Building. Note: SVG on the surface of the painted metal door on the floor (possible fire-rated door).

Photo 10: View of Room 2 in the Former Generator Building. Note: Electrical panel on wall.

Photo 11: View of piping on the floor of Room 2 in the Former Generator Building.

Photo 12: View of 5 gallon pails of hydraulic oil in Room 2 of the Former Generator Building. Note: Pipe in background and green staining on the floor.

Photo 13: View of a 45 gallon drum (spill kit) and 5 gallon pails (hydraulic oil) in Room 2 of the Former Generator Building.

Photo 14: View of electrical baseboard heater in Room 2 of the Former Generator Building.

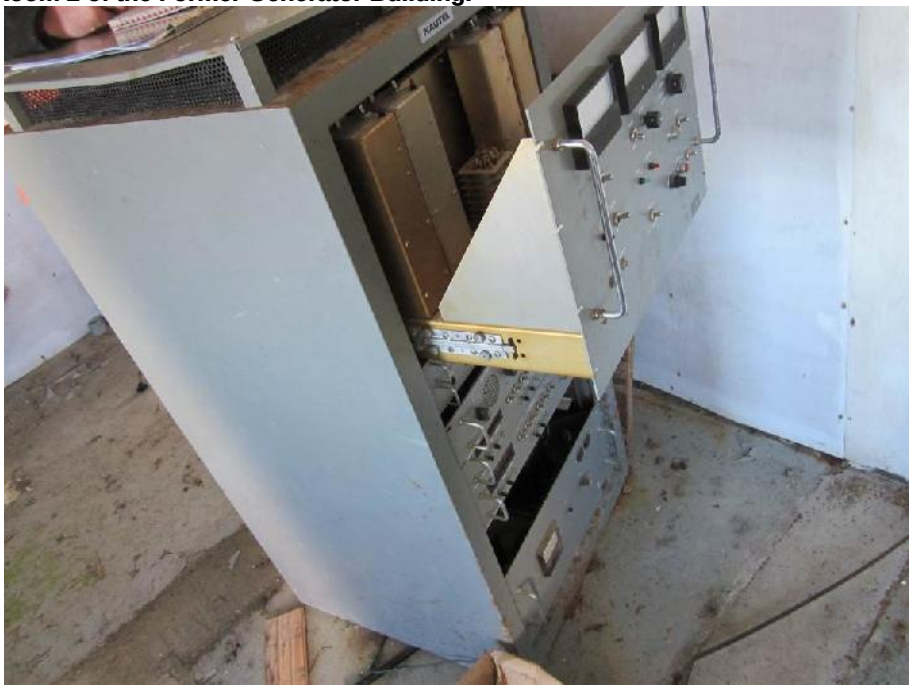

Photo 15: View of unknown equipment (possibly electrical equipment) in Room 2 of the Former Generator Building.

Photo 16: View of location of shingle and tar sample EQ-ASB-01 (roof).

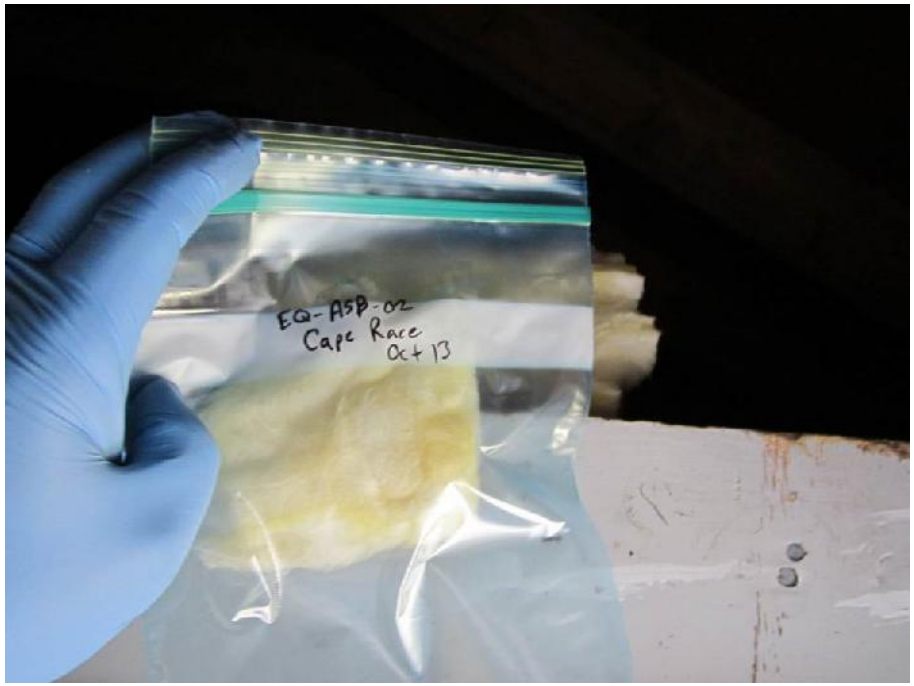

Photo 17: View of location of fiberglass insulation sample EQ-ASB-02 (ceiling).

Photo 18: View of location of tar paper sample EQ-ASB-03 (exterior wall).

Photo 19: View of location of paint samples EQ-PS-1 and EQ-PS-2 (exterior wall). Note: SVG on the white paint sample.

Photo 20: View of location of paint sample EQ-PS-3 (floor).

Photo 21: View of location of paint sample EQ-PS-4 (floor).

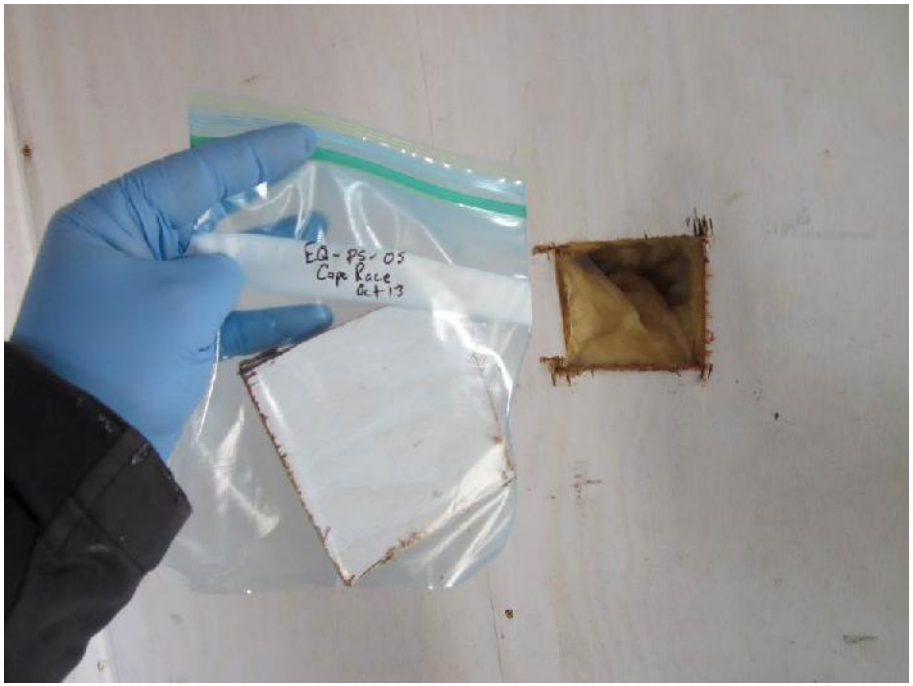

Photo 22: View of location of paint sample EQ-PS-5 (exterior wall). Note: Fibreglass insulation.

Photo 23: View of location of paint samples PS-2-A (exterior wall).

Photo 24: View of location of paint sample PS-3-A (floor).

Photo 25: View of location of paint sample PS-4-A (floor).

Photo 26: View of white Honeywell thermostat.

Photo 27: View of white Honeywell thermostat (casing removed).

Photo 28: View of dry chemical fire extinguisher.

APPENDIX C4

SAMPLE AND ANALYTICAL SUMMARY TABLES

Table C4-1: Bulk Sample Descriptions and Asbestos Analytical Results (Former Generator Building)

Sample ID	Material (Layer) Analyzed	Detailed Material Description	Sample Location / Room No. (Photo No.)	Analytical Result
EQ-ASB-01-Shingle	Shingle	Black shingle from roof	Former Generator Building Exterior (16)	2% Chrysotile
EQ-ASB-01-Tar	Tar	Black tar under shingle from roof	Former Generator Building Exterior (16)	ND
EQ-ASB-02	Fibreglass Insulation	Yellow fibreglass insulation from interior wall	Former Generator Building Room 1 (17)	ND
EQ-ASB-03	Tar Paper	Black tar paper from under clapboard	Former Generator Building Exterior (18)	ND

Notes:

ND: Non-detect

ND = <1% asbestos

Shaded results greater than 1% asbestos by dry weight are considered to be asbestos-containing materials (ACMs) as outlined in the Newfoundland and Labrador Asbestos Abatement Regulations (Reg. 111/98)

Table C4-2: Paint Sample Descriptions and Lead Analytical Results (Former Generator Building)

Sample ID	Colour Description	Substrate	Sample Location / Room No. (Photo No.)	RDL (mg/kg)	Total Lead (mg/kg)
EQ-PS-1	White	Wood (window, door and corner trims)	Former Generator Building Exterior (19)	5.0	**1,800**
EQ-PS-2	Red (multiple layers)	Wood (clapboard)	Former Generator Building Exterior (19)	5.0	**8,800**
EQ-PS-3	Grey over grey over red	Concrete (floor)	Former Generator Building Room 1 (20)	5.0	**8,700**
EQ-PS-4	Grey over green and yellow	Concrete (floor)	Former Generator Building Room 1 (21)	5.0	**13,000**
EQ-PS-5*	White	Plywood (wall)	Former Generator Building Room 1 (22)	5.0	32

Notes

* Paint sample included substrate

Bold and underlined results indicate that lead concentration is above the Federal HPA criterion of 90 mg/kg.

Shaded results indicate that lead concentration is above the former Federal HPA criterion of 5,000 mg/kg.

Table C4-3: Paint Sample Descriptions and Mercury Analytical Results (Former Generator Building)

Sample ID	Colour Description	Substrate	Sample Location / Room No. (Photo No.)	RDL (mg/kg)	Total Mercury (mg/kg)
EQ-PS-1	White	Wood (window, door and corner trims)	Former Generator Building Exterior (19)	<1.0	2.0
EQ-PS-2	Red (multiple layers)	Wood (clapboard)	Former Generator Building Exterior (19)	<1.0	1.4
EQ-PS-3	Grey over grey over red	Concrete (floor)	Former Generator Building Room 1 (20)	<1.0	4.4
EQ-PS-4	Grey over green and yellow	Concrete (floor)	Former Generator Building Room 1 (21)	<1.0	1.2
EQ-PS-5*	White	Plywood (wall)	Former Generator Building Room 1 (22)	<1.0	<1.0

Notes

* Paint sample included substrate

Bold and underlined results indicate that mercury concentration is above the Federal HPA criterion of 10 mg/kg.

Shaded results indicate that mercury concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for mercury in soil at an industrial site (50 mg/kg).

Table C4-4: Sample Descriptions and PCB Analytical Results (Former Generator Building)

		Paint					
Sample ID		EQ-PS-1	EQ-PS-2	EQ-PS-3	EQ-PS-4	EQ-PS-5*	EQ-PS-5 Lab-Dup*
Sample Location and Room No.		Former Generator Building Exterior	Former Generator Building Exterior	Former Generator Building Room 1	Former Generator Building Room 1	Former Generator Building Room 1	Former Generator Building Room 1
Colour Description		White	Red (multiple layers)	Grey over grey over red	Grey over green and yellow	White	White
Substrate		Wood	Wood	Concrete	Concrete	Plywood	Plywood
Location (Photo No.)		Windows, door and corner trims (19)	Clapboard (19)	Floor (20)	Floor (21)	Wall (22)	Wall (22)
Parameter	**RDL (mg/kg)**	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1221	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1232	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1248	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1242	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1254	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Aroclor 1260	5.0	<5.0	<5.0	<20	<20	<0.50	<0.50
Total PCB (Calculated)	5.0	<5.0	<5.0	<20	<20	<0.50	-

Notes:

* Paint sample included substrate

Lab-Dup: Laboratory duplicate

RDL: Reportable detection limit

<X: Non-detect

Shaded results indicate that PCB concentration is above the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for PCBs in soil at an industrial site (33 mg/kg).

Table C4-5: Paint Sample Descriptions and Leachable Lead Analytical Results (Former Generator Building)

		Data					Guidelines
Sample ID		PS-2-A*	PS-2-A Lab-Dup*	PS-2-A Lab-Dup 2*	PS-3-A	PS-4-A*	ENVC Guidance Document Leachable Toxic Waste, Testing and Disposal Revised November 2003 (GD-PPD-26.1)
Sample Location and Room No.		Former Generator Building Exterior	Former Generator Building Exterior	Former Generator Building Exterior	Former Generator Building Room 1	Former Generator Building Room 1	
Colour Description		Red (multiple layers)	Red (multiple layers)	Red (multiple layers)	Grey over grey over red	Grey over green and yellow	
Location (Photo No.)		Wood (clapboard) (23)	Wood (clapboard) (23)	Wood (clapboard) (23)	Concrete (floor) (24)	Concrete (floor) (25)	
Parameters	**RDL (µg/L)**	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Schedule II (Interprovincial Movement of Hazardous Waste Regulations (pending)) (µg/L)
Leachable Lead (Pb)	5.0	1,200	1,800	2,800	2,000	<5.0	5,000

Notes:

* Paint sample inluded substrate

Lab-Dup: Laboratory duplicate

RDL: Reportable detection limit

ENVC: Newfoundland and Labrador Department of Environment and Conservation

TCLP: Toxicity Characteristic Leaching Procedure

Shaded results indicate that TCLP concentration exceeds Schedule II TCLP limits provided in the Leachable Toxic Waste Guidance Document.

APPENDIX D4

ROOM-BY-ROOM INSPECTION SHEETS

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
Equipment (EQ)	outside	-	outside	

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	concrete foundation . wooden door - white.			
Walls	. red paint on clapboard . wood trim, white, doors, windows & Eves	poor		
Ceiling Roof.	→ shingles. . Black shingle over tar	poor		ASB. 1
Paint (collect adequate amount for leachate analysis)	Walls - red on wood Ceiling - Floor - grey on concrete Other - white on trims			PS-2 PS-1
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	-			
Piping / Mechanical Equipment	-			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: -	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	-			
Thermostats (eg. Honeywell, etc.)	Manufacturer Colour - Shape Wall/Floor Mounted Dial Casing		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	-			
Mould / Water Staining	Area impacted -			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) ASB-3 - black tar paper under clapboard			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
EQ	1	–	Main Room	

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	grey painted concrete	poor		
Walls	white paint plywood · steel door painted white on floor	fair → poor		
Ceiling	white paint plywood	fair		
Paint (collect adequate amount for leachate analysis)	Walls white on plywood Ceiling " Floor grey on concrete Other grey on green on concrete	poor		PS-5 PS-3 PS-4
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	yellow fibre glass in ceiling.	fair		ASB-2
Piping / Mechanical Equipment	–			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: –	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	6x incand			
Thermostats (eg. Honeywell, etc.)	Manufacturer honeywell Dial Colour white Casing plastic Shape rect Wall/Floor Mounted wall		Total #: 1 # Checked:	Mercury Switch: 0
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	–			
Mould / Water Staining	Area impacted –			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) various debris - concrete, wood, buckets, garbage bags, paint cans, small fan, small heater, plastic pipe			
Photos	Fire ext - old, ABC, 2A, 10-B·C. 746726 4ft baseboard heater, white			

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

Building	Room #	Floor #	Room Description	Dimensions (L x W x H)
E9	2	-	storage ?	

	Description	Condition (good, fair, poor)	Quantity (SF, LF, total)	Visual / Actual Samples Collected
Floor	Concrete - gray.	poor		
Walls	white on plywood	fair		
Ceiling	white on plywood			
Paint (collect adequate amount for leachate analysis)	Walls see above Ceiling Floor Other			
Insulation (Piping/Mechanical/ Wall/Ceiling/Other)	-			
Piping / Mechanical Equipment	- electrical panel - 4 ft baseboard heater			
Lighting (Fluorescent) (10% to be checked)	Ballast Manufacturer: Serial #: -	Leaking / Other	Total #: # Checked:	Suspect PCBs:
Lighting (Incandescent, HID, etc.)	4 x incand			
Thermostats (eg. Honeywell, etc.)	Manufacturer honeywell Dial Colour white Casing Shape rect plastic Wall/Floor Mounted wall		Total #: # Checked:	Mercury Switch:
LCMs (saudering, pipes batteries, exit/ emerg lighting,)	Random red pipes on Floor. 1 one through floor (steel) from ?			
Mould / Water Staining	Area impacted			
Other	e.g. UFFI, CO, VOCs, ODSs (refrigerator units/beverage coolers, drinking fountains, fire extinguishers), furnace, ASTs, USTs, drums) electrical panel, empty 45 gallon drums, empty 5 gallon pails (eg. hydraulic oil) concrete in bags			
Photos				

Legend: PS (paint sample); VPS (visual reference to PS); AS (asbestos sample); VAS (visual reference to AS); FS (fungal sample); LCM (lead-containing material); ACM (asbestos-containing material); DJC (drywall joint compound); VFT (vinyl floor tile – specify 1 x 1', 9 x 9"); ACT (acoustic ceiling tile – specify pattern e.g. speckled); LF (linear feet); SF (square feet).

Notes/Comments:

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APPENDICES

5.0 CLOSURE AND LIMITATIONS

5.1 QA/QC DISCUSSION

Details regarding the QC assessment of surrogate recoveries, laboratory blank and laboratory duplicate samples are presented in this section. The QA/QC results are reported on the laboratory certificates of analyses included in Appendix A5.

5.1.1 Surrogate Recoveries

The surrogate (decachlorobiphenyl) recoveries for 14 of the 18 paint samples analyzed for PCBs were not within the laboratory's acceptable QC limits of 30% - 130%. PCBs were not detected above the reportable detection limits in all of the paint samples analyzed during this assessment. According to Maxxam, an on-going issue with paint samples is the tendency for paints to be attached to the substrates (i.e., drywall, wood, etc.) and these materials often wick or absorb the surrogate rendering it unavailable for recovery.

The surrogate (decachlorobiphenyl) recovery for all five (5) caulking samples analyzed for PCBs were within the laboratory's acceptable QC limits of 30% - 130%.

The surrogate (leachable 2,4,6-tribromophenol, leachable 2-fluorobiphenyl, leachable 2-fluorophenol, leachable D14-terphenyl, leachable D5-nitrobenzene and leachable D5-phenol) recoveries for the treated wood sample analyzed for leachable arsenic, leachable chromium, leachable benzo(a)pyrene, leachable m/p-cresol, leachable o-cresol, leachable total cresol and leachable pentachlorophenol were within the laboratory's acceptable QC limits of 10% - 130% and 30% - 130%.

5.1.2 Laboratory Blank Samples

Laboratory method blank samples were analyzed for lead, mercury, PCBs and leachable arsenic, leachable chromium, leachable benzo(a)pyrene, leachable m/p-cresol, leachable o-cresol, leachable total cresol and leachable pentachlorophenol. The purpose of the laboratory blank samples were to assess the quality of the laboratory results with respect to the presence/absence of instrument cross contamination at the laboratory.

Analysis of the laboratory blank samples indicated non-detectable concentrations; therefore, no evidence of cross contamination at the laboratory was identified during the laboratory analytical program.

5.1.3 Laboratory Duplicates

The analytical data for the laboratory duplicate paint samples and the original paint samples analyzed for lead, mercury, PCBs and leachable lead were compared as relative percent differences (RPDs). A review of the laboratory duplicate data is summarized in Table 5-1.

Table 5-1: Laboratory Duplicate RPDs (Paint)

Lab Duplicate Sample ID	Original Sample ID	RPD – Lead %	RPD – Mercury %	RPD – PCBs %	RPD – Leachable Lead %
PS-6 (DWELLING) Lab-Dup	PS-6 (DWELLING)	21.5	10.5	NA	NA
FH-PS-1 Lab-Dup	FH-PS-1	NA	NA	---	NA
FH-PS-4 Lab Dup	FH-PS-4	13.3	---	NA	NA
EQ-PS-5 Lab-Dup	EQ-PS-5	NA	NA	---	NA
PS-2-A Lab-Dup	PS-2-A	NA	NA	NA	40
PS-2-A Lab-Dup 2	PS-2-A	NA	NA	NA	80

Notes:
--- denotes sample results are identical (i.e. 0.0%).
NA denotes not applicable.

The poor RPDs for leachable lead in samples PS-2-A Lab-Dup and PS-2-A Lab-Dup 2 are likely attributed to sample inhomogeneity.

The analytical data for the laboratory duplicate bulk material samples and the original bulk material samples analyzed for leachable semivolatiles and PCBs were compared as RPDs. A review of the laboratory duplicate data is summarized in Table 5-2.

Table 5-2: Laboratory Duplicate RPDs (Bulk Materials)

Laboratory Duplicate Sample ID	Original Sample ID	RPD – Leachable Semivolatiles % (Treated Timber)	RPD – PCBs % (Caulking)
TT-01 (DWELLING) Lab-Dup	TT-01 (DWELLING)	---	NA
FH-ASB-02-B Lab-Dup	FH-ASB-02-B	NA	---

Notes:
--- denotes sample results are identical (i.e. 0.0%).
NA denotes not applicable.

5.1.4 Summary of QA/QC Discussion

Overall, based on these QC reviews, the analytical results are considered representative of the site conditions in the immediate vicinity of the sample locations.

5.2 CLOSURE

This report was prepared for the exclusive use of PWGSC and DFO. The findings of this report are based solely on the conditions of the site buildings encountered at the time of the site visits, and are limited by the availability of information at the time of the HBMA, lack of accessibility to areas within the buildings, project scope and budget. The findings of this assessment are based on the interpretation of data from a limited number of areas investigated and analytical results pertaining to specific samples. It is possible that materials exist which could not be reasonably identified within the scope of the HBMA or which were not apparent or accessible during the site visits. This Report is also subject to the further limitations contained in Appendix B5.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler is required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. This assessment has been carried out using commercially reasonable best efforts consistent with the level and skill ordinarily exercised by members of the profession currently practicing under similar conditions.

Except when otherwise specified, Amec Foster Wheeler disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to Amec Foster Wheeler after the time during which Amec Foster Wheeler conducted the hazardous building materials assessment.

In evaluating the property, Amec Foster Wheeler has relied in good faith on information provided by other individuals noted in this report. Amec Foster Wheeler has assumed that the information provided is factual and accurate. In addition, some of the findings in this report are based upon information provided by the current owner/occupant. Amec Foster Wheeler accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

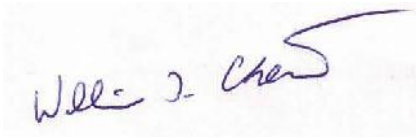
Yours truly,

Amec Foster Wheeler Environment & Infrastructure,
A Division of Amec Foster Wheeler Americas Limited

Prepared by:

Lori Wiseman, P.Eng.
Project Manager

Reviewed by:



Bill Chew, B.Sc., CET
Environmental Scientist

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APPENDIX A5

LABORATORY CERTIFICATES OF ANALYSES

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http://www.EMSL.com / torontolab@emsl.com

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Customer ID: 55MEEN26
Customer PO: TF16076698
Project ID:

Attn: Lori Wiseman
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Proj: CAPE RACE HBMA

Phone: (709) 722-7023
Fax: (709) 722-7353
Collected:
Received: 10/19/2016
Analyzed: 10/26/2016

Summary Test Report for Asbestos Analysis via EPA 600/R-93/116

Client Sample ID: ASB-01 ***Lab Sample ID:*** **551611239-0001**

Sample Description: Former Dwelling/Red Shingle over Black Shingle over Black Felt over Tar

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Black	0%	100%	None Detected	

Client Sample ID: ASB-02-A ***Lab Sample ID:*** **551611239-0002**

Sample Description: Former Dwelling/Exterior Grey Caulking Painted White

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Gray	0%	100%	None Detected	

Client Sample ID: ASB-03 ***Lab Sample ID:*** **551611239-0003**

Sample Description: Former Dwelling/Concrete Foundation Painted Grey

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Gray	0%	100%	None Detected	

Client Sample ID: ASB-04-A ***Lab Sample ID:*** **551611239-0004**

Sample Description: Former Dwelling/Exterior Door White Caulking Painted Red

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Red	0%	100%	None Detected	

Client Sample ID: ASB-05 ***Lab Sample ID:*** **551611239-0005**

Sample Description: Former Dwelling/Green Wire Casing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Gray/Black	85%	15%	None Detected	

Client Sample ID: ASB-06-Paper Backing ***Lab Sample ID:*** **551611239-0006**

Sample Description: Former Dwelling/Pink Fiberglass Insulation & Brown Paper Backing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Brown/Black	90%	10%	None Detected	

Client Sample ID: ASB-06-Insulation ***Lab Sample ID:*** **551611239-0006A**

Sample Description: Former Dwelling/Pink Fiberglass Insulation & Brown Paper Backing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Pink	90%	10%	None Detected	

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Project ID:

Summary Test Report for Asbestos Analysis via EPA 600/R-93/116

Client Sample ID: ASB-07 ***Lab Sample ID:*** **551611239-0007**

Sample Description: Former Dwelling/Brick Mortar Grey

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Gray	0%	100%	None Detected	

Client Sample ID: ASB-08 ***Lab Sample ID:*** **551611239-0008**

Sample Description: Former Dwelling/Brick Red

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Red	0%	100%	None Detected	

Client Sample ID: ASB-09-Floor Tile ***Lab Sample ID:*** **551611239-0009**

Sample Description: Former Dwelling/1x1 Vinyl Floor Tile, White & Brown Streaks & Brown Mastic

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Tan	0%	100%	None Detected	

Client Sample ID: ASB-09-Mastic ***Lab Sample ID:*** **551611239-0009A**

Sample Description: Former Dwelling/1x1 Vinyl Floor Tile, White & Brown Streaks & Brown Mastic

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Brown	0%	100%	None Detected	

Client Sample ID: ASB-10 ***Lab Sample ID:*** **551611239-0010**

Sample Description: Former Dwelling/Floral Panel Board

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Brown/White	85%	15%	None Detected	

Client Sample ID: ASB-11-Drywall Joint Compound ***Lab Sample ID:*** **551611239-0011**

Sample Description: Former Dwelling/Joint Compound, Tape & Gyp Rock

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Tan	0%	97%	**3% Chrysotile**	

Client Sample ID: ASB-11-Gypsum ***Lab Sample ID:*** **551611239-0011A**

Sample Description: Former Dwelling/Joint Compound, Tape & Gyp Rock

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	White	0%	100%	None Detected	

Client Sample ID: ASB-12 ***Lab Sample ID:*** **551611239-0012**

Sample Description: Former Dwelling/Black Tar Paper

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/25/2016	Brown	85%	15%	None Detected	

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Customer ID: 55MEEN26
Customer PO: TF16076698
Project ID:

Summary Test Report for Asbestos Analysis via EPA 600/R-93/116

Client Sample ID: FH-ASB-01-Red Shingle ***Lab Sample ID:*** **551611239-0013**

Sample Description: Fog Horn Builidng/Red Shingle on Black Shingle

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Red	0%	97%	**3% Chrysotile**	

Client Sample ID: FH-ASB-01-Black Shingle ***Lab Sample ID:*** **551611239-0013A**

Sample Description: Fog Horn Builidng/Red Shingle on Black Shingle

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	0%	100%	None Detected	

Client Sample ID: FH-ASB-02-A-Caulking ***Lab Sample ID:*** **551611239-0014**

Sample Description: Fog Horn Builidng/White Caulking, Black Felt Painted Red

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	White	0%	100%	None Detected	

Client Sample ID: FH-ASB-02-A-Felt ***Lab Sample ID:*** **551611239-0014A**

Sample Description: Fog Horn Builidng/White Caulking, Black Felt Painted Red

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	15%	85%	None Detected	

Client Sample ID: FH-ASB-03 ***Lab Sample ID:*** **551611239-0015**

Sample Description: Fog Horn Builidng/Black Tar Paper

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	40%	60%	None Detected	

Client Sample ID: FH-ASB-04-A ***Lab Sample ID:*** **551611239-0016**

Sample Description: Fog Horn Builidng/Black Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Gray/Black	0%	100%	None Detected	

Client Sample ID: FH-ASB-05-A ***Lab Sample ID:*** **551611239-0017**

Sample Description: Fog Horn Builidng/White Caulking Painted Red

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	White/Red	0%	100%	None Detected	

Client Sample ID: FH-ASB-06 ***Lab Sample ID:*** **551611239-0018**

Sample Description: Fog Horn Builidng/White Drywall Joint Compound & Tape

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Tan	0%	98%	**2% Chrysotile**	

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EMSL Canada Order 551611239
Customer ID: 55MEEN26
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Project ID:

Summary Test Report for Asbestos Analysis via EPA 600/R-93/116

Client Sample ID: FH-ASB-07-Paper Backing ***Lab Sample ID:*** **551611239-0019**

Sample Description: Fog Horn Builidng/Pink Fiberglass Insulation & Black, Brown Backing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Brown/Black	90%	10%	None Detected	

Client Sample ID: FH-ASB-07-Insulation ***Lab Sample ID:*** **551611239-0019A**

Sample Description: Fog Horn Builidng/Pink Fiberglass Insulation & Black, Brown Backing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Pink	90%	10%	None Detected	

Client Sample ID: FH-ASB-08 ***Lab Sample ID:*** **551611239-0020**

Sample Description: Fog Horn Builidng/White Gyp Rock

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	White	0%	100%	None Detected	

Client Sample ID: FH-ASB-09 ***Lab Sample ID:*** **551611239-0021**

Sample Description: Fog Horn Builidng/Concrete Painted Grey

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Gray	0%	100%	None Detected	

Client Sample ID: EQ-ASB-01-Shingle ***Lab Sample ID:*** **551611239-0022**

Sample Description: Equipment Building/Black Shingle over Tar

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	0%	98%	**2% Chrysotile**	

Client Sample ID: EQ-ASB-01-Tar ***Lab Sample ID:*** **551611239-0022A**

Sample Description: Equipment Building/Black Shingle over Tar

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	0%	100%	None Detected	

Client Sample ID: EQ-ASB-02 ***Lab Sample ID:*** **551611239-0023**

Sample Description: Equipment Building/Yellow Fiberglass Insulation

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Yellow	90%	10%	None Detected	

Client Sample ID: EQ-ASB-03 ***Lab Sample ID:*** **551611239-0024**

Sample Description: Equipment Building/Black Tar Paper

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	10/26/2016	Black	40%	60%	None Detected	

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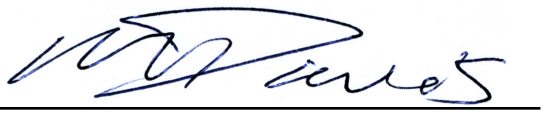
Summary Test Report for Asbestos Analysis via EPA 600/R-93/116

Analyst(s):

Romeo Samson PLM (15)
Ronald Ng PLM (16)

Reviewed and approved by:



Matthew Davis
or Other Approved Signatory

Samples analyzed by EPA 600/R-93/116 consistent with NLR 111/98. The estimated limit of detection for non-detect samples is <0.1%. Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL`s liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 10/26/201610:04:46

Your P.O. #: TF16076698
Your Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your C.O.C. #: B 157066, B 157065, B 157067

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
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Report Date: 2016/10/28
Report #: R4227594
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6M5562
Received: 2016/10/19, 14:48

Sample Matrix: Paint
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Paint Acid Extr. ICPMS	12	2016/10/24	2016/10/24	ATL SOP 00058	EPA 6020A R1 m
Metals Paint Acid Extr. ICPMS	2	2016/10/24	2016/10/26	ATL SOP 00058	EPA 6020A R1 m
PCBs in Paint by GC/ECD (1)	14	2016/10/24	2016/10/26		EPA 8082A m
PCB Aroclor sum (paint)	14	N/A	2016/10/26		Auto Calc.

Sample Matrix: SOLID
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Semivolatile Organic Compounds (TCLP) (2)	1	2016/10/27	2016/10/28	CAM SOP-00301	EPA 8270D m
Metals Leach TCLP/CGSB extraction	1	2016/10/25	2016/10/25	ATL SOP 00058	EPA 6020A R1 m
Metals Bulk Acid Extr. ICPMS	4	2016/10/21	2016/10/21	ATL SOP 00058	EPA 6020A R1 m
PCBs in Solid by GC/ECD (3)	4	2016/10/26	2016/10/27	ATL SOP 00105	EPA 8082A m
PCB Aroclor sum (solid)	4	N/A	2016/10/27		Auto Calc.
TCLP - % Solids (2)	1	2016/10/24	2016/10/25	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid (2)	1	N/A	2016/10/25	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH (2)	1	N/A	2016/10/25	CAM SOP-00401	EPA 1311 Update I m
TCLP Inorganic extraction - pH	1	N/A	2016/10/25	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	1	N/A	2016/10/25	ATL SOP 00035	EPA 1311 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your P.O. #: TF16076698
Your Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your C.O.C. #: B 157066, B 157065, B 157067

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/10/28
Report #: R4227594
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6M5562
Received: 2016/10/19, 14:48

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Non accredited test method. Best laboratory practices and all routine QC procedures were employed.
(2) This test was performed by Maxxam Analytics Mississauga
(3) Samples were analyzed for PCB using an accredited standard procedure modified for a non-standard matrix. Best laboratory practice and all routine QC procedures were employed. The accreditation does not extend to the matrix analyzed.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6M5562
Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		DGW020	DGW021	DGW022	DGW024	DGW025		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13		
COC Number		B 157066	B 157066	B 157066	B 157065	B 157065		
	UNITS	**FH-PS-1**	**FH-PS-2**	**FH-PS-3**	**PS-1 (DWELLING)**	**PS-2 (DWELLING)**	**RDL**	**QC Batch**
Metals								
Acid Extractable Lead (Pb)	mg/kg	42000	16000	31000	18000	14000	5.0	4714511
Acid Extractable Mercury (Hg)	mg/kg	3.5	<1.0	16	<1.0	<1.0	1.0	4714511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		DGW026	DGW027		DGW029	DGW029		
Sampling Date		2016/10/13	2016/10/13		2016/10/13	2016/10/13		
COC Number		B 157065	B 157065		B 157065	B 157065		
	UNITS	**PS-3 (DWELLING)**	**PS-4 (DWELLING)**	**RDL**	**PS-6 (DWELLING)**	**PS-6 (DWELLING) Lab-Dup**	**RDL**	**QC Batch**
Metals								
Acid Extractable Lead (Pb)	mg/kg	74000	110000	50	7200	5800	5.0	4714511
Acid Extractable Mercury (Hg)	mg/kg	<1.0	5.8	1.0	2.0	1.8	1.0	4714511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		DGW030	DGW031	DGW034	DGW035	DGW036	DGW037		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13		
COC Number		B 157065	B 157065	B 157067	B 157067	B 157067	B 157067		
	UNITS	**PS-7 (DWELLING)**	**PS-8 (DWELLING)**	**EQ-PS-1**	**EQ-PS-2**	**EQ-PS-3**	**EQ-PS-4**	**RDL**	**QC Batch**
Metals									
Acid Extractable Lead (Pb)	mg/kg	13000	1300	1800	8800	8700	13000	5.0	4714511
Acid Extractable Mercury (Hg)	mg/kg	2.1	1.8	2.0	1.4	4.4	1.2	1.0	4714511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B6M5562
Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

Maxxam ID		DGW020	DGW020	DGW021		DGW022		DGW024		
Sampling Date		2016/10/13	2016/10/13	2016/10/13		2016/10/13		2016/10/13		
COC Number		B 157066	B 157066	B 157066		B 157066		B 157065		
	UNITS	**FH-PS-1**	**FH-PS-1 Lab-Dup**	**FH-PS-2**	**RDL**	**FH-PS-3**	**RDL**	**PS-1 (DWELLING)**	**RDL**	**QC Batch**
PCBs										
Aroclor 1016	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1221	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1232	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1248	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1242	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1254	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Aroclor 1260	mg/kg	<5.0	<5.0	<5.0	5.0	<10	10	<5.0	5.0	4715273
Calculated Total PCB	mg/kg	<5.0		<5.0	5.0	<10	10	<5.0	5.0	4708704
Surrogate Recovery (%)										
Decachlorobiphenyl	%	26 (1)	21 (1)	9.7 (1)		11 (2)		17 (1)		4715273

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.
(2) PCB surrogate not within acceptance limits. Analysis was repeated with similar results. Elevated PCB RDL due to matrix / co-extractive interference.

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Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
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Sampler Initials: CT

POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

Maxxam ID		DGW025		DGW026	DGW027		DGW029		
Sampling Date		2016/10/13		2016/10/13	2016/10/13		2016/10/13		
COC Number		B 157065		B 157065	B 157065		B 157065		
	UNITS	**PS-2 (DWELLING)**	**RDL**	**PS-3 (DWELLING)**	**PS-4 (DWELLING)**	**RDL**	**PS-6 (DWELLING)**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1221	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1232	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1248	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1242	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1254	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Aroclor 1260	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4715273
Calculated Total PCB	mg/kg	<5.0	5.0	<10	<10	10	<5.0	5.0	4708704
Surrogate Recovery (%)									
Decachlorobiphenyl	%	8.2 (1)		51 (2)	44 (2)		28 (1)		4715273

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.
(2) Elevated PCB RDL due to matrix / co-extractive interference.

Maxxam ID		DGW030	DGW031	DGW034	DGW035		DGW036	DGW037		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13		2016/10/13	2016/10/13		
COC Number		B 157065	B 157065	B 157067	B 157067		B 157067	B 157067		
	UNITS	**PS-7 (DWELLING)**	**PS-8 (DWELLING)**	**EQ-PS-1**	**EQ-PS-2**	**RDL**	**EQ-PS-3**	**EQ-PS-4**	**RDL**	**QC Batch**
PCBs										
Aroclor 1016	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1221	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1232	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1248	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1242	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1254	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Aroclor 1260	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4715273
Calculated Total PCB	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<20	<20	20	4708704
Surrogate Recovery (%)										
Decachlorobiphenyl	%	6.3 (1)	11 (1)	18 (1)	12 (1)		21 (2)	25 (2)		4715273

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.
(2) PCB surrogate not within acceptance limits. Analysis was repeated with similar results. Elevated PCB RDL due to matrix / co-extractive interference.

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Maxxam Job #: B6M5562
Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

RESULTS OF ANALYSES OF SOLID

Maxxam ID		DGW032		
Sampling Date		2016/10/13		
COC Number		B 157065		
	UNITS	**TT-01 (DWELLING)**	**RDL**	**QC Batch**
Inorganics				
Final pH	pH	5.00		4715761
Initial pH	pH	9.05		4715761
Sample Weight (as received)	g	100	N/A	4714575
TCLP - % Solids	%	100	0.2	4715757
TCLP Extraction Fluid	N/A	FLUID 1		4715760
Initial pH	N/A	5.0		4714576
Final pH	N/A	4.9		4714576

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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ELEMENTS BY ICP/MS (SOLID)

Maxxam ID		DGW032		
Sampling Date		2016/10/13		
COC Number		B 157065		
	UNITS	**TT-01 (DWELLING)**	**RDL**	**QC Batch**
Metals				
Leachable Arsenic (As)	ug/L	170	20	4716251
Leachable Chromium (Cr)	ug/L	56	20	4716251

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Sampler Initials: CT

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

Maxxam ID		DGW023	DGW023	DGW028	DGW033	DGW038		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13		
COC Number		B 157066	B 157066	B 157065	B 157065	B 157067		
	UNITS	**FH-PS-4**	**FH-PS-4 Lab-Dup**	**PS-5 (DWELLING)**	**PS-9 (DWELLING)**	**EQ-PS-5**	**RDL**	**QC Batch**
Metals								
Acid Extractable Lead (Pb)	mg/kg	1600	1400	51000	120	32	5.0	4711716
Acid Extractable Mercury (Hg)	mg/kg	20	20	1.2	<1.0	<1.0	1.0	4711716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Sampler Initials: CT

SEMI-VOLATILE ORGANICS BY GC-MS (SOLID)

Maxxam ID		DGW032	DGW032		
Sampling Date		2016/10/13	2016/10/13		
COC Number		B 157065	B 157065		
	UNITS	**TT-01 (DWELLING)**	**TT-01 (DWELLING) Lab-Dup**	**RDL**	**QC Batch**
Semivolatile Organics					
Leachable Benzo(a)pyrene	ug/L	<0.10	<0.10	0.10	4721500
Leachable m/p-Cresol	ug/L	<2.5	<2.5	2.5	4721500
Leachable o-Cresol	ug/L	<2.5	<2.5	2.5	4721500
Leachable Cresol Total	ug/L	<2.5	<2.5	2.5	4721500
Leachable Pentachlorophenol	ug/L	<2.5	<2.5	2.5	4721500
Surrogate Recovery (%)					
Leachable 2,4,6-Tribromophenol	%	77	78		4721500
Leachable 2-Fluorobiphenyl	%	64	73		4721500
Leachable 2-Fluorophenol	%	28	28		4721500
Leachable D14-Terphenyl (FS)	%	92	92		4721500
Leachable D5-Nitrobenzene	%	66	73		4721500
Leachable D5-Phenol	%	27	29		4721500

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOLID)

Maxxam ID		DGW023	DGW028	DGW033	DGW038	DGW038		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13		
COC Number		B 157066	B 157065	B 157065	B 157067	B 157067		
	UNITS	**FH-PS-4**	**PS-5 (DWELLING)**	**PS-9 (DWELLING)**	**EQ-PS-5**	**EQ-PS-5 Lab-Dup**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1221	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1232	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1248	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1242	mg/kg	1.7	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1254	mg/kg	0.97	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Aroclor 1260	mg/kg	0.74	<0.50	<0.50	<0.50	<0.50	0.50	4718701
Calculated Total PCB	mg/kg	3.4	<0.50	<0.50	<0.50		0.50	4708705
Surrogate Recovery (%)								
Decachlorobiphenyl	%	105	107	101	107	109		4718701

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
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Your P.O. #: TF16076698
Sampler Initials: CT

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.7°C

POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

PCBs in Paint by GC/ECD: This data was generated using accepted laboratory practices and standard Quality Control procedures. However, due to the absence of a recognized reference method for the PCB Paints, an in-house method was used. Quality control (QC) samples were analyzed, however certain QA/QC elements may be unavailable, as noted:
1) Calculations of Method Detection Limit (MDL) as per CFR 40 (Part 136)
2) Accuracy and precision study
3) External performance evaluation study
4) Duplicate and/or matrix spike
analysis

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
FOG HORN BUILDING, FORMER DWELLING,
Site Location: EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4715273	Decachlorobiphenyl	2016/10/26	20 (1)	30 - 130	44	30 - 130	65	%		
4718701	Decachlorobiphenyl	2016/10/27	104	30 - 130	105	30 - 130	99	%		
4721500	Leachable 2,4,6-Tribromophenol	2016/10/28	80	10 - 130	89	10 - 130	81	%		
4721500	Leachable 2-Fluorobiphenyl	2016/10/28	74	30 - 130	81	30 - 130	78	%		
4721500	Leachable 2-Fluorophenol	2016/10/28	44	10 - 130	51	10 - 130	45	%		
4721500	Leachable D14-Terphenyl (FS)	2016/10/28	90	30 - 130	103	30 - 130	95	%		
4721500	Leachable D5-Nitrobenzene	2016/10/28	77	30 - 130	86	30 - 130	82	%		
4721500	Leachable D5-Phenol	2016/10/28	28	10 - 130	30	10 - 130	27	%		
4711716	Acid Extractable Lead (Pb)	2016/10/21	NC	75 - 125	104	75 - 125	<5.0	mg/kg	9.4	35
4711716	Acid Extractable Mercury (Hg)	2016/10/21	NC	75 - 125	107	75 - 125	<1.0	mg/kg	1.9	35
4714511	Acid Extractable Lead (Pb)	2016/10/24	NC	75 - 125	100	75 - 125	<5.0	mg/kg	22	35
4714511	Acid Extractable Mercury (Hg)	2016/10/24	92	75 - 125	106	75 - 125	<1.0	mg/kg	NC	35
4714575	Sample Weight (as received)	2016/10/25					NA	g		
4715273	Aroclor 1016	2016/10/26					<5.0	mg/kg	NC	50
4715273	Aroclor 1221	2016/10/26					<5.0	mg/kg	NC	50
4715273	Aroclor 1232	2016/10/26					<5.0	mg/kg	NC	50
4715273	Aroclor 1242	2016/10/26					<5.0	mg/kg	NC	50
4715273	Aroclor 1248	2016/10/26					<5.0	mg/kg	NC	50
4715273	Aroclor 1254	2016/10/26	26 (2)	30 - 130	91	30 - 130	<5.0	mg/kg	NC	50
4715273	Aroclor 1260	2016/10/26					<5.0	mg/kg	NC	50
4716251	Leachable Arsenic (As)	2016/10/25	98	75 - 125	96	80 - 120	<20	ug/L		
4716251	Leachable Chromium (Cr)	2016/10/25	94	75 - 125	97	80 - 120	<20	ug/L		
4718701	Aroclor 1016	2016/10/27					<0.50	mg/kg	NC	50
4718701	Aroclor 1221	2016/10/27					<0.50	mg/kg	NC	50
4718701	Aroclor 1232	2016/10/27					<0.50	mg/kg	NC	50
4718701	Aroclor 1242	2016/10/27					<0.50	mg/kg	NC	50
4718701	Aroclor 1248	2016/10/27					<0.50	mg/kg	NC	50
4718701	Aroclor 1254	2016/10/27	94	30 - 130	91	30 - 130	<0.50	mg/kg	NC	50
4718701	Aroclor 1260	2016/10/27					<0.50	mg/kg	NC	50

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Maxxam Job #: B6M5562
Report Date: 2016/10/28

QUALITY ASSURANCE REPORT(CONT'D)

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4721500	Leachable Benzo(a)pyrene	2016/10/28	84	30 - 130	97	30 - 130	<0.10	ug/L	NC	40
4721500	Leachable Cresol Total	2016/10/28	62	10 - 130	73	10 - 130	<2.5	ug/L	NC	40
4721500	Leachable m/p-Cresol	2016/10/28	52	10 - 130	62	10 - 130	<2.5	ug/L	NC	40
4721500	Leachable o-Cresol	2016/10/28	71	10 - 130	84	10 - 130	<2.5	ug/L	NC	40
4721500	Leachable Pentachlorophenol	2016/10/28	82	30 - 130	93	30 - 130	<2.5	ug/L	NC	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.

(2) Matrix Spike: results are outside acceptance limit. Analysis was repeated with similar results.

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Maxxam Job #: B6M5562
Report Date: 2016/10/28

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: HBMA CAPE RACE
Site Location: FOG HORN BUILDING, FORMER DWELLING, EQUIPMENT BUILDING
Your P.O. #: TF16076698
Sampler Initials: CT

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Eric Dearman, Scientific Specialist

Rosemarie MacDonald, Scientific Specialist (Organics)

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90 Esplanade Sydney, NS B1P 1A1 | Tel: 902-567-1255 | Fax: 902-539-6504 | Toll Free: 1-888-535-7770
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MAXXAM Chain of Custody Record

COC #: B 157066 Page 1 of 3

This column for lab use only:

Client Code

Maxxam Job # B6M5562

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			17	18	15	

Integrity: YES NO | Integrity / Checklist by: EC

Labelled by | Location / Bin #

INVOICE INFORMATION:

Company Name: Amec FW
Contact Name: Lori Wiseman
Address: 133 crosbie Road
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: 709-722-7023 Fax: 722-7353

REPORT INFORMATION (if differs from invoice):

Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #
Project # / Phase # TF16076698
Project Name / Site Location HBMA Cape Race
Quote Amec 2016
Site # Fog Horn Building
Task Order #
Sampled by CT

TURNAROUND TIME

Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

Hazardous Products Act
TDG Regulations

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HClO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	Lead	Mercury	PCB
1 [redacted] Flt-ps-1	paint	oct 13 2016	1 bag																				
2 Flt-ps-2	paint	↓	↓																				
3 Flt-ps-3	paint																						
4 Flt-ps-4	paint on drywall paper																						
5																							
6																							
7																							
8																							
9																							
10																							

2016 OCT 19 14:48

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Rob Foley	Oct 14/16		[illegible]		

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Maxxam Analytics International Corporation

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90 Esplanade Sydney, NS B1P 1A1 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770
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MAXXAM Chain of Custody Record

COC #: B 157065 Page 2 of 3

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Client Code:
Maxxam Job #: B6M5562

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			17	18	18	

Integrity: YES NO
Integrity Checklist by:
Labelled by:
Location / Bin #:

INVOICE INFORMATION:
Company Name: Amec FW
Contact Name: Lori Wiseman
Address: 133 Crosbie Road
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: 709-722-7023 Fax: 722-7353

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #:
Project # / Phase #: TF16076698
Project Name / Site Location: HBMA Cape Race
Quote: Amec 2016
Site #: Former Dwelling
Task Order #:
Sampled by: CT

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	Metals Water: RCAP-30 Choose Total or Diss Metals	Metals Water: RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved (for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	Lead	Mercury	PCBs	TCLP (PCP, Arsenic and Chromium Package for Treated Wood - except creosote)
1 PS-1 (dwelling)	paint	Oct 13/16	1 bag																			↓	↓	↓	
2 PS-2 (dwelling)																									
3 PS-3 (dwelling)	↓																								
4 PS-4 (dwelling)	paint ~~removed~~																								
5 PS-5 (dwelling)	Paint on wood																								
6 PS-6 (dwelling)	paint																								
7 PS-7 (dwelling)																									
8 PS-8 (dwelling)	↓	↓	↓																						
9 TT-01 (dwelling)	wood	↓	↓																					X	
10 PS-9 (dwelling)	paint on wood	↓	↓																						

2016 OCT 19 14:48

RELINQUISHED BY: (Signature/Print) Date Time
Rob Foley Oct 14/16
Robert Foley

RECEIVED BY: (Signature/Print) Date Time
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ATL FCD 00149 / Revision

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MAXXAM Chain of Custody Record

COC #: B 157067 Page 3 of 3

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Client Code:
Maxxam Job #: B6M5562

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			17	18	18	

Integrity: YES NO
Integrity / Checklist by: CR
Labelled by:
Location / Bin #:

INVOICE INFORMATION:
Company Name: Amec FW
Contact Name: Lori Wiseman
Address: 133 Crosbie Road
St. John's, NL Postal Code A1B4A5
Email: lori.wiseman@amecfw.com
Ph: 709-722-7023 Fax: 722-7353

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #:
Project # / Phase #: TF160076698
Project Name / Site Location: HBMA Cape Race
Quote: Nalcor 2016
Site #: Equipment Building
Task Order #:
Sampled by: CT

TURNAROUND TIME
Standard ☑
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles
1	EQ-PS-1	paint	oct 13 2016	1 bag
2	EQ-PS-2	↓	↓	↓
3	EQ-PS-3	↓	↓	↓
4	EQ-PS-4	↓	↓	↓
5	EQ-PS-5	paint on wood	↓	↓
6				
7				
8				
9				
10				

Metals Water: Field Filtered & Preserved; Lab Filtration Required; RCAP-30 Choose Total or Diss Metals; RCAP-MS Choose Total or Diss Metals; Total Digest (Default Method) for well water, surface water; Dissolved for ground water; Mercury
Metals Soil: Metals & Mercury Default Available Digest Method; Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4); Mercury Low level by Cold Vapour AA; Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural; Hot Water soluble Boron (required for CCME Agricultural)
Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32); Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32; NB Potable Water BTEX, VPH, Low level T.E.H.; TPH Fractionation; PAH's; PAH's with Acridine, Quinoline

Lead ↓ Mercury ↓ PCBs ↓

2016 OCT 19 14:48

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Rob Foley Robert Foley	oct 13/16				

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Your Project #: TF16076698
Site Location: CAPE RACE HBMA
Your C.O.C. #: B157068

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/10/25
Report #: R4222568
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6M6538
Received: 2016/10/19, 14:48

Sample Matrix: Paint
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PCBs in Solid by GC/ECD (1)	5	2016/10/21	2016/10/25	ATL SOP 00105	EPA 8082A m
PCB Aroclor sum (solid)	5	N/A	2016/10/25		Auto Calc.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Samples were analyzed for PCB using an accredited standard procedure modified for a non-standard matrix. Best laboratory practice and all routine QC procedures were employed. The accreditation does not extend to the matrix analyzed.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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Maxxam Job #: B6M6538
Report Date: 2016/10/25

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA
Sampler Initials: CT

POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

Maxxam ID		DHA222	DHA223	DHA224	DHA224	DHA225		
Sampling Date		2016/10/13	2016/10/13	2016/10/13	2016/10/13	2016/10/13		
COC Number		B157068	B157068	B157068	B157068	B157068		
	UNITS	**ASB-02-B (DWELLING)**	**ASB-04-B (DWELLING)**	**FH-ASB-02-B**	**FH-ASB-02-B Lab-Dup**	**FH-ASB-04-B**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1221	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1232	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1248	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1242	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1254	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Aroclor 1260	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4711688
Calculated Total PCB	mg/kg	<0.50	<0.50	<0.50		<0.50	0.50	4710418
Surrogate Recovery (%)								
Decachlorobiphenyl	%	37	46	74	64	75		4711688

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		DHA226		
Sampling Date		2016/10/13		
COC Number		B157068		
	UNITS	**FH-ASB-05-B**	**RDL**	**QC Batch**
PCBs				
Aroclor 1016	mg/kg	<0.66	0.66	4711688
Aroclor 1221	mg/kg	<0.66	0.66	4711688
Aroclor 1232	mg/kg	<0.66	0.66	4711688
Aroclor 1248	mg/kg	<0.66	0.66	4711688
Aroclor 1242	mg/kg	<0.66	0.66	4711688
Aroclor 1254	mg/kg	<0.66	0.66	4711688
Aroclor 1260	mg/kg	<0.66	0.66	4711688
Calculated Total PCB	mg/kg	<0.66	0.66	4710418
Surrogate Recovery (%)				
Decachlorobiphenyl	%	47 (1)		4711688

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated PCB RDL due to limited sample.

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Maxxam Job #: B6M6538
Report Date: 2016/10/25

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA
Sampler Initials: CT

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.7°C

Results relate only to the items tested.

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Maxxam Job #: B6M6538
Report Date: 2016/10/25

QUALITY ASSURANCE REPORT

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA
Sampler Initials: CT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4711688	Decachlorobiphenyl	2016/10/25	62	30 - 130	80	30 - 130	78	%		
4711688	Aroclor 1016	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1221	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1232	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1242	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1248	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1254	2016/10/25					<0.50	mg/kg	NC	50
4711688	Aroclor 1260	2016/10/25	64	30 - 130	82	30 - 130	<0.50	mg/kg	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6M6538
Report Date: 2016/10/25

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA
Sampler Initials: CT

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Rosemarie MacDonald, Scientific Specialist (Organics)

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Maxxam Analytics International Corporation

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90 Esplanade Sydney, NS B1P 1A1 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770
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MAXXAM Chain of Custody Record

COC #: B 157068 Page 1 of 1

This column for lab use only:
Client Code
Maxxam Job # B0M6539

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			17	18	16	

Integrity: YES (NO) Integrity / Checklist by: AW
Labelled by: Location / Bin #:

INVOICE INFORMATION:
Company Name: Amec FW
Contact Name: Lori Wiseman
Address: 133 Crosbie Road
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: 709-722-7023 Fax: 722-7353

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #
Project # / Phase # TF160766 98
Project Name / Site Location Cape Race HBMA
Quote Amec 2016
Site #
Task Order #
Sampled by CT

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	PCBs
1 ASB-02-B (dwelling)	chair rail	Oct 13	1 bag																		X
2 ASB-04-B (dwelling)																					X
3 FH-ASB-02-B																					X
4 FH-ASB-04-B																					X
5 FH-ASB-05-B																					X
6																					
7																					
8																					
9																					
10																					

2016 OCT 19 14:48

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Rob Foley Robb Foley	Oct 14/16		Anwar Axsan Wahab		

White: Maxxam Yellow : Mail Pink: Client ATL FCD 00149 / Revision 10

Your Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Your C.O.C. #: B156988

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/12/30
Report #: R4306998
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1647
Received: 2016/12/14, 10:59

Sample Matrix: Paint
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Leach TCLP/CGSB extraction	7	2016/12/22	2016/12/22	ATL SOP 00058	EPA 6020A R1 m
TCLP Inorganic extraction - pH	7	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	7	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Your C.O.C. #: B156988

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
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A1B 4A5

Report Date: 2016/12/30
Report #: R4306998
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1647
Received: 2016/12/14, 10:59

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==========
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Maxxam Job #: B6R1647
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Sampler Initials: RF

RESULTS OF ANALYSES OF PAINT

Maxxam ID		DPW479	DPW480	DPW481	DPW482	DPW483	DPW484	DPW485	
Sampling Date		2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09	
COC Number		B156988	B156988	B156988	B156988	B156988	B156988	B156988	
	UNITS	**PS-1-A**	**PS-2-A**	**PS-3-A**	**PS-4-A**	**PS-5-A**	**PS-6-A**	**PS-7-A**	**QC Batch**
Inorganics									
Sample Weight (as received)	g	100	80	100	100	100	100	3.9	4800048
Initial pH	N/A	4.9	4.9	4.9	4.9	4.9	5.0	5.1	4800051
Final pH	N/A	5.0	6.6	5.4	5.0	4.9	6.8	6.3	4800051
QC Batch = Quality Control Batch									

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Maxxam Job #: B6R1647
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Sampler Initials: RF

ELEMENTS BY ICP/MS (PAINT)

Maxxam ID		DPW479	DPW480	DPW481	DPW482	DPW483	DPW484	DPW485		
Sampling Date		2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09		
COC Number		B156988	B156988	B156988	B156988	B156988	B156988	B156988		
	UNITS	**PS-1-A**	**PS-2-A**	**PS-3-A**	**PS-4-A**	**PS-5-A**	**PS-6-A**	**PS-7-A**	**RDL**	**QC Batch**
Metals										
Leachable Lead (Pb)	ug/L	2900	3400	34000	13000	3900	5400	1000	5.0	4803354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6R1647
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Sampler Initials: RF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Sample DPW480 [PS-2-A] : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample DPW485 [PS-7-A] : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Results relate only to the items tested.

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Maxxam Job #: B6R1647
Report Date: 2016/12/30

QUALITY ASSURANCE REPORT

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Sampler Initials: RF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4800048	Sample Weight (as received)	2016/12/22					NA	g	0.0040	N/A
4803354	Leachable Lead (Pb)	2016/12/22	NC	75 - 125	99	80 - 120	<5.0	ug/L	39 (1)	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

(1) Poor RPD due to sample inhomogeneity. Results confirmed by repeat extraction and analysis.

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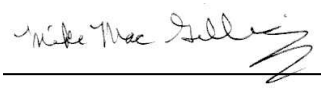
Maxxam Job #: B6R1647
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE. HBMA, DWELLING
Sampler Initials: RF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam Analytics International Corporation

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49 Elizabeth Ave., St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227
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www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC #: B 156988 Page 1 of 1

This column for lab use only:

Client Code

Maxxam Job # B6R1647

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			7	7	7	

Integrity: YES (NO) Integrity / Checklist by: AW

Labelled by: Location / Bin #:

INVOICE INFORMATION:

Company Name: Amec Foster Wheeler
Contact Name: Lori Wiseman
Address: 133 Crosbie Road
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: (709) 722-7023 Fax: (709) 722-7353

REPORT INFORMATION (if differs from invoice):

Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #
Project # / Phase # TF160766 98
Project Name / Site Location Cape Race HBMA
Quote Amec FW 2016-2017 standing offer
Site # Dwelling
Task Order #
Sampled by Robert Foley

TURNAROUND TIME

Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

NL ENVC, Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1)

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	TCLP + Lead
1 PS-[illegible]1-A	Paint	Dec. 9 2016	Baggie																		X
2 PS-2-A	"	"	"																		X
3 PS-3-A	"	"	"																		X
4 PS-4-A	"	"	"																		X
5 PS-5-A	"	"	"																		X
6 PS-6-A	"	"	"																		X
7 PS-7-A	"	"	"																		X
8																					
9																					
10																					

RELINQUISHED BY: (Signature/Print) Date Time
Lori Wiseman Dec 12/16 10:30 a.m.

RECEIVED BY: (Signature/Print) Date Time
2016 DEC 14 10:59

White: Maxxam Yellow: Mail Pink: Client

ATL FCD 00149 / Revision 10

Your Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Your C.O.C. #: B144527

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/12/30
Report #: R4306999
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1669
Received: 2016/12/14, 10:59

Sample Matrix: Paint
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Leach TCLP/CGSB extraction	3	2016/12/22	2016/12/22	ATL SOP 00058	EPA 6020A R1 m
TCLP Inorganic extraction - pH	3	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	3	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Your C.O.C. #: B144527

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/12/30
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Version: 1 - Final

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MAXXAM JOB #: B6R1669
Received: 2016/12/14, 10:59

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

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Maxxam Job #: B6R1669
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Sampler Initials: RF

RESULTS OF ANALYSES OF PAINT

Maxxam ID		DPW526	DPW526	DPW527	DPW528	
Sampling Date		2016/12/09	2016/12/09	2016/12/09	2016/12/09	
COC Number		B144527	B144527	B144527	B144527	
	UNITS	**PS-2-A**	**PS-2-A Lab-Dup**	**PS-3-A**	**PS-4-A**	**QC Batch**
Inorganics						
Sample Weight (as received)	g	100	100	60	100	4800048
Initial pH	N/A	4.9	4.9	4.9	4.9	4800051
Final pH	N/A	4.9	4.9	5.1	12	4800051

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6R1669
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Sampler Initials: RF

ELEMENTS BY ICP/MS (PAINT)

Maxxam ID		DPW526	DPW526	DPW526	DPW527	DPW528		
Sampling Date		2016/12/09	2016/12/09	2016/12/09	2016/12/09	2016/12/09		
COC Number		B144527	B144527	B144527	B144527	B144527		
	UNITS	**PS-2-A**	**PS-2-A Lab-Dup**	**PS-2-A Lab-Dup 2**	**PS-3-A**	**PS-4-A**	**RDL**	**QC Batch**
Metals								
Leachable Lead (Pb)	ug/L	1200	1800 (1)	2800 (2)	2000	<5.0	5.0	4803354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Poor RPD due to sample inhomogeneity. Results confirmed by repeat extraction and analysis.
(2) Poor RPD due to sample inhomogeneity.

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Maxxam Job #: B6R1669
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Sampler Initials: RF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Sample DPW527 [PS-3-A] : Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Results relate only to the items tested.

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Maxxam Job #: B6R1669
Report Date: 2016/12/30

QUALITY ASSURANCE REPORT

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Sampler Initials: RF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4800048	Sample Weight (as received)	2016/12/22					NA	g	0.0040	N/A
4803354	Leachable Lead (Pb)	2016/12/22	NC	75 - 125	99	80 - 120	<5.0	ug/L	39 (1)	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

(1) Poor RPD due to sample inhomogeneity. Results confirmed by repeat extraction and analysis.

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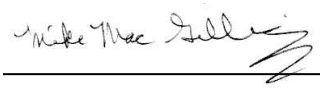
Maxxam Job #: B6R1669
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, EQUIPMENT BUILDING
Sampler Initials: RF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam Analytics International Corporation

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90 Esplanade Sydney, NS B1P 1A1 | Tel: 902-567-1255 | Fax: 902-539-6504 | Toll Free: 1-888-535-7770
www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC #: B 144527 Page 1 of 1

This column for lab use only:
Client Code
Maxxam Job #: B6R1669

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			7	7	7	

Integrity: YES (NO) | Integrity / Checklist by: fw
Labelled by | Location / Bin #

INVOICE INFORMATION:
Company Name: Amec Foster Wheeler
Contact Name: Lori Wiseman
Address: 133 Crosbie Road
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: (709) 722-7023 Fax: (709) 722-7353

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #
Project # / Phase #: TF16076698
Project Name / Site Location: Cape Race HBMA
Quote: Amecfw 2016-2017 Standing offer
Site #: Equipment Building
Task Order #
Sampled by: Robert Foley

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

NL ENVC, Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1)

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	TCLP + Lead
1 PS-2-A	Paint	Dec 9, 2016	Baggie																		X
2 PS-3-A	"	"	"																		X
3 PS-4-A	"	"	"																		X
4																					
5																					
6																					
7																					
8																					
9																					
10																					

RELINQUISHED BY: (Signature/Print) Date Time
Lori Wiseman Dec. 12/16 10:30 a.m.

RECEIVED BY: (Signature/Print) Date Time
MARYANN COMEAU 2016/12/14 10:59

White: Maxxam Yellow: Mail Pink: Client

ATL FCD 00149 / Revision 10

Your Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Your C.O.C. #: B144528

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
133 Crosbie Rd, Suite 202
St John's, NL
A1B 4A5

Report Date: 2016/12/30
Report #: R4307000
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1688
Received: 2016/12/14, 10:59

Sample Matrix: Paint
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Leach TCLP/CGSB extraction	3	2016/12/22	2016/12/22	ATL SOP 00058	EPA 6020A R1 m
TCLP Inorganic extraction - pH	3	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight	3	N/A	2016/12/22	ATL SOP 00035	EPA 1311 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Your C.O.C. #: B144528

Attention:Lori Wiseman

AMEC Foster Wheeler Environment & Infrastructure
St John's - Standing Offer
PO Box 13216
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A1B 4A5

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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1688
Received: 2016/12/14, 10:59

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B6R1688
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Sampler Initials: RF

RESULTS OF ANALYSES OF PAINT

Maxxam ID		DPW560	DPW561	DPW562	
Sampling Date		2016/12/09	2016/12/09	2016/12/09	
COC Number		B144528	B144528	B144528	
	UNITS	**PS-1-A**	**PS-2-A**	**PS-3-A**	**QC Batch**
Inorganics					
Sample Weight (as received)	g	100	100	100	4800048
Initial pH	N/A	4.9	4.9	4.9	4800051
Final pH	N/A	5.0	4.9	6.8	4800051
QC Batch = Quality Control Batch					

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Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Sampler Initials: RF

ELEMENTS BY ICP/MS (PAINT)

Maxxam ID		DPW560	DPW561	DPW562		
Sampling Date		2016/12/09	2016/12/09	2016/12/09		
COC Number		B144528	B144528	B144528		
	UNITS	**PS-1-A**	**PS-2-A**	**PS-3-A**	**RDL**	**QC Batch**
Metals						
Leachable Lead (Pb)	ug/L	10000	7100	2000	5.0	4803354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6R1688
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AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Sampler Initials: RF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Results relate only to the items tested.

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Maxxam Job #: B6R1688
Report Date: 2016/12/30

QUALITY ASSURANCE REPORT

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Sampler Initials: RF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4800048	Sample Weight (as received)	2016/12/22					NA	g	0.0040	N/A
4803354	Leachable Lead (Pb)	2016/12/22	NC	75 - 125	99	80 - 120	<5.0	ug/L	39 (1)	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

(1) Poor RPD due to sample inhomogeneity. Results confirmed by repeat extraction and analysis.

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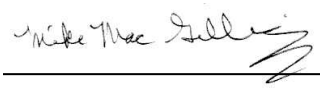
Report Date: 2016/12/30

AMEC Foster Wheeler Environment & Infrastructure
Client Project #: TF16076698
Site Location: CAPE RACE HBMA, FOG HORN BUILDING
Sampler Initials: RF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam Analytics International Corporation

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49 Elizabeth Ave., St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227
90 Esplanade Sydney, NS B1P 1A1 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770
www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC #: B 144528 Page 1 of 1

This column for lab use only:
Client Code
Maxxam Job # B6R1698

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			7	7	7	

Integrity: YES (NO) Integrity / Checklist by: AW
Labelled by: Location / Bin #:

INVOICE INFORMATION:
Company Name: Amec Foster Wheeler
Contact Name: Lori Wiseman
Address: 133 Crosbie Rd.
St. John's, NL Postal Code A1B 4A5
Email: lori.wiseman@amecfw.com
Ph: (709) 722-7023 Fax: (709) 722-7353

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PO #
Project # / Phase # TF16076698
Project Name / Site Location Cape Race HBMA
Quote AmecFW 2016-2017 Standing offer
Site # Fog Horn Building
Task Order #
Sampled by Robert Foley

TURNAROUND TIME
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10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

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NL ENVC, Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1)

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Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	TCLP + Lead
1 PS-1-A	Paint	Dec. 9, 2016	Baggie																		X
2 PS-2-A	"	"	"																		X
3 PS-3-A	"	"	"																		X
4																					
5																					
6																					
7																					
8																					
9																					
10																					

2016 DEC 14 10:59

RELINQUISHED BY: (Signature/Print) Date Time
Lori Wiseman Dec 12/16 10:30am

RECEIVED BY: (Signature/Print) Date Time

White: Maxxam Yellow : Mail Pink: Client

ATL FCD 00149 / Revision 10

emcscientific
INCORPORATED

Laboratory Analysis Report

To:

Lori Wiseman
AMEC Foster Wheeler
Environment & Infrastructure
133 Crosbie Road
P.O. Box 13216
St. John's, Newfoundland
A1B 4A5

EMC LAB REPORT NUMBER: 59801
Job/Project Name: HBMA Cape Race
Job/Project No: TF16076698 **No. of Samples:** 1
Sample Type: Bulk **Date Received:** Oct 19/16
Analysis Method(s): Direct Microscopic Examination
Date Analyzed: Oct 24/16 **Date Reported:** Oct 24/16
Analyst: Weizhong Liu, Ph.D., *Mycologist*
Approved By: Fajun Chen, Ph.D., *Principal Mycologist*

Client's Sample ID	Lab Sample No.	Date Sampled	Description/Location	Mould Identified, in Rank Order	Mould Growth
FH-MS-01	264760	Oct 13/16	Fog horn building	*Cladosporium*	Abundant

Note:
1. Mould growth is subjectively assessed with description terms sparse, moderate and abundant.
2. The presence of spores (lacking other fungal structures associated) is assessed as following: a few spores (< 10 spores average per microscopic field at 400X), some spores (10 - 100 spores average per microscopic field at 400X), many spores (> 100 spores average per microscopic field at 400X).
3. The presence of a few spores generally represents settled spores on the surface of the sample rather than indicating mould growth.
4. The results are only related to the samples analyzed.

APPENDIX B5

REPORT LIMITATIONS

LIMITATIONS

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:

   (a) The Standard Terms and Conditions which form a part of our Contract;
   (b) The Scope of Services;
   (c) Time and Budgetary limitations as described in our Contract; and,
   (d) The Limitations stated herein.

2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.

3. The conclusions presented in this report were based, in part, on visual observations of the site and attendant structures. Our conclusions cannot and are not extended to include those portions of the site or structures which were not reasonably available, in Amec Foster Wheeler's opinion, for direct observation.

4. The environmental conditions at the site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the site with any applicable local, provincial or federal by-laws, orders-in-council, legislative enactments and regulations was not performed.

5. Where testing was performed it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, might be present on site and be revealed by different or other testing not provided for in our contract.

6. The findings within this report do not reflect potential ACMs in areas not accessed, such as remote space areas, roof areas, wall cavities and ceilings spaces. During future renovations or demolition activities and subsequent removal of interior wall and ceiling materials, the actual quantities of asbestos containing materials can be verified. Also at this time, analysis of suspect ACM materials may be required if the appearance differs from that of materials previously confirmed to contain asbestos in adjacent rooms.

7. Because of the limitations referred to above, different environmental conditions from those stated in our report might exist. Should such different conditions be encountered, Amec Foster Wheeler must be notified in order that it may determine if modifications to the conclusions in the report are necessary.

8. The utilization of Amec Foster Wheeler's services during the implementation of any remedial measures will allow Amec Foster Wheeler to observe compliance with the conclusions and recommendations contained in the report. Amec Foster Wheeler's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.

9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report, is the sole responsibility of such third party. Amec Foster Wheeler accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.

10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Amec Foster Wheeler.

APPENDIX C
SITE PHOTOS

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

FORMER DWELLING

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FOG HORN BUILDING

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FOG HORN BUILDING

FOG HORN BUILDING

FOG HORN BUILDING

FOG HORN BUILDING

GENERATOR BUILDING

GENERATOR BUILDING

GENERATOR BUILDING

GENERATOR BUILDING

SITE OVERVIEW

APPENDIX D
CCA-COVID-19-STANDARDIZED PROTOCOLS FOR ALL CANADIAN CONSTRUCTION SITES

Canadian Construction Association

COVID-19 - Standardized Protocols for All Canadian Construction Sites

Version 4
April 16, 2020

For inquiries: Contact Zack Mullins
at zmullins@cca-acc.com

TABLE OF CONTENTS

COVID-19 - STANDARDIZED PROTOCOLS FOR ALL CANADIAN CONSTRUCTION SITES

The Standardized Protocols for All Canadian Construction Sites outlines the best practices for construction sites in order to maintain the health and safety of all workers required to perform duties during the COVID-19 crisis. The protocols, which include prevention, detection and response measures, will minimize the impacts of the crisis and ensure business continuity in the construction industry. This is not a legal document. Some provinces and municipalities have implemented stricter measures than those found in this document, and contractors are responsible for compliance with the rules, regulations and practices required by the applicable authorities. At the end of this document, there are links to information from some of our partner associations and other industry stakeholders that are further tailored to province specific requirements.

The objectives of the Standardized Protocols are to:

- Prioritize the health and safety of workers and of their surrounding communities;
- Apply recommendations and best practices from federal, provincial, and municipal public health authorities to construction site procedures;
- Establish and maintain a common COVID-19 Pandemic Response Plan across construction sites; and
- Foster open communication amongst stakeholders and ensure a respectful work environment.

Standardized Protocols for All Canadian Construction Sites

Prevention measures

Communication and awareness

- Clear signage is posted at entry points on the construction site and outline the commitment of the contractor to maintain health and safety measures during the COVID-19 crisis, with relevant updates from appropriate jurisdictions' public health authorities and self-identification screening tools.
- Worksite policies as they relate to the COVID-19 crisis are communicated to workers and made available on site.
- All workers exercise the following recommended practices for reducing the risk of transmission as identified by the Public Health Agency of Canada (PHAC), Health Canada, and Centers for Disease Control and Prevention:
    - o Avoid touching eyes, nose and mouth with unwashed hands;
    - o When coughing or sneezing:
        - Cough or sneeze into a tissue or the bend of your arm, not your hand;
        - Dispose of any tissues you have used as soon as possible in a lined waste basket and wash your hands afterwards;
    - o Non-medical face-coverings (such as homemade cloth masks) should be worn as a potential mitigant to catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing, physical distancing, and other protective measures. Face-coverings should be created and used in line with

the guidelines provided by PHAC, found here: canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks/instructions-sew-no-sew-cloth-face-covering.html;

- Clean and disinfect frequently touched objects and surfaces, including all reusable personal protective equipment (PPE);
- Do not share personal items or supplies such as phones, pens, notebooks, tools, PPE, etc.;
- Use and remove PPE with care, being mindful of which surfaces may be contaminated. Individuals must clean their hands after handling any used PPE;
- Avoid common physical greetings, such as handshakes;
- Maintain a minimum physical distance of two metres from others; and
- Wash hands often with soap and water for at least 20 seconds after using the washroom, before handling food, after blowing nose, coughing, or sneezing, and before smoking. If hands are not visibly soiled, and soap and water are unavailable, alcohol-based hand sanitizer can be used.

Business-related travel

- Non-essential business travel is not authorized. Business travel is limited and on an exceptional basis only.
- All individuals returning from out of country must undergo a 14-day self-isolation period, as mandated by the federal government and outlined here: canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/latest-travel-health-advice.html.
- As some provincial governments impose similar restrictions for inter-provincial travel, any such requirements for self-isolation must be obeyed as applicable.

Working remotely

- Where practical, all office employees supporting a project work remotely. Meetings are held through teleconferencing or videoconferencing.

Access and movement to/from construction site

- Wherever possible, workers travel to site using individual modes of transportation (e.g., personal vehicle or bicycle). Additional parking arrangements are made as required.
- Entry and exiting of the worksite is monitored and controlled to ensure that the minimum physical distancing is not broken when shifts begin and end.
- All non-essential individuals are not permitted access to the site.

Monitoring the status of workers

- Detailed tracking of worker's status on-site and off-site are kept at all time (e.g. fit to work, sick, off-work for family caring duties, etc.). A list of all quarantined workers is updated daily, with their privacy maintained.
- Records are kept of which individuals work together and when.

Construction site and site trailer cleaning protocols

- All offices and jobsites implement additional cleaning measures of common areas. All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal workstation areas are wiped down at least twice a day with a disinfectant, such as disinfectant wipes. Individuals are responsible for cleaning and disinfecting their workstations.

- Additional sanitary measures are implemented on site: hand washing stations with a posted hand washing protocol, hand sanitizer stations, provision of disinfectant wiping products. These types of facilities are made available at site entries, exits, washrooms, eating areas, offices, and any other areas with commonly touched surfaces.
- Commonly touched surfaces on vehicles and equipment are thoroughly cleaned and disinfected at the end of shifts and between users.
- All cleaning and disinfecting is carried out per PHAC's recommendations here: canada.ca/en/public-health/services/publications/diseases-conditions/cleaning-disinfecting-public-spaces.html.

Limiting and removing internal touch point areas

- Limit access and use of shared devices like coffee machines, water fountains, microwave ovens, and similar. Means to clean and disinfect such devices between uses is provided.
- Limit use of common pens for sign-in sheet to construction site.
- Washroom modifications - Install more sinks and sinks with physical separation between users where feasible. Change out taps, paper towel dispensers and garbage cans to hands-free models.
- Remove doors/door handles - Look at all reasonable opportunities to remove them.
- Where touch points like door handles and water coolers remain, paper towels are provided to allow users to avoid skin contact.
- Gloves are worn whenever possible while on the worksite, but are treated the same as bare hands in terms of minimizing unnecessary touching of anything on site and the user's face.

Compartmentalization

- The construction site is to be segregated to the extent possible in zones or other methods to keep different crews/trades physically separated at all time. This promotes physical distancing and supports the containment of propagation should it arise.
- Eating is restricted to clearly identified dedicated eating areas with handwashing stations, cleaning and disinfectant materials, and adequate space to maintain minimum physical distancing.
- Upper limits are put on the number of people allowed in each zone and in facilities like washrooms, trailers, and eating areas at once to allow for the recommended minimum physical distancing.
- One-way staircases are established wherever practical to minimize worker contact.
- Freight elevators are operated/occupied by only one individual at a time or where feasible, by respecting the minimum physical distancing guidelines.

Site operation

- The number of in person meetings is minimized. If required, meetings should involve only necessary individuals and include six people or fewer. Minimum physical distancing is maintained, and meetings are held in open spaces when possible.
- The worksite is rearranged to reduce high-traffic areas and allow for the minimum physical distancing.
- Site teams are encouraged to put forward split/alternating shifts to avoid extensive intermingling. Voluntary shift offset and implementing time gaps between shifts are highly encouraged.

- Alternate arrangements are made as necessary to ensure workers avoid breaking the minimum physical distance with others for prolonged periods. When this is not feasible, plans are made to minimize the duration of the task. For any work that ultimately must be done in close-proximity, a procedure is formalized outlining the required PPE and all steps to be taken to minimize risk.
- Where work is done in crews, the work is planned to minimize or eliminate the crossover of workers between crews.
- Project teams stagger break and lunch schedules to minimize the number of people in close proximity to one another. Enclosed lunchrooms are only made available during inclement weather.
- Work schedules are adjusted to provide time for proper cleaning and disinfecting as required.

Deliveries

- Delivery zones are clearly identified and limited to receivers and deliverers only.
- When possible, nothing is passed between the deliverer and the receiver (e.g. shipment documents and pens for signatures). Deliveries are unloaded solely by receivers using proper PPE, while deliverers remain in their vehicles.

Work in occupied spaces

- When working in spaces currently occupied (e.g. private residences), the minimum physical distancing with any occupants is strictly enforced. Where possible, workers and occupants are segregated in different rooms.
- Non-emergency work should not be done in any occupied spaces where an occupant is suspected to have contracted COVID-19 or is under self-isolation (per the directions of the applicable authorities). Emergency work can be carried out provided workers are equipped with nitrile gloves, Tyvek suits or coveralls, and facial/respiratory protection.
- Hands and tools are thoroughly cleaned before entering the workplace and after leaving, and any surfaces or equipment in the occupied space are disinfected before work is done on them.

Protocol auditing

- Contractors are to conduct periodic audits (frequency to be determined based on a project scale and scope) to verify that the appropriate measures have been implemented and are maintained.

Other

- Any other measures deemed to increase the safety or limit the propagation of the virus.

Detection measures

Screening at entry of construction site

- Before entering the site, individuals must confirm that:
    - o They are not currently exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion;
    - o They have not returned from outside of Canada within the past 14 days;
    - o To the best of their knowledge, they have not been in contact with someone with a confirmed or probable case of COVID-19; and

  - They have not been working on a site that was shut down due to the virus.

  Responses are to be kept private and treated as sensitive medical information.
- Individuals who are at increased risk of serious illness (due to age, pregnancy or other medical condition) are not to be permitted on site.
- Workers who are not authorized to access the site are to be safely transported directly back home, or to a preferred location of self-isolation. When unable to do so themselves, a vehicle and driver will be arranged for them.
- When transporting a potentially ill individual, both driver and passenger are to be given masks and nitrile gloves. The passenger is to sit in the backseat, and the driver is to open and close the doors for them.

Response measures

Possible cases of COVID-19

- Individuals who have been potentially exposed to the virus, or who are exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion are instructed to:
  - Not come to work;
  - Contact their supervisor and/or human resources department;
  - Stay at home and self-isolate; and
  - Contact local health authorities for further direction.

  Such individuals are required to follow the directions of the local health authority and may not return to work until given approval by the proper health authorities.
- Individuals who begin to display flu-like symptoms on site are instructed to avoid touching anything, take extra care to contain coughs and sneezes, and return home immediately to undergo self-isolation as directed by the local health authority..
- All areas on site potentially infected by a confirmed or probable case are barricaded to keep individuals two metres away until the area is properly cleaned and disinfected.

Response plans

- All contractors are to complete an integrated continuity plan to respond to partial or complete shutdown of construction sites or in the case of a severe limitation of site operations.

Other

- Refer to canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html for the latest information.

The situation related to COVID-19 is changing rapidly. This Protocol will be updated on an as required basis to reflect the latest broadly adopted measures.

For province specific guidance, please review the resources linked below. Questions on province-specific health and safety matters can be directed to the listed contacts.

British Columbia
British Columbia Construction Association
bccassn.com/media/Guidance%20to%20Construction%20Sites%20Operating%20During%20COVID19.pdf

BC Construction Safety Alliance
Mike Mckenna, Executive Director mmckenna@bccsa.ca
Tammy Oliver, Senior Director toliver@bccsa.ca

Alberta
Alberta Construction Association
albertaconstruction.net/wp-content/uploads/2020/04/PANDEMIC-PLANNING-FOR-THE-CONSTRUCTION-INDUSTRY.pdf

Alberta Roadbuilders and Heavy Construction Association
279e5ecb-ae4a-4a97-bda5-1b2fe77f0894.filesusr.com/ugd/77f1bc_683524748e3c482aac8a8f59e5a86218.pdf?index=true

Alberta Construction Safety Association
Dan MacLennan, CEO dmaclennan@youracsa.ca
Tammy Hawkins, COO thawkins@youracsa.ca

Saskatchewan
Saskatchewan Construction Association
scaonline.ca/third-party-information-bulletins.html

Saskatchewan Construction Safety Association
Thomas Archer, VP of Operations thomasa@scsaonline.ca
Collin Pullar, President collinp@scsaonline.ca

Heavy Construction Safety Association of Saskatchewan
Al Goldstone, Safety Director alg@hcsas.sk.ca

Manitoba
Winnipeg Construction Association
togetherwebuild.ca/

Construction Safety Association of Manitoba
Sean Scott, Executive Director sean@constructionsafety.ca
Derek Pott, Director of Operations derek@constructionsafety.ca

Manitoba Heavy Construction Association
Don Hurst, Director don@mhca.mb.ca

Ontario
ORBA / OGCA / RESCON / OSPE / OHBA
orba.org/wp-content/uploads/2020/03/ORBA-branded-COVID19-resource-and-best-management-practices-document-Final.pdf

Infrastructure Health & Safety Association
Enzo Garritano, President egarritano@ihsa.ca
Paul Casey, Vice President pcasey@ihsa.ca

Quebec
L'Association de la construction du Québec
acq.org/coronavirus/sante-securite-du-travail/

ASP Construction
Sylvie L'Heureux, Executive Director slheureux@asp-construction.org

New Brunswick
New Brunswick Construction Association
nbcsa.ca/wp-content/uploads/2020/04/Construction-Site-COVID-19-Prevention-Procedures.pdf

New Brunswick Construction Safety Association
Roy Silliker, CEO rsilliker@nbcsa.ca
Shelley Poirier, Senior Safety Advisor spoirier@nbcsa.ca

Nova Scotia
Construction Association of Nova Scotia
cans.ns.ca/covid-19-managing-covid-19-on-the-worksite/

Construction Safety Association of Nova Scotia
MJ MacDonald, CEO mmacdonald@constructionsafetyns.ca
Damon Alcock, Chief Safety Officer dalcock@constructionsafetyns.ca

Prince Edward Island
Construction Association of PEI
capei.ca/member_access/LiveEditor/images/Public%20Health%20Order%20-%20March%202020.pdf

Newfoundland and Labrador
Newfoundland and Labrador Construction Association
nlca.ca/critical-information-covid-19/

Newfoundland and Labrador Construction Safety Association
Jackie Manuel, CEO jmanuel@nlcsa.com

Yukon
Northern Safety Network Yukon
Sheila Sergy, Executive Director sheila@yukonsafety.com

Northwest Territories and Nunavut
Northern Construction Safety Association
Chris Johnston, Executive Director chris@nsa-nt.ca

APPENDIX E
FUEL STORAGE TANK MANAGEMENT PROCEDURE

Petroleum Storage Tank System Removal Close Out Documentation		
EC #:	**System Location:**	
	System Type:	
	Product Stored:	
1. DFO Action		
Environment Canada notified (Send completed EC form to ROEC within 60 days)	☐	
Tank Removal is to be supervised by a Certified Tank Installer or P.Eng and a letter for proof of the supervision.	☐	
Ensure a label is attached to the fill pipe indicating the tank is permanently withdrawn from service and the tank is locked once cleaned and purged (if necessary).	☐	
2. Contractor Action		
Licensed Petroleum Contractor or P. Eng Supervising Removal:		
Date of Removal:		
Tank disposal receipts provided	☐	
Liquid and sludge disposal receipts provided	☐	
Confirmation tank purged to less than 10% LEL (regardless of product contained/removed)	☐	
Indication of residual petroleum impacts to environment	Yes☐	No☐

Petroleum Storage Tank System Installation Checklist	
EC #:	**System Location:**
	System Type:
	Product Stored:

1. DFO Action	
Notify ROEC	☐
Determine CEPA requirements	☐
Determine CEAA requirements	
Design completed by Licensed Engineer (Including PTA design)	☐
Register System with Environment Canada (Contact ROEC)	☐
EC # posted on tank prior to first tank fill	☐
Emergency Plan up-to-date	☐
Emergency Plan available on site prior to first fill	☐
Spill response equipment available on site	☐
As-built drawings complete prior to first tank fill	☐
Tank installation is supervised by a Certified Tank Installer or P. Eng and a letter of proof of the supervision.	☐

2. Contractor Action	
Installation Date:	
Licensed Petroleum Contractor or P.Eng:	
As-built red line markup drawings complete	☐
Acknowledgement by licensed petroleum contractor of installation as per regulations and codes	☐

3. Engineer Action	
As-built record drawings complete	☐

TANK WITHDRAWAL FLOWCHART

Tank system withdrawn by an approved person or supervised by a professional engineer.

Permanent

- All liquids/sludge removed and disposed of at an approved facility;
- Tank purged of vapours to < 10% of the lower flammability limit.

- Presence of vapours checked with a combustible gas meter;
- Any tank designated for disposal must be cut to render it unfit for further use.

Withdrawal completed such that there is no immediate or long term harmful effect on the environment and it does not constitute a danger to human health.

Owner/Operator must notify Minister of the permanent withdrawal from service of storage tank system (or any component) within 60 days of such withdrawal.

Temporary (withdrawal <2 years)

If applicable, cathodic protection must be maintained and operated during withdrawal.

Underground tank systems (other than vertically-oriented underground tanks) or shop-fabricated aboveground tanks that have been out of service for more than one year, must be leak tested using tank precision leak detection in accordance with Section 21 of the Regulations prior to the system being returned to service.

Field erected aboveground tanks or vertically-oriented underground tanks that have been out of service for more than one year must have their floors inspected using either Ultrasonic, Magnetic Particle, Videographic or Vacuum methods before being put back into service.

Owner/Operator must keep a record of the date on which they withdrew the system from service.

Owner/Operator must affix a label to system's fill pipe stating that the system is permanently or temporarily out of service.

If storage tank system is to be removed, the Owner must have the system removed by an approved person or supervised by a professional engineer.

Owner must keep a record establishing that the storage tank system was removed by an approved person or supervised by a professional engineer (refer to Section V of the EC Storage Tank System Identification Form).

Records must be kept at the Owner/Operator's place of work nearest to the system for five years after the day on which the record was made.

APPENDIX F
SITE SPECIFIC RISK MANAGEMENT PLAN

Property Description

The site (DFRP# 00004) is situated in a remote area on the southeast tip of the Avalon Peninsula adjacent to the Atlantic Ocean (Figure 1). It is approximately 150 kilometers (km) southwest of the City of St. John's, Newfoundland and Labrador (NL), refer to Figure 1. The site is accessible by a twenty-two (22) kilometer gravel road. The property is currently operated as a lightstation by Fisheries Canadian Coast Guard (CCG). The property was first established as a light station in 1856, with the addition of a light keepers dwelling in 1858 and a fog alarm in 1873. The initial tower was made of steel. Information obtained online indicates that the current tower was constructed in 1906 (lighthousefriends.com).

The Light Station property has been divided into two separate areas as follows:

- Area 1 – Building Area: Contains the Former Dwelling, Former Fog Horn Building, Former Generator Building, New Fog Horn Building, Light Tower and Communications Tower (Aliant Telecom Incorporated).
- Area 2 – Northern Area: Contains the current Fuel Cache Area which is leased and operated by the Department of National Defense [DND] for Search and Rescue [SAR] helicopter refueling and the Lightkeepers Residence, which is resided year around by two CCG employees, and a DFO owned Garage. The site also and contained a former Fuel Cache Area (now a concrete pad) and Disposal sites No.1 to No.3

The Cape Race Lighthouse was designated a national historic site in 1974 and a Recognized Federal Heritage Building in 1990. The Myrick Wireless Interpretative Centre (Marconi Building) is owned and operated by the CRHI. The Environment Canada Weather Recording Equipment Area was not included in the assessment.

Based on the results of historical assessments completed at the site, the primary focus of the human health and ecological risk assessment was Area 1, the Building Area.

Based on field observations, the majority of the site is grassed with a gravel covered road and parking areas. The majority of the grassed area near the Former Generator Building was imported fill and sod with natural/original grasses remaining along the perimeter of the site. Bedrock at the site consists of grey to black fractured shale. There was limited vegetation on the site and several bare areas with bedrock outcrops. No potable wells are located on-site or in the immediate vicinity of the site. Land to the north and west of the site is undeveloped Crown land. Land to the south and east of the site is a steep rocky coastline and the Atlantic Ocean.

An environmental summary of site conditions is presented below, followed by the Site Specific Risk Management Plan (SSRMP).

Environmental Summary of Site Conditions

<table>
<tr><td rowspan="8">ESA Details</td><td>Environmental Site Investigation
NGL (1994)</td><td>Nine Test Pits</td><td>TP24 to TP32</td></tr>
<tr><td>Phase IV Risk Assessment
NGL (1995)</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Phase IV RAP
NGL (1995)</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Demolition and Site Remediation
CCG (1995)</td><td>No confirmatory soil samples collected</td><td>N/A</td></tr>
<tr><td>Phase III/IV ESA
Dillon (2001)</td><td>38 Test Pits
7 Groundwater Monitoring Wells</td><td>Soil: TP1 to TP38
Soil/Groundwater: MW1 to MW7</td></tr>
<tr><td>Supplemental Phase III ESA and HHERA
Amec Foster Wheeler (2015)</td><td>55 surface soil samples

3 boreholes/monitoring wells (sub-soil and groundwater samples)

2 – subslab vapour samples, 2 events</td><td>Surface Soil: SS1-SS55

Subsurface Soil: 14-MW1-SS1, 14-MW1-SS2, 14-MW1-SS3, 14-MW1-SS4, 14-MW2-SS1, 14-MW3-SS1

Groundwater: 14-MW1 to 14-MW3, MW1

Vapour: Probe #1 & Probe #2 (two events)</td></tr>
<tr><td colspan="3">Analysis Conducted:
Soil – Benzene, toluene, ethylbenzene, xylenes (BTEX)/total petroleum hydrocarbons (TPHs), metals, polycyclic aromatic hydrocarbons (PAHs)
Groundwater – BTEX/TPH, Metals, PAHs
Vapour – BTEX, TPH Fractionation</td></tr>
<tr><td>ESA Summary of Findings</td><td colspan="3">• Environmental Site Investigation (NGL, 1998) – Nine test pits excavated. Two areas of petroleum hydrocarbon impacted soil were identified near the Former Fog Horn Building and Former Dwelling.
• Phase IV Risk Assessment (NGL, 1995) – The risk assessment concluded that remedial action was warranted for soil. The development of a remedial action plan (RAP) was recommended for the Site.
• Phase IV RAP (NGL, 1995) – The RAP identified in-situ land farming as appropriate remedial approaches for impacted soil.
• Demolition and Site Remediation (CCG, 1995) - Soil from two impacted areas was excavated and fuel storage tanks were removed. The excavated soil was spread to increase surface area and allow for aeration and volatile organic compound evaporation. No confirmatory soil samples were collected. A considerable amount of scrap metal was also removed from the site.
• Phase III/IV (Dillon, 2001) - Soil and groundwater samples were analyzed for BTEX/TPH, PAHs and metals. TPH impacted soil was delineated from the Former ASTs location adjacent to the Former Generator Building to the Former Dwelling. Approximately 2,500 metric tonnes of impacted soil exceeded applicable guidelines. PAH and metals (copper and lead) exceeded guidelines in the area of impacted soil. A thin film (<0.01 m) of free product was observed in several test pits and MW7. The area where free product was observed and coincided with the area where soil exceeded guidelines.
• PWGSC provided the reports by Dillon (2001) and PWGSC (2003) to the NL Department of Environment and Conservation (ENVC) for review Based solely on the information contained in the reports, ENVC was satisfied, at that point in time, that the stated level of contamination remaining at the site, in the area addressed by the reports, does not pose an unacceptable risk to human health and the environment. Notwithstanding this opinion, the Department reserved the right to re-evaluate this decision should new information come available, or should site activities, site uses or circumstances change which may result in an increase in contamination or contaminant migration or which may cause changes in site conditions or site classification that may otherwise pose a risk to human health and the environment.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">• Supplemental Phase III ESA and HHERA (Amec Foster Wheeler, 2015) – Concentrations of BTEX/TPH in soil were below the Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) and PAHs in soil were below the CCME Canadian Soil Quality Guidelines (CSQGs). Concentrations of arsenic, chromium, copper, lead, mercury, molybdenum, selenium and zinc in soil exceeded CCME CSQGs. Petroleum hydrocarbons were detected in groundwater at a concentration above the Atlantic PIRI Tier I ecological screening levels (ESLs) for protection of plants and soil invertebrates. All other parameters in soil, groundwater and vapour were below guideline levels.</td></tr>
<tr><td rowspan="2">Environmental Site Remediation and Restoration</td><td>Environmental Site Remediation and Restoration PWGSC (2003)</td><td>15 Soil Samples</td><td>Confirmatory Soil Samples: Cape Race-01 to Cape Race-15</td></tr>
<tr><td colspan="3">• 1000 m³ of soil was excavated to bedrock (generally >0.5 m) from around the Former Generator Building, partially around the Former Dwelling and surrounding test pits TP14, TP25 and TP27 (near Former Back-up Generator Building) and removed for treatment/disposal. The limits of excavation are provided in Figure 3, attached.
• Approximately 20,000 L of PHC impacted water was removed from site.
• 15 confirmatory soil samples (Cape Race-01 to Cape Race-15) were collected from the limits of excavation for BTEX/TPH analysis. BTEX/TPH concentrations in confirmatory soil samples (with the exception of soil sample Cape Race-09) were below the then applicable Tier I RBSLs and all were below the Site Specific Targets Levels calculated for the site in 2001.
• Oxygen Releasing Compounds (ORCs) were applied to the base of the excavations prior to backfilling to promote microorganism growth and residual degradation.</td></tr>
<tr><td rowspan="2">Document Review, Data Gap Analysis</td><td>Document Review, Data Gap Analysis, Amec Foster Wheeler (2015)</td><td>n/a</td><td>n/a</td></tr>
<tr><td colspan="3">In 2014 Amec Foster Wheeler conducted a Data Gap analysis for the site consisting of a detailed review of all previous reports completed for the site. The following data gaps and following up recommendations were provided for the Building Area of the site.

• No post-remediation groundwater monitoring was conducted since conditional closure was granted for the site in 2003. Groundwater monitoring, sampling and analysis was recommended to assess the presence/absence of free product on groundwater and determine current concentrations of PHCs, PAHs and metals.
• Based on the age of the buildings (80 plus years) (with the exception of the new Fog Horn Building), it is likely that exterior surfaces contain lead and mercury based paints. The painted surfaces were observed to be in poor condition and paint chips were observed in the soil along the foundations of the Former Dwelling, Former Fog Horn Building, Former Generator Building and Light Tower. It was recommended that surface soil samples be collected adjacent to the foundations of the site buildings for metals analysis.
• No soil was removed from underneath the buildings during the Environmental Site Remediation program completed at the site by PWGSC in 2003. Given that the boundaries of the petroleum hydrocarbon impacted soil encroached the building foundations, it is possible that petroleum hydrocarbon impacted soil is present underneath the structures. It was recommended that sub-slab vapour sampling and analysis be conducted at the Former Dwelling, Former Fog Horn Building and Former Generator Building.
• In summary, based on a review, groundwater monitoring, surface water sampling, soil vapour sampling and a HHERA were recommended for the site.
• Following the document review, several attempts were made to install sub-slab vapour probes in the concrete foundations of the Former Generator Building and Former Fog Horn Building. However, due to large rocks (beach rocks) in the concrete foundations, drilling and thus probe installation could not be completed. The sub-slab assessment was only conducted at the Former Dwelling.</td></tr>
</table>

Human Health and Ecological Risk Assessment (HHERA)	Supplemental Phase III ESA and HHERA Amec Foster Wheeler (2015)	See ESA section above	See ESA section above

	• The assumed receptors for the HHRA included the following (i.e., two land use options):
	  ◦ For Current Use: 1) DFO Worker present on site 2 hours a day, 7 days a week for half the year (26 weeks) based on rotational shifts, and 2) a site visitor (toddler) assumed to be present on site for 2 hours a day, 2 days a week, 52 weeks of the year.
	  ◦ Potential Future Use: Resident/Tourism Operator, which assumed that a person (toddler) would live at the site 7 days per week, 24 hours per day, 52 weeks per year throughout their lifetime. This is also protective of a tourism worker that could potentially reside at the site.
	• PHC soil vapour concentrations detected in the former dwelling during two sampling events are less than the applicable indoor air RfCs/RSCs and soil PHC concentrations are less than the soil ingestion/dermal contact PSSLs. No further HHRA of PHCs to human receptors on-site is required for either land use option (residential or commercial).
	• Based on the qualitative risk evaluation, the following conceptual site model was developed for evaluating the quantitative exposure: Metals impacts (lead, mercury) are present in the surface soil on the site. Adult workers and potential residents may be exposed to impacted soil/dust through ingestion, dermal contact, and inhalation of re-suspended soil/dust particles.
	• Site specific target levels (SSTLs) were developed for lead and mercury for both land use options based on the conceptual model.
	• The derived SSTLs for lead and mercury for commercial workers were 11,350 mg/kg and 61 mg/kg, respectively and the derived SSTLs for lead and mercury for site visitors were 1,400 mg/kg and 24 mg/kg, respectively. SSTLs in both cases were above the exposure point concentrations. Therefore, **if the property use remains as it is currently** (commercial, with site visitor), unacceptable risks to on-site human receptors are not expected and no further assessment or remediation of lead or mercury is required.
	• The revised SSTLs for lead and mercury (427 mg/kg and 8 mg/kg, respectively), are less than the exposure point concentrations indicating that there is a potential for unacceptable risks to a toddler or a tourism operator that would reside at the site, **if the site is redeveloped for residential use**. In the event that the property undergoes divestiture and is used for residential purposes, remediation or soil risk management is recommended for the subject property, based on human health considerations.
	• Based on the results of the ERA, substantive health risks to ecological receptors, including plants, soil invertebrates, mammals, birds, and species at risk, are not expected at the site.		

Species At Risk Act (SARA)	• The harlequin duck (Histrionicus histrionicus), short eared owl (Asio flammeus), and woodland caribou (Rangifera tarandus) were identified by the SARA registry search. • A number of whale species and the leatherback sea turtle (Dermochelys coriacea) were listed by SARA, which may be found in the marine environment within proximity of the site. However, they would have very limited, if any, exposure to the terrestrial environment at the site. • Many terrestrial species were quickly eliminated because the habitat is so exposed and with minimal vegetation with the exception of grass.		
References	1. Environmental Site Investigation, Cape Race Lightstation, Cape Race, NL, Newfoundland Geosciences Limited (NGL), September 1994. 2. Phase IV Risk Assessment, Cape Race Lightstation, Cape Race, NL, NGL, March 1995a. 3. Phase IV Remedial Action Plan, Cape Race Lightstation, Cape Race, NL, NGL, March 1995b. 4. Demolition and Site Remediation, Cape Race Lightstation, Summary Report, CCG, 1995. 5. Phase III/IV ESA, Cape Race Lightstation, Dillon Consulting Limited, 2001. 6. Environmental Site Remediation & Restoration, Cape Race Lightstation, Cape Race, NL, PWGSC, 2003. 7. Document Review, Data Gap Analysis and Statement of Work Development, Cape Race Lightstation, Cape Race, NL, Amec Foster Wheeler, 2015 8. Supplemental Phase III ESA, HHERA, Cape Race. Amec Foster Wheeler, 2015		

Site Specific Risk Management Plan (Current Use - Commercial/Site Visitor)

		Date Created: January 13, 2016
Risk Management Objectives	• Advise and protect DFO/CCG workers and construction workers performing earthwork activities at the affected areas. • Protect occasional site visitors who would be present on the site.	
Potential Risks	• Human health receptors associated with lead and mercury in soil. • Exposure pathways include direct/dermal contact, inhalation and/or ingestion of contaminants.	
Issue of Concern (Current Use)	**Location (Figure 4)**	**Required Risk Management Actions (Current Use)**
Lead and Mercury in Soil	Although it was concluded that there were no unacceptable risk associated with metals impacts in soil, there are areas of metal exceedances of CCME guidelines (see Figure 4 in Appendix A).	• Any earthwork activities on site should be performed in accordance with a site specific health & safety plan (HASP) to address potential contaminants. Proper personal protective equipment (PPE) such as gloves and protective clothing (disposable cover-alls) should be worn to limit dermal contact and inadvertent ingestion of impacted soil while working in the areas indicated in Figure 4.
Historical soil analytical data for contaminants of concern (lead and mercury) are appended in Appendix A.		
Monitoring Requirements:		
None required at this time		
Other Risk Management Considerations:		
Land Use Changes	Change to the current land use from commercial may have an impact on site human health risk. (i.e., construction of buildings or change to residential use). In the event of land use changes, a re-evaluation of this SSRMP may be required in the event of land use change.	
Hazardous Building Materials	Consult with the Office of Environmental Coordination for work associated with the existing building or infrastructure (i.e. renovation/demolition or removal). All structures on site that contain lead and mercury based paint will need to be remediated (i.e., source removal).	

Site Specific Risk Management Plan (Potential Future Use – Residential)

		Date Created: January 13, 2016
Risk Management Objectives	• Protect occasional site visitors who would be present on the site. • Protect occupants including visitors, tourism operators/workers who would reside on the site.	
Potential Risks	• Human health receptors associated with lead and mercury in soil. • Exposure pathways include direct/dermal contact, inhalation and/or ingestion of contaminants.	
Issue of Concern	**Location (Figure 5)**	**Required Risk Management Actions**
Lead and Mercury in Soil	The lead and mercury contaminated soil is located in the building area of the site.	• Any earthwork activities on site should be performed in accordance with a site specific health & safety plan (HASP) to address potential contaminants. Proper personal protective equipment (PPE) such as gloves and protective clothing (disposable cover-alls) should be worn to limit dermal contact and inadvertent ingestion of impacted soil. • Should the impacted areas be located near high traffic areas (i.e. doorways, pathways) consideration should be given to constructing wooden walkways and/or steps to prevent dermal contact and to protect the vegetated cover/barrier, if practicable. • Vegetable gardens should not be constructed in the areas identified on Figure 5, attached, unless they are raised beds (at least 0.3 m) with imported soil. • The former fog horn building and former generator building should not be used for residential purposes. Further assessment may be required with respect to petroleum hydrocarbons if use of these buildings changes; and **Either** • The area to the west of the former dwelling, indicated on Figure 5 should be remediated. Soil is recommended to be removed to a depth of 0.3 m, and backfilled with clean material **Or** • The gravel or disturbed surfaces in the area to the west of the former dwelling are to be capped. This will include installation of a geotextile liner, followed by a soil layer and sod to provide a barrier for dermal contact, if practicable. On-going monitoring will be required to ensure the cap remains in place.
Historical soil analytical data for contaminants of concern (lead and mercury) are appended in Appendix A.		
Monitoring Requirements:		
If impacted areas discussed above are capped or if area is remediated, on-going monitoring will be required to ensure the cap remains in place. The groundcover inspection checklist (provided in Appendix B) must be completed for the site.		
Other Risk Management Considerations:		
Land Use Changes	Change to land use may have an impact on site human health risk. (i.e., construction of buildings). In the event of these changes, a re-evaluation of this SSRMP may be required.	
Hazardous Building Materials	Consult with the Office of Environmental Coordination for work associated with the existing building or infrastructure (i.e. renovation/demolition or removal). All structures on site that contain lead and mercury based paint will need to be remediated (i.e., source removal).	

NOTES:

THIS DRAWING BASED ON 1:50,000 TOPOGRAPHIC MAP 1 K/11.

THIS DRAWING IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION IN SUPPORT OF THIS REPORT.

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Environment & Infrastructure
133 Crosbie Road
St. John's, NL A1B 4A5
709-722-7023

Client:

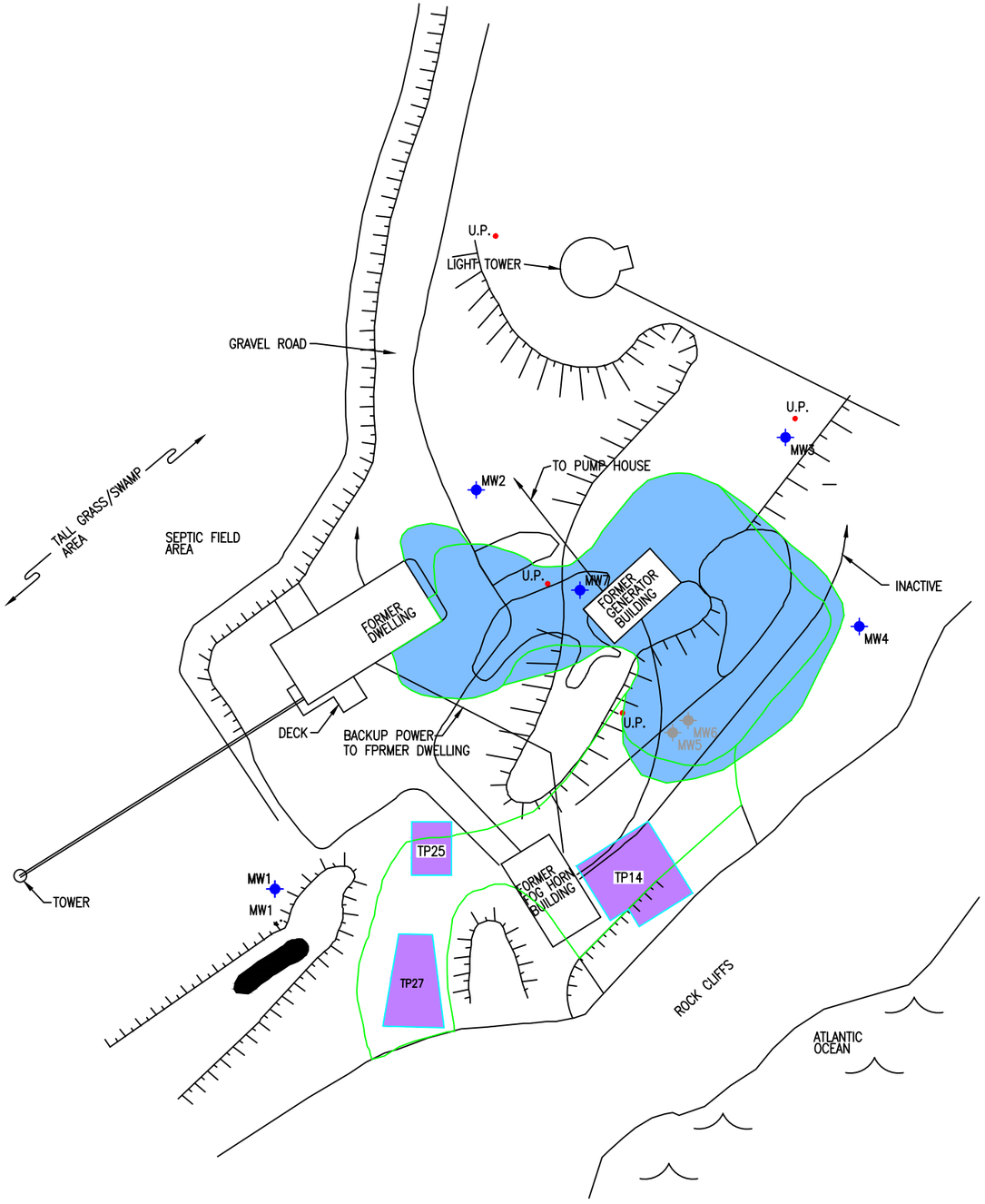
Public Works and Government Services Canada / Travaux publics et Services gournementaux Canada

Date: January 2016	Project: SITE SPECIFIC RISK MANAGEMENT PLAN CAPE RACE LIGHTSTATION CAPE RACE, NL		
Drawn by: T. Rideout	Title: SITE LOCATION PLAN		
Approved by: S. Barfoot	Scale: NTS	Project No.: TF15076602	Figure No.: 1

Amec Foster Wheeler
Environment & Infrastructure
133 Crosbie Road
St. John's, NL A1B 4A5
709-722-7023

Client:
Public Works and Government Services Canada
Travaux publics et Services gournementaux Canada

Date: January 2016	Project: SITE SPECIFIC RISK MANAGEMENT PLAN CAPE RACE LIGHTSTATION CAPE RACE, NL			
Drawn by: T. Rideout	Title: SITE PLAN			
Approved by: S. Barfoot	Scale: NTS	Project No.: TF15076602	Figure No.: 2	



LEGEND:

- MW — MONITORING WELL LOCATION (DILLON 2001)
- MW — MONITORING WELL LOCATION (DECOMMISIONED)
- REMEDIATION EXCAVATION
- EXCAVATED TEST PIT LOCATIONS

NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PUBLIC WORKS AND GOVERNMENT SERVICES CANADA AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.
7. FIGURE REPRODUCED FROM PWGSC 2003 (FIGURE 4)

Client:

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

AMEC Foster Wheeler
Environment & Infrastructure
133 Crosbie Road
St. John's, NL A1B 4A5
709-722-7023

amec foster wheeler

Drawn by: T. Rideout

Approved by: S. Barfoot

Scale: NTS

Project: SITE SPECIFIC RISK MANAGEMENT PLAN
CAPE RACE LIGHTSTATION,
CAPE RACE, NL

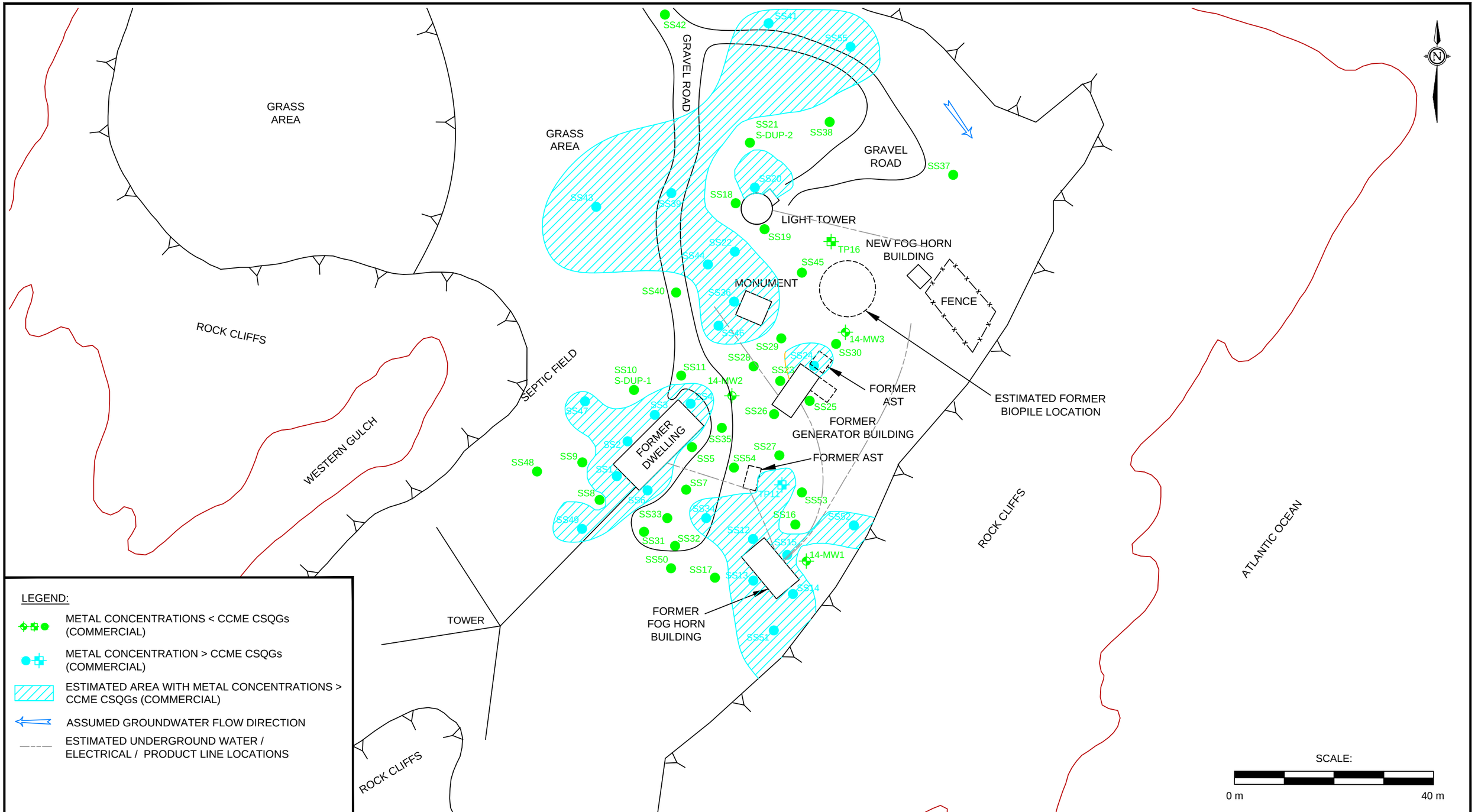
Title: 2001 REMEDIATION EXCAVATIONS - BUILDING AREA

Date: January 2016

Project No. TF15076602

Rev. No. 0

Figure No. 3



LEGEND:

- METAL CONCENTRATIONS < CCME CSQGs (COMMERCIAL)
- METAL CONCENTRATION > CCME CSQGs (COMMERCIAL)
- ESTIMATED AREA WITH METAL CONCENTRATIONS > CCME CSQGs (COMMERCIAL)
- ASSUMED GROUNDWATER FLOW DIRECTION
- ESTIMATED UNDERGROUND WATER / ELECTRICAL / PRODUCT LINE LOCATIONS

NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
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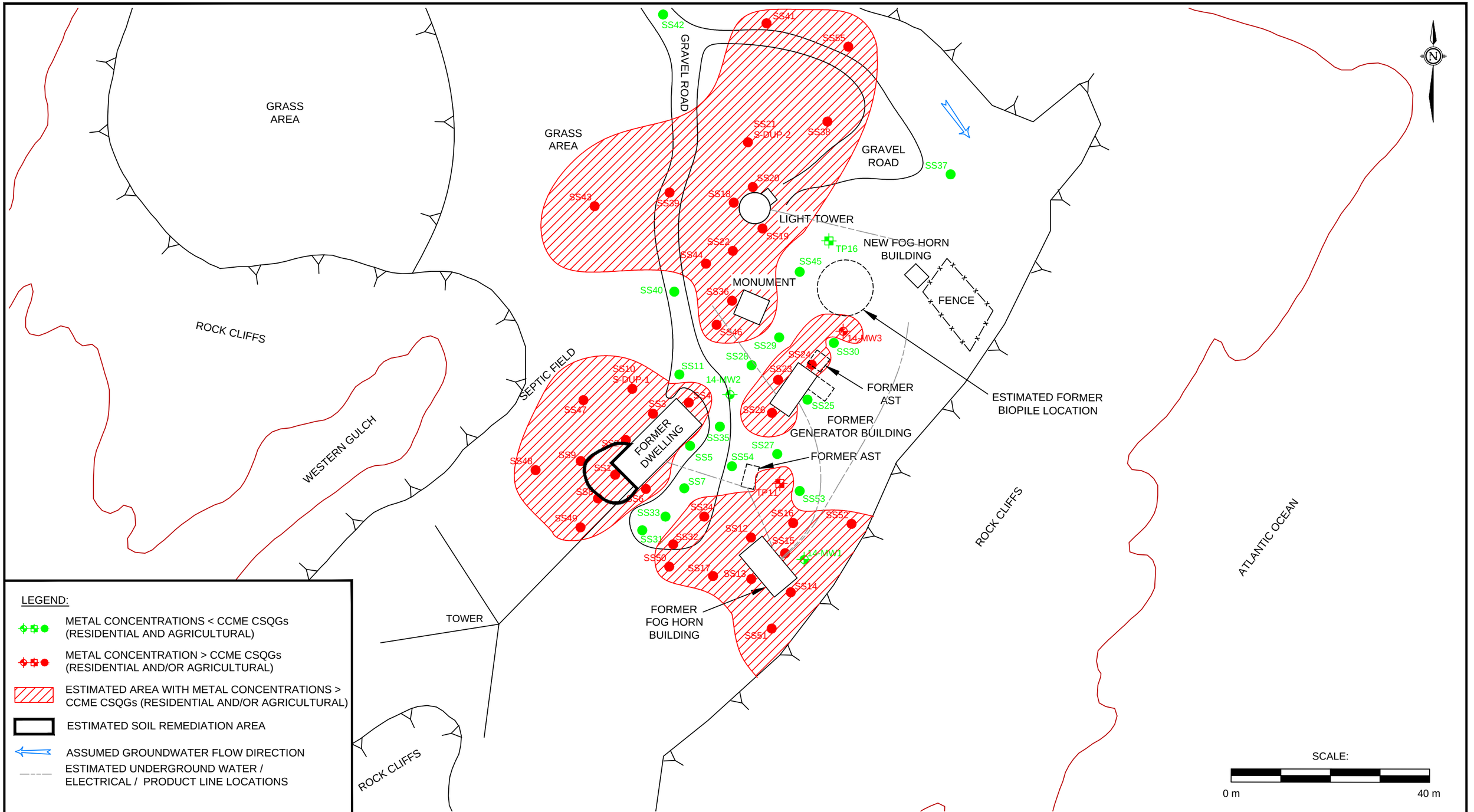
Drawn by: T. Rideout
Approved by: S. Barfoot
Scale: As Shown

Project: SITE SPECIFIC RISK MANAGEMENT PLAN
CAPE RACE LIGHTSTATION,
CAPE RACE, NL

Title: METALS IN SOIL (COMMERCIAL)

Date: January 2016
Project No. TF15076602
Rev. No. 0
Figure No. 4



LEGEND:

- METAL CONCENTRATIONS < CCME CSQGs (RESIDENTIAL AND AGRICULTURAL)
- METAL CONCENTRATION > CCME CSQGs (RESIDENTIAL AND/OR AGRICULTURAL)
- ESTIMATED AREA WITH METAL CONCENTRATIONS > CCME CSQGs (RESIDENTIAL AND/OR AGRICULTURAL)
- ESTIMATED SOIL REMEDIATION AREA
- ASSUMED GROUNDWATER FLOW DIRECTION
- ESTIMATED UNDERGROUND WATER / ELECTRICAL / PRODUCT LINE LOCATIONS

SCALE: 0 m 40 m

NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
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Client: Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

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Drawn by: T. Rideout
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Scale: As Shown

Project: SITE SPECIFIC RISK MANAGEMENT PLAN
CAPE RACE LIGHTSTATION,
CAPE RACE, NL

Title: METALS IN SOIL (RESIDENTIAL)

Date: January 2016
Project No. TF15076602
Rev. No. 0
Figure No. 5

Appendix A

Historical analytical soil data for contaminants of concern

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL)

		Dillon 2001		AMEC 2014												GUIDELINES
LAB ID				YV5272	YV5273	YV5274	YV5275	YV5276	YV5277	YV5278	YV5278	YV5279	YV5280	YV5281	YV5322	
SAMPLE ID	RDL	**TP11**	**TP16**	**SS1**	**SS2**	**SS3**	**SS4**	**SS5**	**SS6**	**SS7**	**SS7 Lab-Dup**	**SS8**	**SS9**	**SS10**	**S-DUP-1**	**CCME (commercial)**
DEPTH (m)		1.0-1.2	0.6-1.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
DATE		**Nov-00**	**Nov-00**	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	22000	17000	9900	17000	16000	11000	12000	12000	14000	14000	15000	16000	16000	15000	**-**
Antimony (Sb)	2.0	<10	<10	14	2.5	<2.0	6.2	<2.0	24	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Arsenic (As)	2.0	9.0	5.0	7.1	10	10	3	5	6.4	5.8	5.9	8.3	8.2	7	8.2	**12**
Barium (Ba)	5.0	22.0	9.0	40	14	13	12	10	57	14	17	36	14	15	18	**2,000**
Beryllium (Be)	2.0	<5	<5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<5	<5	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	0.40	<0.3	1.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**22**
Chromium (Cr)	2.0	19	14	**160**	28	20	43	18	**230**	13	13	19	15	17	16	**87**
Cobalt (Co)	1.0	40	10	32	18	13	16	11	21	10	10	17	16	14	16	**300**
Copper (Cu)	2.0	**130**	19	**280**	49	26	19	16	63	23	23	36	33	23	27	**91**
Iron (Fe)	50	41000	30000	37000	36000	37000	26000	25000	29000	31000	31000	29000	33000	33000	33000	**-**
Lead (Pb)	0.50	67	22	**1600**	**570**	**450**	**280**	53	**640**	39	48	190	87	73	98	**260**
Lithium (Li)	2.0	-	-	23	47	47	38	39	33	43	42	37	44	45	44	**-**
Manganese (Mn)	2.0	2700	810	880	1100	920	810	1000	840	910	890	1100	1100	1000	1100	**-**
Mercury (Hg)	0.10	0.12	0.01	0.22	0.11	0.12	0.1	<0.10	0.2	<0.10	<0.10	0.21	0.12	0.1	0.14	**24**
Molybdenum (Mo)	2.0	3.0	<2	11	<2.0	<2.0	5	<2.0	16	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Nickel (Ni)	2.0	14.0	15.0	18	21	21	15	15	16	16	16	18	18	18	18	**50**
Rubidium (Rb)	2.0	-	-	5.3	3.8	3.1	2.6	2.9	4.9	3.4	3.3	5.6	5.1	3.6	4.2	**-**
Selenium (Se)	1.0	**<5***	**<2***	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**40**
Strontium (Sr)	5.0	15.0	8.0	56	10	7.5	9.4	7.7	29	9.3	9.3	37	19	12	17	**-**
Thallium (Tl)	0.10	0.20	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**
Tin (Sn)	2.0	-	-	***18***	5.5	<2.0	2.6	<2.0	***8.8***	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	**300**
Uranium (U)	0.10	2	1	0.56	0.34	0.25	0.34	0.29	0.4	0.34	0.37	0.37	0.33	0.26	0.31	**33**
Vanadium (V)	2.0	23	15	14	26	23	12	15	17	15	15	21	19	17	18	**130**
Zinc (Zn)	5.0	180	74	**3300**	**660**	280	**370**	130	**780**	120	110	360	130	99	120	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL) - Continued

		AMEC 2014												GUIDELINES
LAB ID		YV5289	YV5290	YV5291	YV5292	YV5293	YV5294	YV5295	YV5296	YV5297	YV5298	YV5302	YV5323	
SAMPLE ID	RDL	**SS11**	**SS12**	**SS13**	**SS14**	**SS15**	**SS16**	**SS17**	**SS18**	**SS19**	**SS20**	**SS21**	**S-DUP-2**	**CCME (commercial)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	11000	7900	14000	8500	12000	7900	12000	9400	11000	11000	11000	11000	**-**
Antimony (Sb)	2.0	<2.0	<2.0	6.4	20	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	**40**
Arsenic (As)	2.0	2.7	4.2	**15**	**35**	6.8	12	6.6	2.3	2.8	**19**	5.5	4.8	**12**
Barium (Ba)	5.0	12	14	29	93	21	38	18	11	18	20	30	30	**2,000**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	<0.30	0.78	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.32	**22**
Chromium (Cr)	2.0	11	37	52	**130**	31	11	12	10	11	14	14	13	**87**
Cobalt (Co)	1.0	9.5	9.4	10	33	13	6.7	8.6	8.6	8.9	9.4	8	6.6	**300**
Copper (Cu)	2.0	26	**92**	39	**100**	39	36	20	81	32	48	38	51	**91**
Iron (Fe)	50	26000	59000	40000	44000	25000	22000	25000	24000	24000	24000	20000	20000	**-**
Lead (Pb)	0.50	16	**280**	**580**	**2300**	**300**	190	79	12	36	64	230	210	**260**
Lithium (Li)	2.0	41	13	36	19	26	18	30	35	37	39	20	22	**-**
Manganese (Mn)	2.0	860	400	620	610	470	470	660	780	840	850	440	430	**-**
Mercury (Hg)	0.10	<0.10	0.14	1.6	0.99	0.14	0.43	0.2	0.67	0.98	1.1	1.5	1.2	**24**
Molybdenum (Mo)	2.0	<2.0	2.6	5.7	22	3.3	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Nickel (Ni)	2.0	15	9.1	17	21	11	10	13	13	14	14	10	10	**50**
Rubidium (Rb)	2.0	2.7	4.2	4.6	3.5	6.3	3.7	4.2	2.7	3.2	3.5	5	5.2	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	**40**
Strontium (Sr)	5.0	6.5	69	13	93	37	70	24	8.8	14	19	41	33	**-**
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	0.22	<0.10	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**
Tin (Sn)	2.0	<2.0	27	6.8	7.8	<2.0	2.8	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**300**
Uranium (U)	0.10	0.37	0.91	0.29	0.82	0.82	1.1	0.56	0.41	0.37	0.36	1.1	0.89	**33**
Vanadium (V)	2.0	13	10	21	20	20	13	15	11	14	13	15	15	**130**
Zinc (Zn)	5.0	79	**2900**	190	**1100**	340	190	75	260	210	230	260	220	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

S-DUP-2: S-DUP-2 is a blind field duplicate of surface soil sample SS21

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL) - Continued

		AMEC 2014											GUIDELINES
LAB ID		YV5303	YV5304	YV5305	YV5306	YV5307	YV5308	YV5309	YV5310	YV5310	YV5311	YV5324	
SAMPLE ID	RDL	**SS22**	**SS23**	**SS24**	**SS25**	**SS26**	**SS27**	**SS28**	**SS29**	**SS29 Lab-Dup**	**SS30**	**S-DUP-3**	**CCME (commercial)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	7700	13000	8000	14000	11000	9500	13000	13000	12000	11000	10000	**-**
Antimony (Sb)	2.0	9.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Arsenic (As)	2.0	**17**	4.3	4.4	4.2	6.9	3.9	3.7	4.5	4.3	4.5	4.5	**12**
Barium (Ba)	5.0	360	12	15	12	16	14	10	11	11	13	14	**2,000**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	1.8	<0.30	0.53	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**22**
Chromium (Cr)	2.0	21	14	22	15	16	9	12	13	12	11	10	**87**
Cobalt (Co)	1.0	7.2	5.5	10	5.2	6	4.3	4.5	5.1	4.7	5.8	5.5	**300**
Copper (Cu)	2.0	**260**	13	86	13	21	17	13	14	15	17	20	**91**
Iron (Fe)	50	25000	24000	15000	23000	19000	15000	21000	22000	22000	19000	17000	**-**
Lead (Pb)	0.50	**2600**	31	170	42	**71**	19	13	20	21	29	33	**260**
Lithium (Li)	2.0	14	32	17	32	24	20	28	28	27	25	22	**-**
Manganese (Mn)	2.0	410	500	400	460	390	410	460	480	460	460	430	**-**
Mercury (Hg)	0.10	**170**	0.13	0.22	0.11	0.15	0.13	<0.10	0.13	0.13	0.26	0.33	**24**
Molybdenum (Mo)	2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Nickel (Ni)	2.0	12	13	8	12	9.3	7.6	11	11	11	11	9	**50**
Rubidium (Rb)	2.0	5	4.9	4	5.5	5.2	4.1	4.7	4.6	4.7	4.7	4.4	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**40**
Strontium (Sr)	5.0	62	23	57	20	53	60	21	27	24	39	44	**-**
Thallium (Tl)	0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**
Tin (Sn)	2.0	**13**	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**300**
Uranium (U)	0.10	0.52	0.46	1.6	0.62	0.85	1.2	0.7	0.73	0.69	0.92	1.1	**33**
Vanadium (V)	2.0	17	19	12	19	14	11	15	15	15	14	12	**130**
Zinc (Zn)	5.0	**1700**	210	**430**	130	310	71	130	58	58	88	82	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-3: S-DUP-3 is a blind field duplicate of surface soil sample SS30

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL) - Continued

		AMEC 2014											GUIDELINES
LAB ID		YV5312	YV5313	YV5314	YV5315	YV5316	YV5317	YV5318	YV5319	YV5320	YV5321	YV5325	
SAMPLE ID	RDL	**SS31**	**SS32**	**SS33**	**SS34**	**SS35**	**SS36**	**SS37**	**SS38**	**SS39**	**SS40**	**S-DUP-4**	**CCME (commercial)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	10000	11000	14000	13000	10000	9000	10000	13000	16000	15000	16000	**-**
Antimony (Sb)	2.0	<2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Arsenic (As)	2.0	4.3	6.5	6.7	**13**	2.2	12	3.9	5	5.7	7.2	6.2	**12**
Barium (Ba)	5.0	8.8	20	11	110	11	83	13	12	11	16	17	**2,000**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.54	<0.30	<0.30	<0.30	<0.30	<0.30	**22**
Chromium (Cr)	2.0	9.2	10	13	14	9.1	19	9.7	35	15	15	16	**87**
Cobalt (Co)	1.0	8.7	11	9.8	11	8.7	8.3	3.9	15	9.3	9.1	10	**300**
Copper (Cu)	2.0	13	21	22	36	12	80	17	31	**920**	22	36	**91**
Iron (Fe)	50	22000	25000	29000	41000	24000	24000	15000	33000	34000	33000	34000	**-**
Lead (Pb)	0.50	13	89	19	**460**	7.8	**1000**	20	17	40	69	66	**260**
Lithium (Li)	2.0	37	32	41	37	38	19	18	42	47	45	45	**-**
Manganese (Mn)	2.0	800	870	870	940	840	580	340	900	880	860	910	**-**
Mercury (Hg)	0.10	<0.10	0.13	<0.10	0.25	<0.10	3	0.16	0.12	0.11	0.14	0.15	**24**
Molybdenum (Mo)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	4.6	<2.0	<2.0	<2.0	**40**
Nickel (Ni)	2.0	12	13	16	17	13	11	7.6	34	19	17	18	**50**
Rubidium (Rb)	2.0	2.4	4.7	2.5	3.5	2.6	7.6	4.3	5.4	2.8	3	3	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**40**
Strontium (Sr)	5.0	9.9	24	7.3	16	5.9	39	45	8.8	7	7	7.1	**-**
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	**1**
Tin (Sn)	2.0	<2.0	<2.0	<2.0	**5.8**	<2.0	**13**	<2.0	**8.2**	3.4	<2.0	<2.0	**300**
Uranium (U)	0.10	0.3	0.45	0.3	0.34	0.31	0.6	1.3	0.98	0.24	0.26	0.27	**33**
Vanadium (V)	2.0	10	14	14	17	12	16	12	31	17	17	18	**130**
Zinc (Zn)	5.0	94	140	110	260	91	270	57	92	87	92	98	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

S-DUP-4: S-DUP-4 is a blind field duplicate of surface soil sample SS40

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL) - Continued

		AMEC 2014					AMEC 2015						GUIDELINES
LAB ID		YX8457	YX8458	YX8460	YX8462	YX8461	ZO9341	ZO9342	ZO9362	ZO9342	ZO9343	ZO9344	
SAMPLE ID	RDL	**14-MW1-SS1**	**14-MW1-SS2**	**14-MW2-SS1**	**SS-DUP-1**	**14-MW3-SS1**	**SS41**	**SS42**	**S-DUP-5**	**SS42 Lab-Dup**	**SS43**	**SS44**	**CCME (commercial)**
DEPTH (m)		0 to 0.61	1.22 to 1.83	0 to 0.61	0 to 0.61	0 to 0.61	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	
DATE		17/12/2014	15/12/2014	15/12/2014	17/12/2014	17/12/2014	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	15000	15000	15000	15000	13000	6100	16000	15000	16000	5400	8000	**-**
Antimony (Sb)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**40**
Arsenic (As)	2.0	6.7	6	7	7.5	9.2	**32**	8.2	7.1	7.1	5.9	**15**	**12**
Barium (Ba)	5.0	10	13	14	14	24	83	11	10	12	18	170	**2,000**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1	**22**
Chromium (Cr)	2.0	16	15	15	14	14	12	14	14	14	6.6	13	**87**
Cobalt (Co)	1.0	8.3	15	14	14	8	5.8	16	16	15	2.3	5.8	**300**
Copper (Cu)	2.0	16	25	25	25	22	44	27	26	26	**100**	72	**91**
Iron (Fe)	50	29000	32000	31000	32000	29000	31000	33000	32000	32000	13000	25000	**-**
Lead (Pb)	0.50	20	19	59	59	120	**830**	39	30	37	140	**1000**	**260**
Lithium (Li)	2.0	38	45	41	42	32	13	46	45	45	9.6	18	**-**
Manganese (Mn)	2.0	680	1100	1000	1100	640	530	1100	1100	1000	210	500	**-**
Mercury (Hg)	0.10	<0.10	<0.10	0.17	0.16	0.8	4.7	<0.10	<0.10	<0.10	0.4	3	**24**
Molybdenum (Mo)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.4	<2.0	<2.0	<2.0	2.5	3.1	**40**
Nickel (Ni)	2.0	15	18	18	18	13	11	19	18	18	5.3	9.8	**50**
Rubidium (Rb)	2.0	5.1	2.7	3.3	2.9	4.8	5.4	3.2	2.8	3.2	6.7	6.6	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**40**
Strontium (Sr)	5.0	15	6.8	10	10	9.8	73	8.7	8	7.9	36	74	**-**
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.3	0.12	<0.10	<0.10	<0.10	0.16	**1**
Tin (Sn)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**18**	<2.0	<2.0	<2.0	2.9	**14**	**300**
Uranium (U)	0.10	0.31	0.3	0.32	0.31	0.4	0.61	0.29	0.28	0.33	0.59	0.71	**33**
Vanadium (V)	2.0	19	16	16	16	18	17	16	16	17	12	17	**130**
Zinc (Zn)	5.0	73	83	100	100	69	150	92	92	91	51	**660**	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-5: S-DUP-5 is a blind field duplicate of surface soil sample SS42

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-1: Metal Concentrations in Surface Soil (COMMERCIAL) - Continued

		AMEC 2015											GUIDELINES
LAB ID		ZO9345	ZO9346	ZO9347	ZO9348	ZO9349	ZO9350	ZO9357	ZO9358	ZO9359	ZO9360	ZO9361	
SAMPLE ID	RDL	**SS45**	**SS46**	**SS47**	**SS48**	**SS49**	**SS50**	**SS51**	**SS52**	**SS53**	**SS54**	**SS55**	**CCME (commercial)**
DEPTH (m)		0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	
DATE		18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**
Aluminum (Al)	10	14000	11000	9700	11000	9300	7600	8900	8200	9800	11000	8900	**-**
Antimony (Sb)	2.0	<2.0	<2.0	3.4	<2.0	<2.0	<2.0	4.6	<2.0	<2.0	<2.0	<2.0	**40**
Arsenic (As)	2.0	4.7	**14**	**25**	7.7	4.8	6.1	**69**	**16**	5.1	4.4	**19**	**12**
Barium (Ba)	5.0	16	40	160	25	12	22	360	44	23	17	92	**2,000**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	**8**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**
Cadmium (Cd)	0.30	<0.30	<0.30	0.65	<0.30	<0.30	<0.30	0.5	<0.30	<0.30	<0.30	<0.30	**22**
Chromium (Cr)	2.0	13	12	14	10	9.4	10	11	8.5	10	11	11	**87**
Cobalt (Co)	1.0	5.4	11	8.7	7.1	5.5	5	22	5.7	3.9	5.6	7	**300**
Copper (Cu)	2.0	13	31	**110**	18	13	26	**210**	43	19	14	26	**91**
Iron (Fe)	50	22000	28000	33000	26000	20000	18000	97000	25000	18000	20000	31000	**-**
Lead (Pb)	0.50	18	**360**	**740**	71	47	81	**630**	130	52	35	**550**	**260**
Lithium (Li)	2.0	29	27	19	30	24	17	15	19	22	26	20	**-**
Manganese (Mn)	2.0	520	650	720	710	570	410	730	420	370	480	630	**-**
Mercury (Hg)	0.10	0.14	0.97	1.8	0.12	0.3	0.16	0.49	0.19	0.11	0.11	0.82	**24**
Molybdenum (Mo)	2.0	<2.0	2.7	4.4	<2.0	2	<2.0	12	2.8	<2.0	<2.0	3.8	**40**
Nickel (Ni)	2.0	12	12	15	12	11	8.4	44	12	8.8	10	11	**50**
Rubidium (Rb)	2.0	4.8	5.5	7	5.5	6	4.1	3.5	3.9	4.1	4.8	5.6	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	**2.9**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**40**
Strontium (Sr)	5.0	27	28	68	31	27	68	180	98	53	34	49	**-**
Thallium (Tl)	0.10	<0.10	0.12	0.35	<0.10	<0.10	<0.10	0.69	0.2	<0.10	<0.10	<0.10	**1**
Tin (Sn)	2.0	<2.0	3.7	**9.8**	<2.0	<2.0	<2.0	**31**	<2.0	<2.0	<2.0	**10**	**300**
Uranium (U)	0.10	0.55	0.68	0.69	0.5	0.45	1.6	1.3	1.1	0.98	0.84	0.49	**33**
Vanadium (V)	2.0	15	18	21	15	15	11	25	13	12	14	19	**130**
Zinc (Zn)	5.0	58	130	**440**	140	**620**	120	340	110	85	79	110	**360**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

SS-DUP-1: SS-DUP-1 is a blind field duplicate of sub-surface soil sample 14-MW2-SS1

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates that concentrations exceeds the CCME guideline (commercial)

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL)

		Dillon 2001		AMEC 2014												GUIDELINES	
LAB ID				YV5272	YV5273	YV5274	YV5275	YV5276	YV5277	YV5278	YV5278	YV5279	YV5280	YV5281	YV5322		
SAMPLE ID	RDL	**TP11**	**TP16**	**SS1**	**SS2**	**SS3**	**SS4**	**SS5**	**SS6**	**SS7**	**SS7 Lab-Dup**	**SS8**	**SS9**	**SS10**	**S-DUP-1**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		1.0-1.2	0.6-1.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
DATE		**Nov-00**	**Nov-00**	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	22000	17000	9900	17000	16000	11000	12000	12000	14000	14000	15000	16000	16000	15000	-	-
Antimony (Sb)	2.0	<10	<10	14	2.5	<2.0	6.2	<2.0	24	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**20**	-
Arsenic (As)	2.0	9.0	5.0	7.1	10	10	3	5	6.4	5.8	5.9	8.3	8.2	7	8.2	**12**	**17**
Barium (Ba)	5.0	22.0	9.0	40	14	13	12	10	57	14	17	36	14	15	18	**500**	-
Beryllium (Be)	2.0	**<5***	**<5***	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**4**	-
Bismuth (Bi)	2.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-
Boron (B)	50	<5	<5	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	-
Cadmium (Cd)	0.30	0.40	<0.3	1.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**10**	**3.8**
Chromium (Cr)	2.0	19	14	***160***	28	20	43	18	***230***	13	13	19	15	17	16	**64**	**64**
Cobalt (Co)	1.0	40	10	32	18	13	16	11	21	10	10	17	16	14	16	**50**	-
Copper (Cu)	2.0	***130***	19	***280***	49	26	19	16	63	23	23	36	33	23	27	**63**	**63**
Iron (Fe)	50	41000	30000	37000	36000	37000	26000	25000	29000	31000	31000	29000	33000	33000	33000	-	-
Lead (Pb)	0.50	67	22	***1600***	***570***	***450***	***280***	53	***640***	39	48	***190***	***87***	***73***	***98***	**140**	**70**
Lithium (Li)	2.0	-	-	23	47	47	38	39	33	43	42	37	44	45	44	-	-
Manganese (Mn)	2.0	2700	810	880	1100	920	810	1000	840	910	890	1100	1100	1000	1100	-	-
Mercury (Hg)	0.10	0.12	0.01	0.22	0.11	0.12	0.1	<0.10	0.2	<0.10	<0.10	0.21	0.12	0.1	0.14	**6.6**	**12**
Molybdenum (Mo)	2.0	3.0	<2	**11**	<2.0	<2.0	5	<2.0	**16**	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**10**	-
Nickel (Ni)	2.0	14.0	15.0	18	21	21	15	15	16	16	16	18	18	18	18	**50**	**50**
Rubidium (Rb)	2.0	-	-	5.3	3.8	3.1	2.6	2.9	4.9	3.4	3.3	5.6	5.1	3.6	4.2	-	-
Selenium (Se)	1.0	**<5***	**<2***	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20**	-
Strontium (Sr)	5.0	15.0	8.0	56	10	7.5	9.4	7.7	29	9.3	9.3	37	19	12	17	-	-
Thallium (Tl)	0.10	0.20	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**	-
Tin (Sn)	2.0	-	-	***18***	5.5	<2.0	2.6	<2.0	***8.8***	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	**50**	**5**
Uranium (U)	0.10	2	1	0.56	0.34	0.25	0.34	0.29	0.4	0.34	0.37	0.37	0.33	0.26	0.31	**23**	**33**
Vanadium (V)	2.0	23	15	14	26	23	12	15	17	15	15	21	19	17	18	**130**	**130**
Zinc (Zn)	5.0	180	74	***3300***	***660***	***280***	***370***	130	***780***	120	110	***360***	130	99	120	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Italic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

***detection limit exceeds applicable guideline**

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL) - Continued

		AMEC 2014												GUIDELINES	
LAB ID		YV5289	YV5290	YV5291	YV5292	YV5293	YV5294	YV5295	YV5296	YV5297	YV5298	YV5302	YV5323		
SAMPLE ID	RDL	**SS11**	**SS12**	**SS13**	**SS14**	**SS15**	**SS16**	**SS17**	**SS18**	**SS19**	**SS20**	**SS21**	**S-DUP-2**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	11000	7900	14000	8500	12000	7900	12000	9400	11000	11000	11000	11000	**-**	**-**
Antimony (Sb)	2.0	<2.0	<2.0	6.4	20	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	**20**	**-**
Arsenic (As)	2.0	2.7	4.2	***15***	***35***	6.8	12	6.6	2.3	2.8	***19***	5.5	4.8	**12**	**17**
Barium (Ba)	5.0	12	14	29	93	21	38	18	11	18	20	30	30	**500**	**-**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**4**	**-**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**	**-**
Cadmium (Cd)	0.30	<0.30	0.78	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.32	**10**	**3.8**
Chromium (Cr)	2.0	11	37	52	***130***	31	11	12	10	11	14	14	13	**64**	**64**
Cobalt (Co)	1.0	9.5	9.4	10	33	13	6.7	8.6	8.6	8.9	9.4	8	6.6	**50**	**-**
Copper (Cu)	2.0	26	***92***	39	***100***	39	36	20	***81***	32	48	38	51	**63**	**63**
Iron (Fe)	50	26000	59000	40000	44000	25000	22000	25000	24000	24000	24000	20000	20000	**-**	**-**
Lead (Pb)	0.50	16	***280***	***580***	***2300***	***300***	***190***	***79***	12	36	64	***230***	***210***	**140**	**70**
Lithium (Li)	2.0	41	13	36	19	26	18	30	35	37	39	20	22	**-**	**-**
Manganese (Mn)	2.0	860	400	620	610	470	470	660	780	840	850	440	430	**-**	**-**
Mercury (Hg)	0.10	<0.10	0.14	1.6	0.99	0.14	0.43	0.2	0.67	0.98	1.1	1.5	1.2	**6.6**	**12**
Molybdenum (Mo)	2.0	<2.0	2.6	5.7	***22***	3.3	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**10**	**-**
Nickel (Ni)	2.0	15	9.1	17	21	11	10	13	13	14	14	10	10	**50**	**50**
Rubidium (Rb)	2.0	2.7	4.2	4.6	3.5	6.3	3.7	4.2	2.7	3.2	3.5	5	5.2	**-**	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	***1.1***	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	**20**	**-**
Strontium (Sr)	5.0	6.5	69	13	93	37	70	24	8.8	14	19	41	33	**-**	**-**
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	0.22	<0.10	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**	**-**
Tin (Sn)	2.0	<2.0	***27***	6.8	***7.8***	<2.0	2.8	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**50**	**5**
Uranium (U)	0.10	0.37	0.91	0.29	0.82	0.82	1.1	0.56	0.41	0.37	0.36	1.1	0.89	**23**	**33**
Vanadium (V)	2.0	13	10	21	20	20	13	15	11	14	13	15	15	**130**	**130**
Zinc (Zn)	5.0	79	***2900***	190	***1100***	***340***	190	75	***260***	***210***	***230***	***260***	***220***	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Itatic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

***detection limit exceeds applicable guideline**

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL) - Continued

		AMEC 2014											GUIDELINES	
LAB ID		YV5303	YV5304	YV5305	YV5306	YV5307	YV5308	YV5309	YV5310	YV5310	YV5311	YV5324		
SAMPLE ID	RDL	**SS22**	**SS23**	**SS24**	**SS25**	**SS26**	**SS27**	**SS28**	**SS29**	**SS29 Lab-Dup**	**SS30**	**S-DUP-3**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	7700	13000	8000	14000	11000	9500	13000	13000	12000	11000	10000	-	-
Antimony (Sb)	2.0	9.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**20**	-
Arsenic (As)	2.0	**17**	4.3	4.4	4.2	6.9	3.9	3.7	4.5	4.3	4.5	4.5	**12**	**17**
Barium (Ba)	5.0	360	12	15	12	16	14	10	11	11	13	14	**500**	-
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**4**	-
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	-
Cadmium (Cd)	0.30	1.8	<0.30	0.53	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**10**	**3.8**
Chromium (Cr)	2.0	21	14	22	15	16	9	12	13	12	11	10	**64**	**64**
Cobalt (Co)	1.0	7.2	5.5	10	5.2	6	4.3	4.5	5.1	4.7	5.8	5.5	**50**	-
Copper (Cu)	2.0	***260***	13	***86***	13	21	17	13	14	15	17	20	**63**	**63**
Iron (Fe)	50	25000	24000	15000	23000	19000	15000	21000	22000	22000	19000	17000	-	-
Lead (Pb)	0.50	***2600***	31	***170***	42	***71***	19	13	20	21	29	33	**140**	**70**
Lithium (Li)	2.0	14	32	17	32	24	20	28	28	27	25	22	-	-
Manganese (Mn)	2.0	410	500	400	460	390	410	460	480	460	460	430	-	-
Mercury (Hg)	0.10	***170***	0.13	0.22	0.11	0.15	0.13	<0.10	0.13	0.13	0.26	0.33	**6.6**	**12**
Molybdenum (Mo)	2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**10**	-
Nickel (Ni)	2.0	12	13	8	12	9.3	7.6	11	11	11	11	9	**50**	**50**
Rubidium (Rb)	2.0	5	4.9	4	5.5	5.2	4.1	4.7	4.6	4.7	4.7	4.4	-	-
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20**	-
Strontium (Sr)	5.0	62	23	57	20	53	60	21	27	24	39	44	-	-
Thallium (Tl)	0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**1**	-
Tin (Sn)	2.0	***13***	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**50**	**5**
Uranium (U)	0.10	0.52	0.46	1.6	0.62	0.85	1.2	0.7	0.73	0.69	0.92	1.1	**23**	**33**
Vanadium (V)	2.0	17	19	12	19	14	11	15	15	15	14	12	**130**	**130**
Zinc (Zn)	5.0	***1700***	***210***	***430***	130	***310***	71	130	58	58	88	82	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Itatic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

***detection limit exceeds applicable guideline**

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL) - Continued

		AMEC 2014											GUIDELINES	
LAB ID		YV5312	YV5313	YV5314	YV5315	YV5316	YV5317	YV5318	YV5319	YV5320	YV5321	YV5325		
SAMPLE ID	RDL	**SS31**	**SS32**	**SS33**	**SS34**	**SS35**	**SS36**	**SS37**	**SS38**	**SS39**	**SS40**	**S-DUP-4**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
DATE		09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014	09/12/2014		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	10000	11000	14000	13000	10000	9000	10000	13000	16000	15000	16000	-	-
Antimony (Sb)	2.0	<2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**20**	-
Arsenic (As)	2.0	4.3	6.5	6.7	***13***	2.2	12	3.9	5	5.7	7.2	6.2	**12**	**17**
Barium (Ba)	5.0	8.8	20	11	110	11	83	13	12	11	16	17	**500**	-
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**4**	-
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	-
Cadmium (Cd)	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.54	<0.30	<0.30	<0.30	<0.30	<0.30	**10**	**3.8**
Chromium (Cr)	2.0	9.2	10	13	14	9.1	19	9.7	35	15	15	16	**64**	**64**
Cobalt (Co)	1.0	8.7	11	9.8	11	8.7	8.3	3.9	15	9.3	9.1	10	**50**	-
Copper (Cu)	2.0	13	21	22	36	12	***80***	17	31	***920***	22	36	**63**	**63**
Iron (Fe)	50	22000	25000	29000	41000	24000	24000	15000	33000	34000	33000	34000	-	-
Lead (Pb)	0.50	13	***89***	19	***460***	7.8	***1000***	20	17	40	69	66	**140**	**70**
Lithium (Li)	2.0	37	32	41	37	38	19	18	42	47	45	45	-	-
Manganese (Mn)	2.0	800	870	870	940	840	580	340	900	880	860	910	-	-
Mercury (Hg)	0.10	<0.10	0.13	<0.10	0.25	<0.10	3	0.16	0.12	0.11	0.14	0.15	**6.6**	**12**
Molybdenum (Mo)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	4.6	<2.0	<2.0	<2.0	**10**	-
Nickel (Ni)	2.0	12	13	16	17	13	11	7.6	34	19	17	18	**50**	**50**
Rubidium (Rb)	2.0	2.4	4.7	2.5	3.5	2.6	7.6	4.3	5.4	2.8	3	3	-	-
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20**	-
Strontium (Sr)	5.0	9.9	24	7.3	16	5.9	39	45	8.8	7	7	7.1	-	-
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	**1**	-
Tin (Sn)	2.0	<2.0	<2.0	<2.0	***5.8***	<2.0	***13***	<2.0	***8.2***	3.4	<2.0	<2.0	**50**	**5**
Uranium (U)	0.10	0.3	0.45	0.3	0.34	0.31	0.6	1.3	0.98	0.24	0.26	0.27	**23**	**33**
Vanadium (V)	2.0	10	14	14	17	12	16	12	31	17	17	18	**130**	**130**
Zinc (Zn)	5.0	94	140	110	***260***	91	***270***	57	92	87	92	98	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Itatic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

*detection limit exceeds applicable guideline

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL) - Continued

		AMEC 2014					AMEC 2015						GUIDELINES	
LAB ID		YX8457	YX8458	YX8460	YX8462	YX8461	ZO9341	ZO9342	ZO9362	ZO9342	ZO9343	ZO9344		
SAMPLE ID	RDL	**14-MW1-SS1**	**14-MW1-SS2**	**14-MW2-SS1**	**SS-DUP-1**	**14-MW3-SS1**	**SS41**	**SS42**	**S-DUP-5**	**SS42 Lab-Dup**	**SS43**	**SS44**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		0 to 0.61	1.22 to 1.83	0 to 0.61	0 to 0.61	0 to 0.61	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05		
DATE		17/12/2014	15/12/2014	15/12/2014	17/12/2014	17/12/2014	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	15000	15000	15000	15000	13000	6100	16000	15000	16000	5400	8000	**-**	**-**
Antimony (Sb)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**20**	**-**
Arsenic (As)	2.0	6.7	6	7	7.5	9.2	***32***	8.2	7.1	7.1	5.9	**15**	**12**	**17**
Barium (Ba)	5.0	10	13	14	14	24	83	11	10	12	18	170	**500**	**-**
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**4**	**-**
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**-**	**-**
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**-**	**-**
Cadmium (Cd)	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1	**10**	**3.8**
Chromium (Cr)	2.0	16	15	15	14	14	12	14	14	14	6.6	13	**64**	**64**
Cobalt (Co)	1.0	8.3	15	14	14	8	5.8	16	16	15	2.3	5.8	**50**	**-**
Copper (Cu)	2.0	16	25	25	25	22	44	27	26	26	***100***	***72***	**63**	**63**
Iron (Fe)	50	29000	32000	31000	32000	29000	31000	33000	32000	32000	13000	25000	**-**	**-**
Lead (Pb)	0.50	20	19	59	59	***120***	***830***	39	30	37	***140***	***1000***	**140**	**70**
Lithium (Li)	2.0	38	45	41	42	32	13	46	45	45	9.6	18	**-**	**-**
Manganese (Mn)	2.0	680	1100	1000	1100	640	530	1100	1100	1000	210	500	**-**	**-**
Mercury (Hg)	0.10	<0.10	<0.10	0.17	0.16	0.8	4.7	<0.10	<0.10	<0.10	0.4	3	**6.6**	**12**
Molybdenum (Mo)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.4	<2.0	<2.0	<2.0	2.5	3.1	**10**	**-**
Nickel (Ni)	2.0	15	18	18	18	13	11	19	18	18	5.3	9.8	**50**	**50**
Rubidium (Rb)	2.0	5.1	2.7	3.3	2.9	4.8	5.4	3.2	2.8	3.2	6.7	6.6	**-**	**-**
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20**	**-**
Strontium (Sr)	5.0	15	6.8	10	10	9.8	73	8.7	8	7.9	36	74	**-**	**-**
Thallium (Tl)	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.3	0.12	<0.10	<0.10	<0.10	0.16	**1**	**-**
Tin (Sn)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	***18***	<2.0	<2.0	<2.0	2.9	***14***	**50**	**5**
Uranium (U)	0.10	0.31	0.3	0.32	0.31	0.4	0.61	0.29	0.28	0.33	0.59	0.71	**23**	**33**
Vanadium (V)	2.0	19	16	16	16	18	17	16	16	17	12	17	**130**	**130**
Zinc (Zn)	5.0	73	83	100	100	69	150	92	92	91	51	***660***	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Italic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

***detection limit exceeds applicable guideline**

Table A-2: Metal Concentrations in Surface Soil (RESIDENTIAL) - Continued

		AMEC 2015											GUIDELINES	
LAB ID		ZO9345	ZO9346	ZO9347	ZO9348	ZO9349	ZO9350	ZO9357	ZO9358	ZO9359	ZO9360	ZO9361		
SAMPLE ID	RDL	**SS45**	**SS46**	**SS47**	**SS48**	**SS49**	**SS50**	**SS51**	**SS52**	**SS53**	**SS54**	**SS55**	**CCME (residential)**	**CCME (agricultural)**
DEPTH (m)		0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05		
DATE		18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015		
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	**(mg/kg)**	**(mg/kg)**
Aluminum (Al)	10	14000	11000	9700	11000	9300	7600	8900	8200	9800	11000	8900	-	-
Antimony (Sb)	2.0	<2.0	<2.0	3.4	<2.0	<2.0	<2.0	4.6	<2.0	<2.0	<2.0	<2.0	**20**	-
Arsenic (As)	2.0	4.7	**14**	***25***	7.7	4.8	6.1	***69***	**16**	5.1	4.4	***19***	**12**	**17**
Barium (Ba)	5.0	16	40	160	25	12	22	360	44	23	17	92	**500**	-
Beryllium (Be)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	**4**	-
Bismuth (Bi)	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-
Boron (B)	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	-
Cadmium (Cd)	0.30	<0.30	<0.30	0.65	<0.30	<0.30	<0.30	0.5	<0.30	<0.30	<0.30	<0.30	**10**	**3.8**
Chromium (Cr)	2.0	13	12	14	10	9.4	10	11	8.5	10	11	11	**64**	**64**
Cobalt (Co)	1.0	5.4	11	8.7	7.1	5.5	5	22	5.7	3.9	5.6	7	**50**	-
Copper (Cu)	2.0	13	31	***110***	18	13	26	***210***	43	19	14	26	**63**	**63**
Iron (Fe)	50	22000	28000	33000	26000	20000	18000	97000	25000	18000	20000	31000	-	-
Lead (Pb)	0.50	18	***360***	***740***	***71***	47	***81***	***630***	***130***	52	35	***550***	**140**	**70**
Lithium (Li)	2.0	29	27	19	30	24	17	15	19	22	26	20	-	-
Manganese (Mn)	2.0	520	650	720	710	570	410	730	420	370	480	630	-	-
Mercury (Hg)	0.10	0.14	0.97	1.8	0.12	0.3	0.16	0.49	0.19	0.11	0.11	0.82	**6.6**	**12**
Molybdenum (Mo)	2.0	<2.0	2.7	4.4	<2.0	2	<2.0	**12**	2.8	<2.0	<2.0	3.8	**10**	-
Nickel (Ni)	2.0	12	12	15	12	11	8.4	44	12	8.8	10	11	**50**	**50**
Rubidium (Rb)	2.0	4.8	5.5	7	5.5	6	4.1	3.5	3.9	4.1	4.8	5.6	-	-
Selenium (Se)	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	***3.3***	<1.0	<1.0	<1.0	<1.0	**1**	**1**
Silver (Ag)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20**	-
Strontium (Sr)	5.0	27	28	68	31	27	68	180	98	53	34	49	-	-
Thallium (Tl)	0.10	<0.10	0.12	0.35	<0.10	<0.10	<0.10	0.69	0.2	<0.10	<0.10	<0.10	**1**	-
Tin (Sn)	2.0	<2.0	3.7	***9.8***	<2.0	<2.0	<2.0	***31***	<2.0	<2.0	<2.0	***10***	**50**	**5**
Uranium (U)	0.10	0.55	0.68	0.69	0.5	0.45	1.6	1.3	1.1	0.98	0.84	0.49	**23**	**33**
Vanadium (V)	2.0	15	18	21	15	15	11	25	13	12	14	19	**130**	**130**
Zinc (Zn)	5.0	58	130	***440***	140	***620***	120	***340***	110	85	79	110	**200**	**200**

Notes:

RDL: Reportable Detection Limit

<: Below detection limit

Lab-Dup: Laboratory Duplicate

S-DUP-1: S-DUP-1 is a blind field duplicate of surface soil sample SS10

CCME: Canadian Council of Ministers of the Environment

-: Guideline not established

Bold/Shaded indicates concentrations exceeds the CCME guideline (residential)

Bold/Itatic/Underlined indicates concentrations exceeds the CCME guideline (agricultural)

***detection limit exceeds applicable guideline**

Appendix B

Ground Cover Inspection Log

Ground Cover Inspection Log Checklist

Site Name:	
Inspector's Name:	
Date (M/D/Y):	**Time on Site:**
Weather: ☐ Clear ☐ Overcast ☐ Rain ☐ Foggy ☐ Snow ☐ _____	
Temperature:	

Cover Type (Location)	Potential Concerns			Location of Concern/Comments
LANDSCAPED (Location)	Erosion	Yes ☐	No ☐	
	Settlement	Yes ☐	No ☐	
	Vegetative root mat intact	Yes ☐	No ☐	
	Damage caused by maintenance activities	Yes ☐	No ☐	
	Geotextile Exposed	Yes ☐	No ☐	
ASPHALT (Location)	Cracking/Deterioration	Yes ☐	No ☐	
	Heaving	Yes ☐	No ☐	
	Potholes	Yes ☐	No ☐	
	Damage caused by maintenance activities	Yes ☐	No ☐	
BY:_____ (INSPECTOR'S SIGNATURE)				**Photographs of Surface Covers** Yes ☐

TO BE COMPLETED BY THE OFFICE OF ENVIRONMENTAL COORDINATION

Describe Corrective Actions Completed:_____

_____

_____

_____

Corrective Action Completed on _____ **by:** _____

(Date) **(Signature)**