Division 0 – Bidding Documents

Division 01 - General Requirements

Division 02 – Existing Conditions

Division 03 – Concrete

Division 04 – Masonry

Division 06 – Wood, Plastics, and Composites

Division 31 - Earthworks

END OF SECTION

1 General

1.1 DEFINITIONS

.1 Information Documents means information of any type and in any form, related to the Project and identified in this Section as such and does not include the Contract Documents.

.2 Contract Documents are as defined in General Requirements and include the Agreement, Definitions, and General Conditions, Divisions 1 through 49 of the specifications, Schedules and Drawings.

.3 Contractor is synonymous with Bidder.

1.2 STATUS OF INFORMATION DOCUMENTS

.1 Information Documents, or any part thereof, are not part of the Contract unless specifically incorporated into Contract Documents by means of copying, transcribing or referencing.

1.3 USE OF AND RELIANCE UPON INFORMATION DOCUMENTS

.1 Information Documents are made available to Bidder by Departmental Representative for the purpose of providing Bidder with access to information available to Departmental Representative.

.2 Information Documents shall not be considered a representation or warranty that information contained therein is accurate, complete or appropriate, and does not form a part of the Contract Documents.

.3 Bidder shall interpret and draw its own conclusions about Information Documents and is encouraged to obtain specialist advice with respect thereto. Departmental Representative assumes no responsibility for such interpretations and conclusions.

.4 Information contained in Information Documents may be time sensitive and dates shall be considered when interpreting Information Documents.

.5 Bidder may rely upon the data contained in Information Documents, or parts thereof, which are specifically incorporated into Contract Documents by means of copying, transcribing or referencing, but shall draw his own conclusions from such data and shall not rely on opinions or interpretations contained therein.

1.4 INFORMATION DOCUMENTS

.1 Information Documents, in whole or in part, consist of the following:

.1 Radium Lodge Construction Drawings circa 1964.

END OF SECTION

Part 1 General

1.1 INTENT

.1 The Work shall be designed, constructed, and commissioned in a manner which is compliant with the Canada National Parks Act and Parks Canada Agency Regulations, Directives, and Guidelines.

.2 Permits are required from Parks Canada and the authority having jurisdiction.

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial, federal, and other regulations. Maintain access during construction.

1.3 USE OF SITE AND FACILITIES

.1 Site is limited by existing buildings and access.

.2 Execute work with least possible interference or disturbance to normal use of area. Make arrangements with Departmental Representative to facilitate work as stated.

.3 Security fencing is required to en sure public protection in accordance with OH & S guidelines. Security fencing is required around parts of lodge building being demolished to create a secure perimeter.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.4 HOURS OF WORK

.1 Work is not allowed on weekends or statutory holidays or after daylight hours [07:00-19:00hrs; for the period November 1-April 30 08:00-17:00hrs] from Monday to Friday, unless otherwise authorized by the Departmental Representative. Site is closed December 21-January 4. From the period of Contract Award Date to October 31 work to include removal of hazardous materials and all other materials within the buildings (e.g. mattresses, piping, televisions etc.).

.2 Demolition activities must be performed from November 1 to January 30. From the period of February 1 to April 30 work to include backfill and construction of slopes. Work is restricted to re-vegetation activities only from May 1- June 15, unless otherwise approved in writing by the Departmental Representative. From the period of June 15 to Contract End Date work to include clean up and correction of deficiencies.

1.5 WORK BY OTHERS

.1 The contractor is advised that Work by others will be ongoing in the vicinity and within the limits of this Work. Work by others will include but is not limited to:

.1 Tree cutting, forwarding/hauling, and transport of mature trees within the Radium Hot Springs Lodge Demo area of Work and surrounding forest. Work will include cutting of trees with mechanical equipment and hand felling techniques and forwarding of timber to two designated landing areas located within the meadow area by Terminal Pole I 851 and open area directly behind (north) Cabins # 1, 2 and 3 (See attached photos). Tree cutting will occur directly beside buildings, such as the Radium Hot Springs Lodge, Cabins (#1, 2 and 3), and Superintendent's house and areas adjacent. Other larger scale tree removal will be occurring in the adjacent forested areas in the vicinity of the site including around access roads. Timber will be loaded at the landing sites and transported by logging trucks off site using existing access roads. Access to certain parts of the site (e.g. Cabins) will not be accessible to the Contractor due to tree removal and hauling activities. Logging trucks will be accessing the site on a regular basis to haul timber from the designated landing areas. Tree removal work and hauling will take precedence during this time. Anticipated contract execution is from October 1st 2013 to October 31, 2013. Contractor is yet to be determined.

.2 Co-ordinate work with that of other Contractors.

1.6 EXISTING SERVICES

.1 Notify Departmental Representative, Parks Canada Representative, and private and public utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative and Parks Canada Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for vehicular traffic control as needed.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Smoking is only allowed in designated areas.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.2 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 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .4 Additional tests specified as follows:
  - .1 Soil Compaction Testing

.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.

1.3 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.

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work as requested by the Departmental Representative.

.2 Departmental Representative shall prepare agenda for meetings.

.3 Departmental Representative shall distribute written notice of each meeting four days in advance of meeting date to all parties.

.4 Contractor to provide physical space and make arrangements for meetings in coordination with Departmental Representative.

.5 Departmental Representative to preside at meetings.

.6 Departmental Representative shall record the meeting minutes and include significant proceedings and decisions with identification of actions by parties.

.7 Departmental Representative shall reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance.

.8 Representative of Consultant, Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of Departmental Representative, Consultants, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants and Reporting Relationships in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedules.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Owner provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms by Contractor.

.13 Insurances, transcript of policies.

.14 Review of Health and Safety Plan and appointment of Health and Safety Co-ordinator.

.15 Review of Environmental Protection Plan and introduction of EA Officer and site review.

1.3 PROGRESS MEETINGS

.1 During course of Work and 2 weeks prior to project completion, schedule progress meetings every two weeks.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative and Owner are to be in attendance.

.3 Notify parties minimum 7 days prior to meetings.

.4 Departmental Representative to record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Review health and safety issues.
.13 Review environmental issues.
.14 Other business.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 EXISTING CONDITIONS

.1 Examine site prior to submitting Tender and be responsible for ascertaining all conditions which will affect this trade, whether shown on the drawings or not, and to take all the necessary measurements.

.2 Investigate and confirm the locations, the method of connections and routes of existing electrical facilities.

.3 Absorb any costs incurred by failure to carry out this investigation and examination.

1.2 GENERAL REQUIREMENTS

.1 Provide and be responsible for the removal, etc., of the electrical devices, equipment, material, etc., as required for the demolition of site.

.2 All electrical devices and equipment which are disconnected, removed from service, etc., and which are not reused on the job and not required to be retained by Parks Canada shall be removed from the site.

.3 Coordinate removal of all overhead lines and poles for both power and communication with BC Hydro and Telus.

.4 Maintain existing Telus overhead lines to superintendent's house, including connections in house to underground communications Telus lines to Radium Hot Pools building, until Telus has provided underground communications lines, and Telus has disconnected and removed overhead communications lines.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

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

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

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

1.3 SUBMITTALS

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

.2 Submit to Departmental Representative within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.4 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

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

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Hazardous Materials Abatement
.6 Demolition of Structures
.7 Excavation.
.8 Backfill.
.9 Final Contouring of Site
.10 Revegetation of Site

1.5 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule every two weeks reflecting activity changes and completions, as well as activities in progress.

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

1.6 PROJECT MEETINGS

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

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 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 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.

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

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

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

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

1.2 SAMPLES

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

.2 Deliver samples to Departmental Representative at bi-weekly site meetings.

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

.4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

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

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

Environmental Assessment report is included in this Project Manual as Appendix A.

1.2 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

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

1.3 SUBMITTALS

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

.2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.

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

.4 Environmental protection plan include:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.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 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Drawings showing 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 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

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

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

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

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.

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

.13 Waste water management plan that identifies 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.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.15 Pesticide treatment plan: to be included and updated, as required.

.16 Include an equipment access plan.

1.4 FIRE PREVENTION AND CONTROL

.1 Carry fire extinguisher for use on each machine and at locations as required in the event of fire. Basic fire fighting equipment recommended includes three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to Contractors' staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".

.2 Water can be obtained from the fire hydrants in the parking lot.

.3 A water truck may be necessary and will depend on the timing of the contract (e.g. - not required during winter or snow covered conditions).

.4 Construction equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.

.5 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.

.6 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately. If not available, Banff Dispatch shall be contacted at (403) 762-4506.

.7 Fires and burning of rubbish on site not permitted.

1.5 DISPOSAL OF WASTES

.1 All garbage must be stored and handled in conformance with the National Parks Garbage Regulations.

.2 All surplus and waste materials shall be removed from the job site to approved sites outside of the National Parks. Disposal of all wastes shall be in compliance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

.3 The closest construction waste site for this project is the Columbia Valley (hazardous material), Revelstoke, or Golden Transfer Station. Contractor shall remove all demolition, construction, and trade waste from the site and dispose of materials at designated site on a regular basis or when directed by Departmental Representative. All users and vehicles must report to the transfer scales prior to the disposal of any material. Various rate schedules apply for unsorted waste, scrap metal, asphalt shingles, appliances, and painted wood.

.4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site. Obtain bear proof garbage containers on-site for domestic garbage generated on-site by Contractor’s personnel.

.5 Dispose of all hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations and Section 02 50 13 while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

.6 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.

.7 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.8 No separate payment will be made for waste disposal. Costs of this work shall be considered incidental to the contract.

.9 Do not burn or bury rubbish and waste materials on-site. Clean concrete shall be deposited in an area designated for this purpose, and in accordance with demolition drawings and specification sections 01 74 21 and 02 41 99.

.10 Remove all demolition, construction, and trade waste from the site and dispose outside of Parks' land to a provincial approved landfill. Other salvaged or dispose materials to location as directed herewithin this document.

.11 Remove creosote timbers from Kootenay National Park and disposed at an approved facility.

1.6 NATIONAL PARKS REGULATIONS

.1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.

.2 The Contractor and all sub-Contractors, each, shall obtain a business license from the Parks Canada Administration Office, Lake Louise, Alberta, prior to commencement of the contract. The business license cost is $100.00 per year.

.3 All Contractor’s business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office.

1.7 CANADIAN ENVIRONMENTAL ASSESSMENT ACT

.1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act Guidelines Order of 2003 and subsequent amendments. This project and its components, has been subject to an environmental assessment as indicated in Section 00 30 00.

.2 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the problem.

1.8 WILDLIFE

.1 Avoid or terminate activities on-site that attract, disturb or harass wildlife and vacate the area and stay away from the immediate location if sheep, bears, cougars display aggressive behaviour or persistent intrusion. Wildlife must be allowed to pass through the site freely.

.2 Notify the Departmental Representative and Parks Environmental Surveillance Officer (ESO) immediately of bear, snake or cougar activity, dens, nests, or wildlife encounters on or around the site. Other wildlife encounters should be reported within 24 hours.

.3 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.

.4 Care will be taken to prevent potential disturbance to rubber boa snakes that may be hibernating in structures or surrounding areas, as specified below:

.1 Of particular concern with respect to the work planned for demolition of the Superintendent's house and other structures on site as snake observations have been made in the area. Structures to be demolished including Superintendent's house, staff cabins, sheds, cast in place concrete retaining wall will be inspected by the Parks ESO for snakes prior to the start of demolition and throughout demolition works. If snakes are discovered, work in that location may need to be delayed until protective measures are implemented by the ESO.

.5 Protect burrows and rock piles in areas identified by the Parks Canada Environmental Surveillance Officer.

.6 Pets will not be permitted on site.

1.9 DRAINAGE

.1 Prepare erosion and sediment management plan that identifies type and location of erosion and sediment controls to be provided. The desired end result is to allow no release into watercourses of sediments or deleterious substances. Similarly there is to be no sediment or deleterious substance release into areas of vegetation growth or sensitive areas that would adversely alter growing or hydraulic conditions. This plan shall be to the satisfaction of the Departmental Representative. The plan will include monitoring and reporting to assure that control measures are in compliance with erosion and sediment control plan, federal, provincial and municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.

.3 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

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

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Parks Canada requirements and in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

1.10 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated or as directed by the Departmental Representative. Any materials that inadvertently fall outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation in that location.

.2 When working adjacent to existing trees and, shrubs, the Contractor shall exercise all possible care to avoid injury to vegetation. Where roots or limbs over 25 mm in diameter and bark are damaged during operations, trim damaged

portion. The Departmental Representative will inspect all trimmed areas and approve them.

.3 Tree removal shall be limited to trees identified for removal by Parks Canada Environmental Surveillance Officer and as directed by Departmental Representative.

.4 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.5 No stripping or vegetation removal shall occur outside the designated areas or as directed by Departmental Representative or ESO.

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

.7 Targeted investigations will be made in the areas where there is potential for presence of underground fuel tanks (in the area identified by the Departmental Representative adjacent to the lodge). This will be done after removal of asphalt and gravels with careful excavating techniques to avoid damage to any underground tanks. A minimum of two investigations will be made for each of the 3 mapped anomalies. Use a careful and cautious approach, with appropriate equipment and excavation techniques, to avoid damage or rupture of tanks if present. Should underground fuel tanks be found, the Contractor will consult with the Departmental Representative and initiate the removal and contaminant handling protocol for underground fuel tanks.

.8 Any contamination found during demolition will be tested, removed and disposed of in accordance with regulatory requirements including being hauled to a licensed landfill facility outside the park. Contaminated sites must be cleaned up to meet the standards established by the CCME Environmental Quality Guidelines for Soil and Water 2007 (with updates to 2012) and CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil 2008 for Residential/Parkland use.

1.11 CONTRACTOR'S EMPLOYEE BRIEFING

.1 Conduct briefing sessions for all employees and subcontractor employees highlighting the requirements of this section, including operation of equipment strictly.

.2 An initial site meeting with Contractor, Departmental Representative, Park Project Manager, and Park Surveillance Officer will take place prior to construction commencing.

.3 Parks Surveillance Officer will conduct approximately 40 minute briefing sessions for all employees and sub-contractor employees highlighting the requirements of this specification section, and other requirements of the Parks Surveillance Officer including operations of equipment strictly within confines of the site; harassment or attraction of wildlife; pollution and garbage management; vehicle access and parking; and care of the environment in the work area.

1.12 CONTRACTOR'S OPERATIONS

.1 The contract documents have been developed in accordance with Park Canada's policy for application of Canadian Environmental Assessment Act (2012). Construction methods which are directly affected by this policy and CEAA will be reviewed at the initial site meeting. The Contractor will be expected to comply with and ensure his construction practice meets the Parks Canada standards. Failure to comply may lead to cessation of work.

.2 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond these work limits without Departmental Representative's written approval.

.3 The Contractor shall prepare an EPP which details how the work limits will be marked and what procedures will be employed to ensure protection or trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and ESO.

.4 Do not store or stockpile construction materials in the trees bordering or being preserved on-site. Do not unreasonably encumber the site with products.

.5 Storage areas shall be located within the project boundaries on disturbed or hardened areas. Storage locations to be approved by Departmental Representative.

.6 Storage locations shall be completely cleaned up and returned to original condition prior to Contractor de-mobilization in the spring, in the fall and finishing the project.

.7 Equipment maintenance shall only be carried out in designated areas or as approved by the Departmental Representative and Park Surveillance Officer. The use of on-site areas for equipment oil changes and other servicing will not be permitted.

.8 Obtain permit from Park Surveillance Officer for on-site storage of fuel or other inflammable liquids. Observe all restrictions and conditions imposed by the permit regarding special protection and berming to control spills and tank damage, fire protection considerations, provisions for the disposal of fouled material and used petroleum products.

.9 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes will not be permitted to sluff or roll into surrounding tree cover or to bury any plant material designated to be retained.

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

.11 Failure to comply with or observe environmental protection measures as identified in these specifications and the environmental assessment report may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

.12 As no non-native vegetation is allowed in Park, all construction equipment shall be thoroughly washed before entering Kootenay National Park.

.13 All wash from equipment and tools from concrete pour operations such as tools, concrete pumper and delivery trucks to be contained in such a matter not to dispose debris, cement and fines onto a hard surface or other surfaces that would allowed it to eventually enter the storm system, sanitary system, body of water or water course.

.14 Review construction access requirements with the Departmental Representative both at start-up and an ongoing bases.

.15 The contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by worker's vehicles or machinery and shall instruct workers so that the 'footprint' of the project is kept within defined boundaries. Areas around buildings requiring excavator or equipment access in natural areas should confine access as close to the edge of the walls as possible. Access requirements, once approved, will be flagged by the Environmental Surveillance Officer.

.16 Work On and Adjacent to Steep Slopes: avoid equipment operation on steep slopes (e.g. when placing angular rock in eroded area and work on elevator shaft); Provide barriers in place to prevent rolling of debris down slopes onto highway or into vegetated areas.

1.13 EQUIPMENT MAINTENANCE, FUELING, AND OPERATION

.1 Provide, operate, and maintain equipment as indicated in Environmental Assessment Amendment, as indicated in Appendix A of this Project Manual and as follows:

.2 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the Kootenay National Park before delivery to the work site.

.3 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres to any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.

.4 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.

.5 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times.

.6 Equipment used on the project shall be fuelled with El0, and low sulphur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of vehicles is avoided.

.7 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc anywhere within Kootenay National Park.

.8 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.

.9 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in Kootenay National Park.

1.14 NOISE AND VIBRATION CONTROL

.1 Low impact demolition equipment and methodologies shall be employed that do not generate significant noise or vibration levels in proximity to the thermal springs, hot pools or sensitive wildlife habitat. Ensure there is no impact to subsurface thermal springs or damage to the Hot Pools heritage building.

.2 Demolition activities shall take place with the use of low noise and low ground vibration inducing equipment and techniques for the project site and in particular in close proximity to the sensitive thermal springs, snake habitat and Hot Pools. Particularly sensitive sites include the Superintendent's house, bus shelter, elevator shaft and other structures within a 100 meters radius of the Hot Pools. For example, equipment could include but is not limited to a processor or pulverizer attached to an excavator.

.3 High impact equipment known to cause higher noise levels and potential for higher ground vibrations shall be prohibited. Blasting, portable rock crushers and large jackhammers are not permitted.

.4 Demolition of the Superintendent’s house and restoration of the area shall be undertaken cautiously and with limited use of large machinery in order to provide ample opportunity to observe and protect any snakes potentially denning in the structure. Demolition of the basement should involve the use of masonry saws, or similar low impact equipment, and a small excavator to slowly and carefully fill the basement with specified concrete rubble. No dumping of rubble shall occur.

.5 During demolition of the Superintendent’s house, the contractor shall minimize the use of heavy and excessively loud equipment or tools, demolish these

features/structures in a careful and methodical manner and respond and/or adapt to snake observations.

.6 Contractor to submit for review a written procedure for concrete demolition at least 2 weeks prior to commencement of site work. Written procedure shall include descriptions of equipment, methods, and tools.

1.15 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material without Departmental Representative's approval.

.3 Do not dump excavated fill, waste material or debris in waterways.

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

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

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or within 100 m of indicated spawning beds.

1.16 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for the Work. The Contractor shall prepare a dust management plan as part of their EPP to be approved by the Departmental Representative.

.5 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres from any watercourse.

.6 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the

construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, sealer, grout, cement, concrete finishing agents, adhesives and sand blasting agents.

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

.8 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.

.9 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.

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

.11 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. If not available, Banff Dispatch will be contacted at (403) 762-4506. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.

.12 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.

.1 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.17 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

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

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

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 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 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative, pay costs for retesting and reinspection.

1.3 PROCEDURES

.1 Notify appropriate agency 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 Refer to Departmental Representative/Contractor Contract.

.2 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.

.3 Make good other Contractor's work damaged by such removals or replacements promptly to the satisfaction of the Departmental Representative.

.4 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative 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 electronic copies of inspection and test reports to Departmental Representative.

.2 Provide copies to Trade Contractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.6 MILL TESTS

.1 Submit mill test certificates as requested or required of specification Sections.

1.7 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.4 DEWATERING

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

1.5 WATER SUPPLY

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

.2 Arrange for connection with Parks owned water systems and pay costs for installation, maintenance and removal.

.3 The cost for utility charges at $2.00 per cubic meter payable to Parks Canada. Billing to the contractor will be at the Date of Completion.

1.6 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.

.3 Contractor and Department Representative shall determine the level of propane in Department Representative's propane tank(s) prior to start construction. Contractor is fully responsible for the propane tank(s) and provide fuel at their cost. At the Contractor’s discretion, the Contractor shall remove and dispose of the propane tanks as part of the Work.

.4 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.

.5 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.6 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.

.7 Permanent heating system of building is not available for use.

.8 On completion of Work for which permanent heating system is used, replace filters.

.9 Pay costs for maintaining temporary heat, when using permanent heating system.

.10 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.

.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

.1 The Contractor shall be responsible for all temporary power during construction for temporary lighting and operating of power tools.

.2 Provide and maintain temporary lighting throughout project as required to maintain safe working conditions.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary cell phone and data device lines necessary for own use.

1.9 FIRE PROTECTION

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

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

.3 Parks Canada do not provide or have any fire protection services at Radium Hot Springs.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.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 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-08, 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.

.3 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 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.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms.

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.

.2 Hoists 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 Limited parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site for authorized personnel.

.3 Follow vehicle parking limitations and permit requirements when within the park.

.4 Personal vehicles shall not be parked on any natural or undisturbed areas. Parking will be confined to parking lots and roads or as approved by the Departmental Representative or ESO.

1.8 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

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.

.3 Provide equipment as indicated in Environmental Assessment in Appendix A of this Project Manual.

1.10 SANITARY FACILITIES

.1 Provide portable sanitary facilities.

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

1.11 CONSTRUCTION SIGNAGE

.1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

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

.3 Company signage is allowed on trailers or vehicles, not elsewhere on site.

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

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

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

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

.11 Snow Removal. Contractor is responsible for snow clearing within their work site including parking lots, sidewalks, etc as shown in the drawings 'Limit of Work'. At the end of the project.

1.13 CLEAN-UP

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

.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.

1.14 FIRE PROTECTION FACILITIES

.1 Provide fire extinguisher and other equipment on site and maintain emergency vehicle access at all times.

1.15 DISRUPTION

.1 Provide dust protection and schedule noisy work accordingly, as not to affect general public, traffic, and adjacent facilities.

.2 No excessive noise will be permitted. Demolition methods that contribute to excessive noise will not be permitted. Low vibration and noise demolition equipment shall be used throughout the project. Best management practices will be followed by the Contractor to reduce noise on site. Equipment and vehicles shall be in good working condition and fitted with proper noise suppressing devices. Combine noisy operations to occur in the same time period. The Contractor is to take care when dropping materials from a height, for example, when dumping concrete material into the Superintendent's basement and elevator shaft. Minimize drop heights at material transfer locations. Shut or throttle down equipment (e.g. backhoes, loaders, generators, bobcats) whenever they are not in actual use. If in the opinion of the Departmental Representative or Parks Canada there is excessive noise, the Contractor will adjust the work schedule of the activity, reduce the sound levels (e.g. use of sound barriers), or implement alternative demolition processes or quieter equipment. Schedule exceptionally noisy demolition activities in close proximity to the Hot Pools before noon before the pools open to the public."

Part 2 Products

2.1 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 Parks Canada.

.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 O121-08, 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 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations and open edges of floors and roofs.

.2 Provide as required by governing authorities.

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 where required to keep partially demolished materials within existing buildings, and not allowing wind-blown debris to depart and be dispersed in an un-authorized manner.

1.5 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.6 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.8 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.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

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

.3 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.

.4 Cost for such testing will be borne 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 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 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.

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

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review project 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, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

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

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

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

1.5 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by licensed or qualified 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.

1.6 CO-ORDINATION

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

1.7 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.

1.8 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities including Parks owned utilities, with minimum of disturbance to Work, and/or building occupants. Make arrangements with Departmental Representative.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 EXISTING SERVICES

.1 Before commencing work, arrange and pay to 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.

1.2 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

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 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 Departmental Representative 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 Departmental Representative or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

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

1.3 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.

.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.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

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

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

.4 Remove samples of installed Work for testing.

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

.6 Restore work with new products in accordance with requirements of Contract Documents.

.7 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 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.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Departmental Representative.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of outside of National Park. Do not burn waste materials on site.

.3 Clear snow and ice from access to building including parking lot and sidewalks, bank/pile snow in designated areas only as directed by Departmental Representative.

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

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that was caused by Departmental Representative.

.5 Remove waste materials from site at regularly scheduled times or dispose of outside of National Park. Do not burn waste materials on site.

.6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.7 Sweep and wash clean paved areas.

1.4 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.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals and prepare a waste management plan.

.2 Waste Management Goal: as much as possible of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

1.2 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Inert Fill: inert waste - exclusively asphalt and concrete.

.3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.6 Separate Condition: refers to waste sorted into individual types.

.7 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to recycled and salvaged are to be removed from site to recycling facility without storing on site. Materials to be recycled on site are to be placed in final location with minimum of rehandling. Stockpiles of concrete in areas other than final buried location will not be permitted.

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

.3 Separate recyclable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility. Transport and deliver recyclable items to recycling facilities.

.4 Protect surface drainage, mechanical and electrical from damage and blockage.

.5 Separate and store materials produced during dismantling of structures in designated areas.

.6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

1.4 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.

.3 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.

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

Part 3 Execution

3.1 APPLICATION

.1 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 On-site sale of recyclable materials is not permitted.

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E - Government Chief Responsibility for the Environment:

British Columbia	Ministry of Environment Lands and Parks 810 Blanshard Street, 4th Floor Victoria BC V8V 1X4	604-387-1161	604-356-6464
	Waste Reduction Commission Soils and Hazardous Waste 770 South Pacific Blvd, Suite 303 Vancouver BC V6B 5E7	604-660-9550	604-660-9596

END OF SECTION

Part 1 General

1.1 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 Inspection.

.2 Departmental Representative 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 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.

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after final inspection, with Departmental Representative's comments.

.4 Revise content of documents as required prior to final submittal.

.5 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four final hard copies and two discs in pdf format of operating and maintenance manuals in English.

.6 Furnish evidence, if requested, for type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

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. 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.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide marked up red-line drawings to the Consultant for them to update the drawings, 1:1 scaled CAD files in dwg format on CD.

1.3 CONTENTS - EACH VOLUME

.1 Table of Contents: 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. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.4 AS-BUILTS 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. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

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

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

1.5 RECORDING ACTUAL SITE CONDITIONS

.1 Record information in red on set of blue line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

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

.4 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 References to related shop drawings and modifications.

.5 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.

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

1.6 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.7 STORAGE, HANDLING AND PROTECTION

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures.

.2 Before proceeding with demolition of load bearing walls or of other walls and where required by authority having jurisdiction submit for review by Departmental Representative shoring and underpinning drawings prepared by qualified professional engineer registered or licensed in the Province of British Columbia, showing proposed method.

1.3 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.

1.4 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

1.5 WASTE MANAGEMENT

.1 Salvage Considerations

.1 There are a variety of materials and equipment that will be able to be salvaged and sold to subsidise the cost of the demolition.

.2 All materials, equipment, tanks and other items that contractors are salvaging would be accepted by the contractor in their current condition. Parks would not be responsible for any certification or liability associated with the reuse of any items.

.3 The removal of all items remaining on site, other than those noted below will be the responsibility of the demolition contractor.

.2 Owner Retained Products

.1 Superintendent’s House: Retain front entrance doors and frame and move to McKay Creek Campground.

.2 Electrical: retain light poles and fixtures and transport to McKay Creek Campground.

1.6 SALVAGE

.1 The contractor is responsible for the removal of all items associated with the mechanical systems. The contractor will be responsible for maximizing the reuse/recycled content of the equipment and materials that are removed.

.2 Types of Items to be expected:

.1 Boilers
.2 Pumps
.3 Propane tanks
.4 Steel and copper pipe
.5 Galvanized ductwork
.6 Roof mounted fans
.7 Packaged Terminal Air Conditioners
.8 Plumbing fixtures
.9 Miscellaneous (Valves, expansion tanks, etc.)
.10 Wood: retain wood timbers as directed.
.11 As indicated in Item 1.5.2.

.3 The contractor will be responsible for assessing the condition of the equipment and materials. All time and costs associated with the removal, repair, sale, transportation or other associated activities shall be the responsibility of the contractor.

.4 All proceeds from the sale of salvaged items are to be applied to reduce the cost of the demolition.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 PREPARATION

.1 Inspect building and site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the

requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

3.3 SITE REMOVALS

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints.

.3 Protect underlying and adjacent granular materials.

3.4 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

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

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada, 2010.

.4 Transportation of Dangerous Goods Act (TDGA), as amended.

.5 Transportation of Dangerous Goods Regulations (TDGR), as amended.

.6 Transport of Dangerous Good Act (RSBC 1996), as amended.

.7 Transport of Dangerous Goods Regulation, BC Reg. 203/85, as amended.

.8 Dangerous Goods Transportation and Hauling Act, as amended.

.9 Dangerous Goods Transportation and Hauling Regulation (Alberta Regulation 157/1997), as amended.

.10 Storage of PCB Material Regulations, SOR/92-507, as amended.

.11 PCB Waste Export Regulations, 1996, SOR/97-109, as amended.

.12 Ozone-Depleting Substances Regulations, SOR/99-07.

.13 Environmental Code of Practice on Halons, July 1996.

.14 Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems, March 1996.

.15 PCB Regulations, SOR/2008-273, as amended.

.16 British Columbia Ministry of Environment

.1 Hazardous Waste Legislation Guide, June 2005.

.2 Ozone Depleting Substances and Other Halocarbons Regulation, BC Reg 387/99; including amendments up to January 14, 2010.

1.2 DEFINITIONS

.1 Toxic: substance is considered toxic if it is listed on Toxic Substances List found in Schedule 1 of CEPA.

.2 List of Toxic Substances: found in Schedule 1 of CEPA, lists substances that have been assessed as toxic. Federal Government can make regulations with respect to a substance specified on List of Toxic Substances. Column II of this list identifies type of regulation applicable to each substance.

.3 PCBs: includes chlorobiphenyls referred to in Column I of item 1 of the List of Toxic Substances in Schedule I of Canadian Environmental Protection Act.

1.3 SUBMITTALS

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

.2 Product Data:

.1 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.2 Submit photocopy of shipping documents and waste manifests to Departmental Representative when shipping toxic wastes off site.

.3 Maintain one copy of product data in readily accessible file on site.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Store and handle toxic wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.2 Store and handle flammable and combustible wastes in accordance with current National Fire Code of Canada requirements.

.3 Co-ordinate storage of toxic wastes with Departmental Representative and follow internal requirements for labelling and storage of wastes.

.4 Observe smoking regulations, smoking is prohibited in area where toxic wastes are stored, used, or handled.

.5 Only approved persons who have successfully completed an environmental awareness course approved by Environment Canada and the minister’s ministry are permitted to work on refrigeration and air conditioning systems.

.6 Report spills or accidents involving toxic wastes immediately to Departmental Representative and to appropriate regulatory authorities. Take reasonable measures to contain the release while ensuring health and safety is protected.

.7 Transport toxic wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.8 Use authorized/licensed carrier to transport toxic waste.

.9 Co-ordinate transportation and disposal of toxic wastes with Departmental Representative.

.10 Notify appropriate regulatory authorities and obtain required permits and approvals prior to exporting toxic waste.

.11 Dispose of toxic wastes generated on site in accordance with applicable federal and provincial acts, regulations, and guidelines.

.12 Ensure toxic waste is shipped to authorized/licensed treatment or disposal facility and that liability insurance requirements are met.

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

.14 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.

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 REMOVAL

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

- .1 Removing and disposing miscellaneous chemicals
- .2 Removing and disposing mercury-containing items
- .3 Removing and disposing items containing radioactive material
- .4 Removing and disposing batteries
- .5 Removing and disposing electronics
- .6 Removing ozone depleting substances

1.2 REFERENCES

.1 Reference Standards:

- .1 Occupational Health and Safety Regulation (BC Reg 230/2011), as amended.
- .2 Workers Compensation Act (RSBC 1996), as amended.
- .3 Transportation of Dangerous Goods Act (TDGA), as amended.
- .4 Transportation of Dangerous Goods Regulations (TDGR), as amended.
- .5 Transport of Dangerous Good Act (RSBC 1996), as amended.
- .6 Transport of Dangerous Goods Regulation, BC Reg. 203/85, as amended.
- .7 Dangerous Goods Transportation and Hauling Act, as amended.
- .8 Dangerous Goods Transportation and Hauling Regulation (Alberta Regulation 157/1997), as amended.
- .9 National Building Code of Canada (2010), as amended.
- .10 Canadian Environmental Protection Act, 1999 (CEPA)
  - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .11 Department of Justice Canada (Jus)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
  - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .12 Green Seal Environmental Standards (GS)
  - .1 GS-11-[2008, 2nd Edition], Paints and Coatings.
  - .2 GS-36-[00], Commercial Adhesives.
- .13 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .14 National Research Council Canada Institute for Research in Construction (NRC-IRC)
  - .1 National Fire Code of Canada-2010.
- .15 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2007, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

.16 Public Works and Government Services Canada

.1 Sustainable Development Strategy SDS 2007 – 2009

1.3 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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit one copy of WHMIS MSDS to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

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

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.4 Storage and Handling Requirements:

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

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

.3 Store and handle flammable and combustible materials in accordance with 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 away from open flames or heat-producing devices.

.7 Solvents or cleaning agents must be non-flammable or 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 hazardous materials and wastes:

.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 stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.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 When hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal with Departmental Representative.

.2 Comply 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 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

.6 Only trained personnel handle, offer for transport, or transport dangerous goods.

.7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide 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.

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

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

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.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 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is 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.

.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 REMVOAL

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

.1 Removing ACM in the Lodge

.1 Removing the drywall containing ACM drywall putty in the Original Lodge and New Lodge as indicated on Dwgs D-01.00 to D-01.06.

.2 Removing ACM pipe insulation in the Original and New Lodge as indicated on Dwgs D-01.00 to D-01.06.

.1 Removal using glove bag and/or cut and wrap

.3 Removing ACM vinyl floor tiles in the Original Lodge as indicated on Dwgs D-01.00 to D-01.06.

.4 Removing cooler caulking in the Original Lodge as indicated on Dwg D-01.04.

.5 Removing gaskets from pipe fittings in Original Lodge and New Lodge.

.6 Removing window caulking from windows in Original Lodge as indicated on Dwg D-01.05.

.1 Tape over caulking

.2 Remove window, wrap and treat entire window as asbestos waste

.7 Removing window caulking from guest room balcony doors in New Lodge as indicated on Dwgs D-01.00 to D-01.02.

.1 Tape over caulking

.2 Remove door, wrap and treat entire door as asbestos waste

.8 Removing all ceiling tile adjacent cinderblock walls and clean any vermiculite.

.2 Removing ACM in Cabin #3

.1 Removing roof tar from exterior roof as indicated on Dwg D-02.00.

.3 Removing ACM in Cabin #2

.1 Removing drywall containing ACM drywall putty as indicated on Dwg D-03.00.

.4 Removing ACM in Cabin #1

.1 Removing ACM vinyl floor tiles as indicated on Dwgs D-03.05 and D-03.06.

.5 Removing ACM in the Superintendent’s House

.1 Removing ACM vinyl floor tiles as indicated on Dwgs D-04.00 to D-04.01.

.2 Removing ACM pipe insulation as indicated on Dwgs D-04.00 to D-04.02.

.1 Removal using glove bag and/or cut and wrap

.3 Removing skim coat from exterior concrete as indicated on Dwg D-04.02.

1.2 RELATED REQUIREMENTS

.1 Complete Public Works and Government Services Canada Asbestos-Related Work Record (current version, as revised).

1.3 REFERENCES

.1 Transportation of Dangerous Goods Act (TDGA), as amended.

.2 Transportation of Dangerous Goods Regulations (TDGR), as amended.

.3 Transport of Dangerous Good Act (RSBC 1996), as amended.

.4 Transport of Dangerous Goods Regulation, BC Reg. 203/85, as amended.

.5 Dangerous Goods Transportation and Hauling Act, as amended.

.6 Dangerous Goods Transportation and Hauling Regulation (Alberta Regulation 157/1997), as amended.

.7 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.205-[94], Sealer for Application of Asbestos Fibre Releasing Materials.

.8 Department of Justice Canada (Jus)

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

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

.1 Material Safety Data Sheets (MSDS).

.10 Underwriters' Laboratories of Canada (ULC)

.11 WorkSafe BC

.1 Safe Work Practices for Handling Asbestos, 2006 ed.

.2 Occupational Health and Safety Regulation Guidelines; including revisions up to February 1, 2012.

.3 Occupational Health and Safety Regulation; including amendments up to February 1, 2012.

.12 British Columbia Ministry of Environment

.1 Hazardous Waste Regulation, BC Reg 63/88; including amendments up to April 1, 2009.

1.4 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 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.

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

.4 Authorized Visitors: Engineer, Departmental Representative or designated representatives, and representatives of regulatory agencies.

.5 Competent worker: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the provincial laws and with the provisions of the regulations that apply to the work.

.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.

1.5 SUBMITTALS

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

.2 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.

.3 Submit Provincial requirements for Notice of Project Form.

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

.5 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.

.11 Submit to Departmental Representative Exposure Control Plan, prepared in accordance with British Columbia Occupational Health and Safety Regulations.

.12 Submit Public Works and Government Services Canada Asbestos-Related Work Record.

.13 Submit Public Works and Government Services Canada Contractor Notification and Acknowledgement.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial 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.

.2 Health and Safety:

.1 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.

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

.3 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.

.4 Ensure workers wash hands and face when leaving Asbestos Work Area.

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

.6 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.

1.7 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.

.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 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.

1.8 EXISTING CONDITIONS

.1 Reports and information pertaining to ACM to be handled, removed, or otherwise disturbed and disposed of during this Project are available for inspection at request and are located on site.

.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 Departmental Representative.

1.9 SCHEDULING

.1 Not later than 24 hours before beginning Work on this Project notify following in writing:

.1 Provincial, Department of Labour.

.2 Disposal Authority.

.2 Hours of Work: perform work involving abatement located at Radium Hot Springs Lodge as per Instruction to Bidders. Include in Contract Sum additional costs due to this requirement.

1.10 DEPARTMENTAL REPRESENTATIVE INSTRUCTIONS

.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.

.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.

.7 Encapsulant: penetrating type conforming to CAN/CGSB-1.205.

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 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)'.

.2 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.

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

.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 asbestos-containing material 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.

.4 Before removing suspended ceilings, remove friable material on upper surfaces using HEPA vacuum equipment.

.1 Remove and clean surfaces of ceiling panels using HEPA vacuum and dispose as asbestos waste.

.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 used.

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

.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 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 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.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.

.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 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 From beginning of Work until completion of cleaning operations, Departmental Representative to take air samples outside of Asbestos Work Area enclosure in accordance with Provincial Occupational Health and Safety Regulations.

.1 Departmental Representative will be responsible for monitoring inside enclosure with cooperation of abatement workers in accordance with applicable Provincial Occupational Health and Safety Regulations.

.2 If air monitoring shows that areas outside Asbestos Work Area enclosure are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area.

.3 Ensure that respiratory safety factors are not exceeded.

.4 During the course of Work, Departmental Representative to measure fibre content of air outside Work areas by means of air samples analyzed by Phase Contrast Microscopy (PCM).

.1 Stop Work when PCM measurements exceed 0.05 f/cc and correct procedures.

.5 Ensure air clearances can be obtained as soon as possible upon completion of abatement.

END OF SECTION

Part 1 General

1.1 REMOVAL

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

.1 Removing ACM ceiling stipple in the New Lodge as indicated on Dwgs D-01.00 to D-01.02.

.2 Removing vermiculite insulation in the Original Lodge as indicated on Dwgs D-01.03 to D-01.05 and S-1.02.

.3 Removing ACM in Cabin #3

.1 Removing vermiculite

.2 Removing ACM linoleum as indicated on Dwg D-02.00

.4 Removal of ACM linoleum in the Superintendent's House as indicated on Dwgs D-04.00 and D-04.01.

1.2 RELATED REQUIREMENTS

.1 Complete Public Works and Government Services Canada Asbestos-Related Work Record (current version, as revised).

1.3 REFERENCES

.1 Transportation of Dangerous Goods Act (TDGA), as amended.

.2 Transportation of Dangerous Goods Regulations (TDGR), as amended.

.3 Transport of Dangerous Good Act (RSBC 1996), as amended.

.4 Transport of Dangerous Goods Regulation, BC Reg. 203/85, as amended.

.5 Dangerous Goods Transportation and Hauling Act, as amended.

.6 Dangerous Goods Transportation and Hauling Regulation (Alberta Regulation 157/1997), as amended.

.7 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.205-94, Sealer for Application to Asbestos-Fibre-Releasing Materials.

.8 Canadian Standards Association (CSA International)

.9 Department of Justice Canada

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

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

.1 Material Safety Data Sheets (MSDS).

.11 Transport Canada (TC)

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

.12 Underwriters' Laboratories of Canada (ULC)

.13 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)

.1 NIOSH 94-113-August 1994, NIOSH Manual of Analytical Methods (NMAM), 4th Edition.

.14 U.S. Department of Labour - Occupational Safety and Health Administration - Toxic and Hazardous Substances

.1 29 CFR 1910.1001-2001, Asbestos Regulations.

.15 WorkSafe BC

.1 Safe Work Practices for Handling Asbestos, 2006 ed.

.2 Occupational Health and Safety Regulation Guidelines; including revisions up to February 1, 2012.

.3 Occupational Health and Safety Regulation; including amendments up to February 1, 2012.

.16 British Columbia Ministry of Environment

.1 Hazardous Waste Regulation, BC Reg 63/88; including amendments up to April 1, 2009.

1.4 DEFINITIONS

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

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

.3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.

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

.5 Authorized Visitors: Departmental Representative, Engineer, or designated representatives, and representatives of regulatory agencies.

.6 Competent worker: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:

.1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.

.2 Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing.

.3 Overlap each polyethylene sheet at openings not less than 1.5 m on each side.

.8 DOP Test: testing method used to determine integrity of Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.

.9 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.

.10 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.

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

.12 Negative pressure: system that extracts air directly from work area, filters such extracted air through High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building.

.1 System to maintain minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas.

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

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

.15 Polyethylene sheeting sealed with tape: polyethylene sheeting of type and thickness specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through sheeting into clean area.

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

1.5 SUBMITTALS

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

.2 Before beginning work:

.1 Obtain from appropriate agency and submit to Departmental Representative necessary permits for transportation and disposal of asbestos waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of asbestos waste.

.2 Submit proof satisfactory to Departmental Representative that all asbestos workers have received appropriate training and education by a competent person on 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. Submit proof of attendance in form of certificate.

.3 Ensure supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Submit proof of attendance in form of certificate. Minimum of one Supervisor for every ten workers.

.4 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review.

.5 Submit documentation including test results for sealer proposed for use.

.6 Submit Provincial or local requirements for Notice of Project form.

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

.8 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.

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

.10 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including but not limited to following:

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

.11 Submit Public Works and Government Services Canada Asbestos-Related Work Record.

.12 Submit Public Works and Government Services Canada Contractor Notification and Acknowledgement.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial and local requirements pertaining to asbestos, provided that 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 while in Asbestos Work Area includes:

.1 Powered air purifying respirator (PAPR) 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. Requirements for each worker:

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos 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 then proceed to Equipment and Access Room and remove clothing except respirators. Place contaminated work suits in receptacles for disposal with other asbestos - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. Still wearing the respirator proceed naked to

showers. Using soap and water wash body and hair thoroughly. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in container provided for purpose; and wash and rinse inside of respirator. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of asbestos 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 After showering and drying off, proceed to clean change room and dress in street clothes at end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in paragraphs above.

.4 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 must not use this system as means to leave or enter work area.

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

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

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

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

.6 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.

1.7 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.

.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, 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.

1.8 EXISTING CONDITIONS

.1 Results of tests of asbestos-containing materials to be handled, removed, or otherwise disturbed and disposed of during this Project are available for inspection at request and are located on site. These are for general information only and are not necessarily representative of asbestos-containing materials covered within scope of this Project.

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

1.9 SCHEDULING

.1 Not later than 24 hours before beginning Work on this Project notify following in writing:

.1 Provincial, Department of Labour.

.2 Disposal Authority.

.2 Submit to Departmental Representative copy of notifications prior to start of Work.

.3 Hours of Work: perform work involving abatement located at Radium Hot Springs Lodge as per Instruction to Bidders. Include in Contract Sum additional costs due to this requirement.

1.10 DEPARTMENTAL REPRESENTATIVE INSTRUCTIONS

.1 Before beginning Work, provide to Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos

exposure, in personal hygiene including dress and showers, in entry and exit from Asbestos Work Area, in aspects of work procedures including 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 Proper 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.

.4 Supervisory personnel to complete required training.

Part 2 Products

2.1 MATERIALS

.1 Polyethylene: minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.

.2 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.

.3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

.4 Wetting agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Departmental Representative, mixed with water in concentration to provide adequate penetration and wetting of asbestos-containing material.

.5 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.

.6 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.

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

.8 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.

.9 Sealer: flame spread and smoke developed rating less than 50 and compatible with new fireproofing.

Part 3 Execution

3.1 PREPARATION

.1 Work Areas:

.1 Shut off and isolate air handling and ventilation systems to prevent fibre dispersal to other building areas during work phase. Conduct smoke tests to ensure that duct work is airtight. Seal and caulk joints and seams of active return air ducts within Asbestos Work Area.

.2 Preclean moveable furniture and carpeting within proposed work area using HEPA vacuum and remove from work area.

.3 Preclean fixed casework, plant, and equipment within proposed work area, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.4 Clean proposed work area using, where practicable, HEPA vacuum cleaning equipment. 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 equipment.

.5 The spread of dust from the work area to be prevented by:

.1 Using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls.

.2 Using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.

.6 Put negative pressure system in operation and operate continuously from time first polyethylene is installed to seal openings until final completion of work including final cleanup. Provide monitoring of pressure difference using automatic recording instrument. The system to maintain a negative air pressure of 0.02 inches (5 Pa) of water, relative to the area outside the enclosed area. The system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.

.7 Seal off openings such as corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.8 Cover floor and wall surfaces with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors. Cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.

.9 Build airlocks at entrances to and exits from work area so that work area is always closed off by one curtained doorway when workers enter or exit.

.10 At each 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: "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)".

.11 After work area isolation, remove heating, ventilating, and air conditioning filters, pack in sealed plastic bags 0.15 mm minimum thick and treat as contaminated asbestos waste. Remove ceiling - mounted objects such as lights, partitions, other fixtures not previously sealed off, and other objects that interfere with asbestos removal, as directed by Departmental Representative. Use localized water spraying during fixture removal to reduce fibre dispersal.

.12 Maintain emergency and fire exits from work area, or establish alternative exits satisfactory to Fire Commissioner of Canada and Provincial Fire Marshall.

.13 Where application of water is required for wetting asbestos containing materials, shut off electrical power, 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.

.14 After preparation of work area and Decontamination Enclosure Systems, for the removal of asbestos-containing materials, remove within work area and dispose of as contaminated waste in specified containers. Spray asbestos debris and immediate work area with amended water to reduce dust, as work progresses.

.2 Worker Decontamination Enclosure System:

.1 Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:

.1 Equipment and Access Room: build Equipment and Access Room between Shower Room and work area, with two curtained doorways, one to Shower Room and one to work area. Install

portable toilet, waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work area. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.

.2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five workers. Provide constant supply of hot and cold or warm water. Drains to common sewers will be available. Provide piping and connect to water sources and drains. Pump waste water through 5 micrometre filter system acceptable to Departmental Representative before directing into drains. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.

.3 Clean Room: build Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

.3 Container and Equipment Decontamination Enclosure System:

.1 Container and Equipment Decontamination Enclosure System consists of Staging Area within work area, Washroom, Holding Room, and Unloading Room. Purpose of system is to provide means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray equipment, and other tools and equipment for which Worker Decontamination Enclosure System is not suitable.

.1 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal to Washroom. Equip Staging Area with curtained doorway to Washroom.

.2 Washroom: build Washroom between Staging Area and Holding Room with two curtained doorways, one to Staging Area and one to Holding Room. Provide high - pressure low - volume sprays for washing of waste containers and equipment. Pump waste water through 5 micrometre filter system before directing into drains. Provide piping and connect to water sources and drains.

.3 Holding Room: build Holding Room between Washroom and Unloading Room, with two curtained doorways, one to Washroom and one to Unloading Room. Build Holding Room sized to accommodate at least two waste containers and largest item of equipment used.

.4 Unloading Room: build Unloading Room between Holding Room and outside, with two curtained doorways, one to Holding Room and one to outside.

.4 Construction of Decontamination Enclosures:

.1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors.

.2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.

.5 Separation of Work Areas from Occupied Areas:

.1 Separate parts of building used for asbestos abatement by means of airtight barrier system constructed as follows:

.1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create airtight barrier.

.2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.

.6 Maintenance of Enclosures:

.1 Maintain enclosures in tidy condition.

.2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

.3 Visually inspect enclosures at beginning of each working period.

.4 Use smoke methods to test effectiveness of barriers when directed by Departmental Representative.

.7 Do not begin Asbestos Abatement work until:

.1 Arrangements have been made for disposal of waste.

.2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of waste water.

.3 Work areas and decontamination enclosures and parts of building not used for asbestos abatement are effectively segregated.

.4 Tools, equipment, and materials waste containers are on hand.

.5 Arrangements have been made for building security.

.6 Warning signs are displayed where access to contaminated areas is possible.

.7 Notifications have been completed and other preparatory steps have been taken.

.8 Containment has been inspected by Departmental Representative.

3.2 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.

3.3 ASBESTOS REMOVAL

.1 Before removing asbestos:

.1 Prepare site.

.2 Spray asbestos material with water containing specified wetting agent, using airless spray equipment capable of providing "mist" application to prevent release of fibres. Saturate asbestos material sufficiently to wet it to substrate without causing excess dripping. Spray asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Remove saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack material in sealable plastic bags 0.15 mm minimum thick 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 that containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

.4 After completion of stripping work, wire brushed and wet sponged surfaces from which asbestos has been removed to remove visible material. During this work keep surfaces wet.

.5 After wire brushing and wet sponging to remove visible asbestos, wet clean entire 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 of work area. Allow at least 16 hours with no entry, activity, ventilation, or disturbance other than operation of negative pressure units during this period.

.6 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.7 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.

.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 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.

3.4 FINAL CLEANUP

.1 Following cleaning specified in 3.3.5 above, and when air sampling shows that asbestos levels on both sides of seals do not exceed 0.02 fibres/ml as determined by NIOSH Method 7400, proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible asbestos 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.

.4 Include in clean-up Work areas, Equipment and Access Room, Washroom, Shower Room, and other contaminated enclosures.

.5 Include in 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 that no dust or debris remains on surfaces as result of dismantling operations and carry out air monitoring again to ensure that asbestos levels in building do not exceed 0.02 fibres/ml. Repeat cleaning using HEPA vacuum equipment, or wet cleaning methods where feasible, in conjunction with sampling until levels meet this criteria.

.7 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of at authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative to ensure that dumping is done in accordance with governing regulations.

3.5 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, Departmental Representative to take air samples outside of work area enclosure in accordance with Provincial Occupational Health and Safety Regulations.

.1 Departmental Representative will be responsible for monitoring inside enclosure with cooperation of abatement workers in accordance with applicable Provincial Occupational Health and Safety Regulations.

.2 Use results of air monitoring inside work area to establish type of respirators to be used. Workers will be required to wear sample pumps.

.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 enclosures are contaminated, enclose, maintain and clean these areas, in same manner as that applicable to work areas.

.3 During course of Work, Departmental Representative to measure fibre content of air outside work areas by means air samples analyzed by Phase Contrast Microscopy (PCM).

.1 Stop Work when PCM measurements exceed 0.05 f/cc and correct procedures.

.4 Final air monitoring to be conducted as follows: After Asbestos Work Area has passed visual inspection and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period has passed, employer will perform air monitoring within Asbestos Work Area.

.1 Final air monitoring results must show fibre levels of less than 0.02 fibres/ml.

.2 If air monitoring results show fibre levels in excess of 0.02 fibres/ml, re-clean work area and apply another acceptable coat of lock-down agent to surfaces.

.3 Repeat as necessary until fibre levels are less than 0.02 fibres/ml.

3.6 INSPECTION

.1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviations from these requirements that have not been approved in writing by Departmental Representative may result in Work stoppage, at no cost to the Departmental Representative.

.2 Departmental Representative will inspect Work for:

.1 Adherence to specific procedures and materials.

.2 Containments.

.3 Final cleanliness and completion.

.4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur 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.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Board of Industrial Hygiene (ABIH)

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

.1 PN1205-1995, PCB Transformer Decontamination: Standards and Protocols.

.3 Department of Justice Canada (Jus)/CEPA SOR/92-507-SOR/2000-102, Storage of PCB Material Regulations, as amended.

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

.4 Environment Canada

.1 Manual for Spills of Hazardous Materials-1985.

.5 Transport Canada (TC)

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

.6 Chlorobiphenyls Regulations (SOR/91-152; Amended SOR/2000-102), as amended.

.1 Regulations Respecting Mobile System for the Destruction and Treatment of Chlorobiphenyls that are Operated by or Under Contract with Federal Institutions (SOR/90-5; amended SOR/93-231 and SOR/2000-105).

.2 Regulations Respecting the Storage of Material Containing Chlorobiphenyls (PCBs) SOR/92-507, Amended SOR/2000-102).

.3 Regulations Respecting the Import and Export of Hazardous Wastes (SOR/92-637; Amended 94-459; SOR 94-684; SOR/2000-103).

.4 Waste Management - PCBs, R.R.O. Regulation 362/90.

.5 Mobile PCB Destruction Facilities, R.R.O. Regulation 352/90.

.6 Regulation 347, General Waste Management, as Amended.

.7 Department of Justice

.1 PCB Regulations, SOR/2008-273; current to January 24, 2012.

.8 British Columbia Ministry of Environment

.1 Hazardous Waste Legislation Guide, June 2005.

.2 Hazardous Waste Regulation, BC Reg 63/88; including amendments up to April 1, 2009.

.9 WorkSafe BC

.1 Occupational Health and Safety Regulation, as Amended.

.2 Occupational Health and Safety Regulation Guidelines, as Amended.

1.2 SUBMITTALS

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

.2 Prior to starting work, Contractor performing work of this section to provide:

.1 Workplace Safety and Insurance Board Clearance Certificate.
.2 Insurance certificates.
.3 Company Health and Safety Policy.
.4 Certificate of Approval for Transportation of PCB Waste and Location of Destruction Facility.
.5 WHMIS Training Certificates for Personnel.
.6 Material Safety Data Sheets for chemicals or material to be used.

.3 Submittals to Local Fire Department and Departmental Representative.

.1 Copy of books and records listed under Record Keeping of Control Submittals Article in PART 1 of this Section.

.4 Waste location and description including:

.1 Building in which PCB waste is stored.
.2 Size of area used for storage site.
.3 Precise location of PCB waste at storage site.
.4 Container storage method used.
.5 Spill containment features in place at storage site.
.6 Security measures in place at storage site.
.7 Fire detection systems in place at storage site.

1.3 CONTROL SUBMITTALS

.1 Co-ordinate procedural requirements with Section 01 45 00 - Quality Control.

.2 Record keeping: maintain and make available for review by environmental officer and/or Departmental Representative.

.1 Removal of waste showing:
.1 Date of removal of PCB waste.
.2 Description of PCB waste including description and quantity.
.3 Condition of PCB waste.
.4 Name of carrier of PCB waste.
.5 Destination of PCB waste.
.6 Name of individual authorizing transport of PCB waste.
.2 Submit records to Departmental Representative.

1.4 QUALITY ASSURANCE

.1 Co-ordinate with Section 01 45 00 - Quality Control.

.2 Instruct personnel on dangers of PCB exposure, respirator use, decontamination and applicable Federal, Provincial and Municipal Regulations.

.3 Complete work so that at no time do PCBs contaminate building, site or environment.

1.5 SUPERVISION

.1 Provide on site a supervisor, with authority to oversee health and safety, remediation methods, scheduling, labour and equipment requirements.

.2 One supervisor for every 10 workers is required.

1.6 DELIVERY, STORAGE AND HANDLING

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

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

.3 Departmental Representative or operators of storage sites.

.1 Provide method for determining concentration of PCBs in particular waste at request of environment officer, inspector or Departmental Representative.

.2 Ensure personnel are familiar with and understand current PCB waste management procedures and use of personal protection equipment and clean-up techniques.

.4 Disposal of PCB waste generated by removal activities must comply with Federal, Provincial and Municipal regulations.

.1 Dispose of PCB waste in leak proof drums.

.2 Containers must be labelled with appropriate warning labels.

.5 Create manifests describing and listing waste created and transport containers by approved means to licenced facility for storage.

.1 For each PCB Article Container or PCB Container: unique identifying number, type of PCB waste (i.e., soil, debris, small capacitors), earliest date of removal from service for disposal, and weight in kilograms of PCB waste contained.

Part 2 Products

2.1 STORAGE ENCLOSURE

.1 Isolate PCB control area by physical boundaries to prevent unauthorized entry of personnel.

.2 Food, drink and smoking materials are not permitted in areas where PCBs are handled or PCB items are stored.

.3 Smoking is not permitted within 10 m of PCB control area.

.1 Provide and post "No Smoking" signs as directed by Departmental Representative.

2.2 STORAGE CONTAINERS

.1 Exterior containers:

.1 Structurally-sound and weather-sealed to hold PCB solids, PCB light ballasts, drained PCB containers or drained PCB equipment.

.2 Storage of equipment containing PCB liquids.

.1 Drums and containers:

.1 Designed with sufficient durability and strength to prevent PCB liquids from being released into environment, affected by weather, or contaminated by external sources.

.2 Steel or other material approved by Departmental Representative.

.2 Drums:

.1 Capacity no greater than 205 litres.

.2 Steel of minimum 18 gauge.

.3 Ensure closed-head double-bung steel drum.

.4 Paint or treat exterior to prevent rusting.

2.3 FLOORING AND ACCESSORIES

.1 Constructed of steel, concrete or other material as approved by Departmental Representative.

.2 Curbing or sufficient siding to contain at least twice volume of PCB liquid contained in largest item of PCB equipment on site or 25 percent of volume of PCB liquid on site, whichever is greater.

.3 Floor Opening, Floor Drains and Sumps:

.1 Closed and sealed to prevent escape of liquid.

2.4 EMERGENCY RESPONSE EQUIPMENT AND SYSTEMS

.1 Safety requirements in storage area:

.1 Portable fire extinguishers to be selected, installed, maintained, inspected and tested to National Fire Code of Canada.

.2 Storage site clean-up materials:

.1 Ensure availability at all time of sorbent or solvents, for clean-up of liquid or solids.

.2 Ensure availability at all times of inert absorbent in sufficient quantity to contain minor leakage.

.1 Place in bottom of each container holding PCB equipment or fluorescent lighting ballasts.

.3 Respirators: Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.

.1 Use approved full-face organic vapour cartridge respirator for exposure to PCB.

2.5 WARNING SIGNS AND LABELS

.1 Label equipment and containers of equipment containing chlorobiphenyls in concentration exceeding 50 parts per million by weight but not greater than 1% with “ATTENTION - Contaminated with PCBs” label.

.2 Label doors to storage sites, fencing and other security barriers enclosing storage sites with non-serialized, black and white, "ATTENTION PCB" label, measuring 150 x 150 mm in accordance with Environment Canada.

.3 Maintain signs and labels in clear and legible condition.

Part 3 Execution

3.1 GENERAL

.1 Select PCB removal procedure to minimize contamination of work areas with PCB or other PCB-contaminated debris/waste. Handle PCBs such that no skin contact occurs.

.2 As feasible, do not carry out PCB handling operations in confined spaces. Confined space means space having limited means of egress and inadequate cross ventilation.

.3 Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with Federal, Provincial and Municipal Regulations and applicable requirements of this Section, including but not limited to:

.1 Notify Departmental Representative prior to beginning operations.

.2 Report leaks and spills to Departmental Representative.

.3 Maintain access log of employees working in PCB control area and provide copy to Departmental Representative upon completion of operations.

.4 Inspect PCB and PCB-contaminated items and waste containers for leaks and forward copies of inspection reports to Departmental Representative.

.5 Maintain spill kit for emergency spills entitled "PCB Spill Kit".

.6 Maintain inspection, inventory and spill records.

3.2 ACCESS TO STORAGE SITE

.1 Permit only authorized personnel to enter site.

3.3 ACCESS TO STORED MATERIAL

.1 Store materials and equipment to permit easy access for inspection.

3.4 STORAGE PRACTICES

.1 Stack containers only if designed for stacking.

.2 Stack liquid containers or drums no higher than 2 containers.

.3 Separate stacked drums from each other with pallets.

.4 Store material to prevent it catching fire.

.5 Store material to prevent it being released.

.6 Store PCB material together, and away from other stored materials.

.7 Exterior:

.1 Cover PCB liquid containers with waterproof roof or cover extending beyond curbing or sides of container.

.2 Elevate PCB waste containers and PCB equipment on pallets or other suitable devices to reduce corrosion.

.8 Interior:

.1 Place on skids or pallets PCB equipment and containers of PCB material not permanently secured to floor or surface.

3.5 HANDLING LIQUID CHLOROBIPHENYL (54% CHLORINE)

.1 Use impervious clothing (nitrile), gloves, face shields and other appropriate protective clothing necessary to prevent skin contact. Do not use natural rubber, neoprene, or polyvinyl chloride (PVC).

.2 Place contaminated clothing in closed containers for storage. Dispose of contaminated clothing in same manner as PCBs.

.3 Ensure that contaminated non-pervious clothing is removed promptly and not reworn until cleaned.

.4 Wear splash-proof safety goggles where liquid chlorobiphenyl (54% chlorine) may contact eyes.

3.6 EMERGENCY RESPONSES

.1 General:

.1 Immediately report to Departmental Representative PCB spills on ground or in water, PCB spills in drip pans, or PCB leaks.

.2 Rope off area around edges of PCB leak or spill and post "PCB Spill Authorized Personnel Only" caution sign. Immediately transfer leaking items to drip pan or other container.

.3 Initiate cleanup of spills as soon as possible, but no later than 48 hours of its discovery. If misting, elevated temperatures or open flames are present, or if spill is situated in confined space, notify Departmental Representative. Mop up liquid with rags or other conventional absorbent. Properly contained and dispose of spent absorbent as solid PCB waste.

.4 Workers to evacuate site. When leaving, shut down water in use. Only personnel trained in use of, and wearing SCBA apparatus, will be allowed to re-enter site.

.5 Do not return to site until Departmental Representative and Ministry of the Environment representatives have declared the area safe for re-entry.

.2 Spill, leak, and disposal procedures:

.1 Permit access to only those wearing protective equipment and clothing.

.2 Issue poison warnings.

.3 Call local fire department or PCB Emergency Response Team.

.4 Avoid contact and inhalation.

.5 Remove ignition sources.

.6 Ventilate areas of spill or leak.

.7 Stop or reduce discharge if possible without risk.

.8 Collect spilled material for reclamation.

.9 Do not flush to sewer.

.10 Use only inert sawdust, vermiculite, dry sand absorbents.

.11 Wipe contaminated area with rags and kerosene. Do not use acetone or toluene.

.12 Notify environmental authorities to determine disposal and clean-up procedures.

.3 Fire protection and emergency procedures plan for storage sites.

.1 Ensure most recent revision of plan is in effect.

.2 Develop plan in consultation with local fire department.

.3 Ensure employees authorized to enter PCB storage site are familiar with contents of fire protection and emergency procedures plan.

.4 Send one copy to local fire department.

.5 Display one copy at storage site in area accessible in fire or spill situation.

.6 Display one copy at storage site Departmental Representative place of business.

.4 Respirators:

.1 Use when chlorobiphenyl concentrations are above permissible exposure levels.

.2 Use in emergency situations.

.5 Permissible exposure limit.

.1 0.5 milligram of chlorobiphenyl (54% chlorine) per cubic metre of air, averaged over 8 hours.

.6 Fire protection:

.1 Wear totally encapsulated suit and self-contained breathing apparatus with full face piece operated in positive pressure mode

3.7 SANITATION

.1 Promptly wash liquid-contaminated skin with soap or mild detergent and water.

.2 Prohibit eating and smoking in areas where liquid chlorobiphenyl (54% chlorine) is handled, processed or stored.

.3 Wash hands thoroughly with soap or mild detergent and water after handling liquid chlorobiphenyl (54% chlorine).

3.8 FIELD QUALITY CONTROL

.1 Departmental Representative or Operators of Storage Sites:

.1 At request of inspector, measure concentration of PCBs in accordance with CEPA SOR/2008-273 - PCB Regulations.

.2 Inspect storage site daily and repair or replace, if necessary, PCB equipment, floors, drains, drainage systems, waterproof roofs or barriers, fire prevention apparatus, personnel protection equipment, security fences and materials used for clean-up at site.

.3 Immediately repair or replace drum, container or equipment found to be leaking PCBs.

.4 Immediately clean up contaminated area.

.5 Ensure controlled access to storage site to prevent entry by unauthorized persons.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 Concrete Removals

.1 Cast in place retaining wall demolition: Remove top of wall to 1.0m below finish grade elevation. Cut off all protruding reinforcing steel and dispose of off-site. Breakdown any removed concrete to the specified gradation and use as backfill as per the drawings and backfill specifications 31 00 10.

.2 Precast retaining walls abandonment: Precast Retaining walls to remain in place as indicated on the drawings. Backfill against precast retaining wall as per detail F on drawing L-4.00 and as per section 31 00 10.

.3 Superintendent’s house foundation demolition: The upper level of the concrete/stone masonry walls (including the stairs) are to be pushed over (inwardly) into the basement space and broken apart and backfilled as per section 31 00 10. The lower rock retaining wall and intermediate landing and lower run of stairs are to be left in place as is. Break 100mm holes per 10m² area in concrete slabs which are not to be removed, to prevent accumulation of water.

.4 Concrete foundations for Piers and cabins demolition:

.1 Remove all concrete foundations and piers to 1.0m below finished grade except for west foundation wall of cabin #3.

.2 Leave the foundation wall for cabin #3 in place as it supports existing vegetation.

.3 Demolished concrete is to be used as fill as per spec 31 00 10.

.5 Lodge Structure Demolition: Demolish buildings completely and remove from the site. Use methods required to complete Work within limitations of governing regulations and as follows:

.1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

.2 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

.3 Break up and remove concrete slabs in small sizes, suitable for backfilling as per section 31 00 10.

.4 Completely remove all concrete to a minimum of 1.0 m below proposed finish grade, including foundation walls, floor slabs and footings. Concrete remaining below 1.0 m below finish grade such as foundation walls, footings and slabs shall remain intact to support the existing slope.

.5 All protruding reinforcing steel shall be cut off and removed from the site.

.6 Backfill building footprint and remaining foundation walls as per section 31 00 10.

.7 Break 100mm holes per 10m² area in concrete slabs which are not to be removed, to prevent accumulation of water.

.6 Elevator shaft: The elevator shaft and structure shall be demolished/abandoned as per drawing S-1.02. Any portion of the elevator structure is to be removed to 1.0m below finished grade. Any part of the structure below 1.0m below finish grade shall remain to allow for disposal of concrete debris as specified in section 33 00 10. Cut off all protruding reinforcing steel and dispose of off-site. The tunnel opening is to be bulk-headed off using a wall of stacked concrete blocks 4 wye's thick.

.7 Concrete curbs and gutters, sidewalks, and Miscellaneous Concrete: All concrete is to be removed to 1.0m below finish grade including foundations and footings. Concrete shall be broken down to the gradation specified and used as fill as per section 31 00 10. Miscellaneous concrete items to be removed are shown in the drawing set.

3.2 DISPOSAL

.1 Concrete is to be broken down to the gradation specified in section 31 00 10 and used to fill voids and contour the project area as shown in the drawings. All Clean concrete is to be wasted on site.

3.3 RESTORATION

.1 Areas of disturbance shall be restored as per sections 31 22 13 – Rough Grading and 32 91 19 – Finish Grading.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 Masonry Removals

.1 Loose fill insulation is to be properly removed and disposed of prior to demolition as identified in Ballast Environmental Hazardous Material Report.

.2 Masonry is to be broken down to the gradation specified in section 31 00 10 and used to fill voids and contour the project area as shown in the drawings. Non clean masonry block shall be broken down to an acceptable size and disposed of at appropriate recycling facilities or landfills in accordance with approving authority.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

- .1 ASTM A116-11, Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric.
- .2 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .4 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .5 ASTM A641/A641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .6 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .7 ASTM A1011/A1011M-12b, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .8 ASTM C140-12a, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- .9 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.2 Canadian Standards Association (CSA International)

- .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete, Includes Update No.1 (2011).
- .2 CAN/CSA-A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2, and A165.3).
- .3 CSA A179-04 (2009), Mortar and Grout for Unit Masonry.
- .4 CSA A370-04 (2009), Connectors for Masonry.
- .5 CAN/CSA A371-04 (R2010), Masonry Construction for Buildings.
- .6 CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2009), Update No. 2 (2010), Update No. 3 (2011).
- .7 CSA S304.1-04, Design of Masonry Structures.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

- .1 Coordinate lines, levels and coursing with work of other Sections.
- .2 Obtain built-in items prior to start of this work.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's representative, trade contractor, material supplier and Consultant in accordance with Division 01 to:

.1 Verify project requirements including specification and details for project.

.2 Confirm required mortar, grout and concrete testing; review batch control and grouting procedures.

.3 Co-ordination with related Work including, but not limited to, air/vapour membranes and insulation.

.4 Review cavity drainage requirements and methods for keeping mortar out of cavity spaces.

.5 Coordinate crack control measures.

.6 Review requirements for reinforcement at corners and wall intersections.

.7 Review membranes and membrane flashing materials and details used for construction.

.8 Confirm trowelled or tooled joints to concealed and exposed masonry faces.

.9 Review methods for controlling efflorescence during construction.

.10 Review hot and cold weather requirements.

1.3 SUBMITTALS

.1 Submit product data in accordance with Division 01.

.1 Provide manufacturer's printed product literature, specifications and data sheet. Indicate masonry types, shapes, sizes, and textures.

.2 Cementitious Materials:

.1 Include brand, type, and name of manufacturer for site mixed mortar materials.

.2 Submit proposed mix proportions and sand analysis reports and compressive strength reports on the proposed mortar mix(es).

.2 Submit samples in accordance with Division 01.

.1 Provide 5 clay-masonry units showing the range of colour possible within each type specified.

.2 Provide 3 concrete masonry units (face only) to show texture and colour variance of exposed units.

.3 Provide sample of masonry connector, joint reinforcement, flashings, weeps and vent.

.4 Obtain review comments from Consultant prior to ordering.

1.4 QUALITY ASSURANCE

.1 Conform to CAN/CSA A371, except as modified by this specification.

.2 The masonry contractor shall be a member in good standing with the Masonry Contractors Association of Alberta.

.3 The masonry contractor shall have a minimum of five (5) years of experience on projects of similar size and magnitude and shall provide continuous active supervision by a journeyman mason while masonry work is in progress.

.4 Masonry work shall be performed by experienced, qualified journeyman masons under the direct and continual full-time supervision of certified masons.

.5 Before starting masonry work establish mix proportions based on the limitations set out in Table 2 of CSA A179.

.6 Test laboratory prepared samples of the proposed mortar(s) for compressive strength in accordance with CSA A179, by a laboratory approved by the Owner. The Owner will pay for the initial cost of mortar testing. Any re-testing required as a result of the original test failing will be borne by the Contractor.

.7 Connectors and joint reinforcement shall conform to CSA A370.

.8 Miscellaneous masonry accessories, and their use where not otherwise specified but shown or required for proper completion of the Work, shall conform to CSA A371.

.9 Regulatory Requirements: Provide fire resistance rated materials and construction identical to those of assemblies with fire resistance ratings determined by ULC Listings.

1.5 MOCK-UPS

.1 Construct mock-up in accordance with Division 01.

.2 Construct a portion of one exterior wall in location agreed upon by Owner's Representative to establish a standard of construction, workmanship, and appearance. Show reinforcement, masonry connectors, flashing, jointing, coursing, mortar, and masonry pattern, unit face alignment, texture, and colour.

.3 Do not continue with work of this Section until Consultant has reviewed mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver masonry units on pallets or cubes, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.

.2 Unload and store on dry, level areas.

.3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings which will provide protection from the elements but allow for air circulation.

.4 Deliver cement, lime, and mortar in dry condition with manufacturer's label intact and store under waterproof cover and protected from elements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Division 01.

1.8 SITE CONDITIONS

.1 Ambient Conditions: maintain materials and surrounding air temperature to:

.1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Provide adequate bracing for masonry during construction and until permanent lateral supports are in place.

Part 2 Products

2.1 CONCRETE MASONRY UNITS

.1 Standard Concrete Masonry Units: to CAN/CSA A 165.1 and as follows:

.1 Classification: H/15/B/M except as modified by fire resistance requirements specified below.

.2 Fire Resistant Characteristics: Aggregate Type and Equivalent Thickness as required to provide fire resistance indicated, determined in accordance with National Building Code and as indicated on Drawings.

.3 Size (Nominal): As indicated on Drawings

.4 Special shapes: provide plain end, bull-nosed and double bull-nosed units for exposed corners as indicated on Drawings. Lintels and bond beams are constructed using knock-out lintel units. Provide additional special shapes as indicated.

.5 Acceptable Manufacturer:

.1 CCI/Expocrete Concrete Products Ltd

2.2 MORTAR AND GROUT MATERIALS

.1 Use same brands of materials and source of aggregate for entire project.

.2 Cement:

.1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement (Type 10); colour as selected by Owner’s Representative.

.2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA A179, Type N.

.3 Aggregate: supplied by one supplier.

.1 Fine Aggregate: to CAN/CSA A179, natural sand or crushed stone.

.2 Course Aggregate: to CAN/CSA A179.

.4 Water: clean and potable.

.5 Lime:

.1 Quick Lime: to CAN/CSA A179.

.2 Hydrated Lime: to CAN/CSA A179, Type S.

.6 Colour Additives:

.1 Use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample. Admixtures to be approved prior to use. Use in accordance with the specific manufacturer's recommendations.

.1 Colour: Confirm with Consultant.

.7 Mortar Mixes

.1 Mortar for exterior masonry above grade:

.1 Loadbearing: type N property specifications.

.2 Non-Loadbearing: N based on property specifications.

.2 Mortar for interior masonry:

.1 Loadbearing: type N based on property specifications.

.2 Non-Loadbearing: N based on property specifications.

.3 Following applies regardless of mortar types and uses specified above:

.1 Mortar for grouted reinforced masonry: type S based on property specifications.

.8 Mortar Mixing:

.1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to be within 1% accuracy.

.2 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.

.3 Maintain sand uniformly damp immediately before mixing process.

.4 Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, or other admixtures; unless approved in writing by the Consultant.

.5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.

.6 Use a batch type mixer in accordance with CAN/CSA A179.

.7 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

.8 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.

.9 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 5 degrees C.

.9 Grout Mixes:

.1 Bond Beams: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CAN/CSA-A23.1.

.2 Lintels: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CAN/CSA-A23.1.

.3 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA A179.

.10 Grout Mixing:

.1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1 transit mixed.

.2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 fine grout.

.3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.

.4 Do not use calcium chloride or chloride based admixtures.

2.3 GALVANIZING

.1 The following galvanizing requirements apply to steel anchors, ties, reinforcing and accessories where requirements are not otherwise specifically listed:

.1 Ties and Reinforcing:

.1 Mill Galvanized (Interior Use): In accordance with ASTM A116, Class 3.

.2 Hot Dip Galvanized (Exterior, including inner wythe of exterior wall construction and High Humidity Use): In accordance with ASTM A153, Class B-2.

.2 Hot Dip Hardware and Bolts: In accordance with ASTM A153, Class B-2 regardless of location.

.3 Hot Dip Sheet Steel: In accordance with ASTM A653, Coating Designation Z600, regardless of location.

.4 Structural Shapes and Pipes: In accordance with ASTM A123, Grade 85, regardless of location.

2.4 REINFORCEMENT

.1 Bar reinforcement: Steel to CAN/CSA A371 and CAN/CSA G30.18, Grade 400W.

.2 Masonry Joint Reinforcement: In accordance with to CSA A371 and ASTM A496, with corrosion protection in accordance with CSA S304 and CSA A370, and as follows:

.1 Interior Walls: Mill galvanized, carbon steel.

.2 Exterior Walls: Hot dip galvanized, carbon steel.

.3 Wire Size for Side Rods: W1.7 or 3.8 mm diameter.

.4 Wire Size for Cross Rods: W1.7 or 3.8 mm diameter.

.5 Spacing of Cross Rods, Tabs, and Cross Ties: At a maximum of 400 mm o/c.

.6 Lengths: A minimum of 3000 mm, with prefabricated corner and tee units.

.3 Connectors: In accordance with to CSA A370 and CSA S304 with hot dip galvanized finish.

.4 Single Wythe Masonry Joint Reinforcement: Either ladder or truss type with single pair of side rods.

2.5 TIES AND ANCHORS

.1 Ties and anchors specified in this section shall be designed in accordance with CSA A370 for non-conventional masonry connectors as follows:

.1 Deflection: Maximum 2 mm, including free play, when acted upon by a lateral load of 0.45 kN, in all possible positions of adjustment.

.2 Positive restraint at position of maximum adjustment.

.3 Free play of multi-component ties maximum 1.2 mm when assembled in all possible configurations.

.4 Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall.

.2 Lateral Partition Supports (Top of Wall Anchors):

.1 Angle Support: Fabricated from 2.657 mm core metal thickness angled steel plate having 75 mm long legs fastened to deck structure to allow vertical movement of masonry assembly; hot dip galvanized; coordinate with Section 07 84 00 for firestopping insulation and smoke seals.

.2 Plate Support: Fabricated from 2.657 mm core metal thickness steel plate with 10 mm diameter metal 150 mm long welded to plate having closed end plastic tube fitted over rod that allows rod to move in and out of tube; hot dip galvanized after fabrication.

.3 Conventional Bolts:

.1 Anchor Bolts: steel bolts in accordance with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers; hot-dip galvanized in accordance with ASTM A153, Class C.

.2 Plate anchors: steel to ASTM A36, weld square of circular steel plate perpendicular to axis of steel bar threaded on opposite end.

.3 Through bolt rods: to ASTM A307 threaded rod or threaded ASTM A36 bar stock.

Part 3 Execution

3.1 EXAMINATION

.1 Verify surfaces and conditions are ready to accept work of this Section.

.2 Examine work of other Sections upon which work of this section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved.

3.2 PREPARATION

.1 Protect adjacent finished materials from damage due to masonry work.

3.3 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.4 INSTALLATION: GENERAL

.1 Construction to conform to CAN/CSA A371.

.2 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.

.3 Masonry horizontal and vertical joints to be 10 mm thick except where adjustments are necessary to maintain the bond pattern or to adjust coursing.

3.5 INSTALLATION: CONCRETE MASONRY UNITS

.1 Standard concrete block units:

.1 Bond: as indicated on Drawings and if not indicated, confirm with Consultant.

.2 Coursing height: 200 mm for one block and one joint.

.3 Jointing: as indicated on Drawings and if not indicated, confirm with Consultant.

.2 Special Shapes:

.1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.

.2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.

.3 End bearing: not less than 200 mm as indicated on drawings.

.4 Install special Work Site cut shaped units.

.3 Cull out masonry units, in accordance with CAN/CSA A165 and reviewed range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.

.4 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.

.5 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.

.6 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.

.7 Install movement joints and keep free of mortar where indicated.

.8 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.

.9 Solid Units: apply mortar over entire vertical and horizontal surfaces.

.10 Ensure compacted head joints. Use full or face-shell joint as indicated.

.11 Tamp units firmly into place.

.12 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.

.13 Strike concealed joints flush.

.14 After mortar has achieved initial set up, tool joints.

.15 Do not interrupt bond below or above openings.

3.6 TOLERANCES

.1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:

.1 Maximum variation between units within specific job lot not to exceed 2 mm.

.2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.

.3 Out of square tolerance not to exceed 2 mm.

3.7 INSTALLATION: CONNECTORS AND REINFORCEMENT

.1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA A370, CAN/CSA A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.

.2 Prior to placing concrete, mortar and grout, obtain Consultant's approval of placement of reinforcement and connectors.

.3 Supply and install additional reinforcement to masonry as indicated.

3.8 BONDING AND TYING

.1 Tie masonry veneer to backing in accordance with CSA-S304.1, CAN/CSA A371, authorities having jurisdiction, and as indicated.

.2 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA A370, CAN/CSA A371, and manufacturer's instructions.

.1 Install horizontal joint reinforcement 400 mm on centre.

.2 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.

.3 Place joint reinforcement continuous in first and second joint below top of walls.

.4 Lap joint reinforcement ends minimum 200 mm.

.5 Connect stack bonded unit joint corners and intersections with strap anchors 400 mm on centre.

3.9 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry beams, masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA-S304.1, CAN/CSA A371, and CAN/CSA A179.

.3 Support and position reinforcing bars in accordance with CAN/CSA A371.

3.10 GROUTING

.1 Grout masonry in accordance with CSA-S304.1, CAN/CSA A371 and CAN/CSA A179 and as indicated.

3.11 ANCHORS

.1 Supply and install metal anchors in accordance with CAN/CSA A370 and CAN/CSA A371.

3.12 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.

3.13 CONTROL AND EXPANSION JOINTS

.1 Install control and expansion joint materials in unit masonry as masonry progresses; do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

.2 Form control joints in concrete masonry consisting of a complete vertical break free from mortar using one of the following methods:

.1 Break joint reinforcement at control joints, but extend bond beam reinforcing 400 mm into wall across control joint and wrap with 0.15 mm polyethylene bond breaker.

.2 Fit bond breaker strips into hollow contour in ends of concrete masonry units on one side of control joint; fill resultant core with grout and rake out joints in exposed faces for application of sealant.

.3 Install preformed control joint gaskets designed to fit standard sash block.

.4 Install interlocking units designed for control joints; install bond breaker strips at joint; keep head joints free and clear of mortar or rake out joint for application of sealant.

.5 Install temporary foam plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

.6 Refer to Drawings for control and expansion joint locations, and vertical reinforcing requirements; confirm location with Consultant before installation; confirm with Consultant where not shown on Drawings.

.3 Form expansion joints in masonry consisting of a complete vertical break free from mortar using one of the following methods:

.1 Build flanges of metal expansion strips into masonry; lap each joint 100 mm in direction of water flow; seal joints below grade and at junctures with horizontal expansion joints if any.

.2 Build flanges of factory fabricated, expansion joint units into masonry.

.3 Build in compressible joint filler.

.4 Form open joint full depth of block wythe a minimum of 10 mm for installation of sealant and backer rod specified in accordance with Section 07 92 00.

.5 Locate joints at 6000 mm o/c maximum and at a minimum of 3600 mm from any corners, any other indication notwithstanding.

.6 Refer to Drawings for control and expansion joint locations, and vertical reinforcing requirements; confirm location with Consultant before installation; confirm with Consultant where not shown on Drawings.

.4 Install a minimum 10 mm high horizontal, pressure relieving joints by either leaving an air space or inserting a compressible filler, sealant and backer rod specified in Section 07 92 00; locate horizontal, pressure relieving joints beneath shelf angles supporting masonry.

.5 Locate joints at 6000 mm centres maximum and at a maximum of 4000 mm from any corners, any other indication notwithstanding.

3.14 FIELD BENDING

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.15 INSTALLATION: FLASHINGS

.1 Build in flashings in masonry in accordance with CAN/CSA A371.

.1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings, and at base of cavity wall and where cavity is interrupted by horizontal members or supports

and as shown on drawings. Install flashings under weep hole courses and as indicated.

.2 In cavity walls and veneered walls, carry flashings from front edge of exterior masonry, under outer wythe, then up backing not less than 150 mm, and as follows:

.1 For masonry backing embed or bond flashing 25 mm in joint.

.2 For concrete backing, insert or bond flashing into reglets.

.3 For wood frame backing, staple flashing to walls behind water resistive paper, and lap joints.

.4 For gypsum board and glass fibre faced sheathing backing, bond to wall using manufacturer's recommended adhesive.

.3 Lap joints 150 mm and seal with adhesive.

.2 Form flashing (end dams) at lintels, sills and wall ends to prevent water from travelling horizontally past flashing ends.

.3 Install vertical flashing where outer veneer returns at window or door jambs, to prevent contact of veneer with inner wall.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 Wood Structure Removals

.1 Superintendent's House: Demolish in place and remove from site. Refer to section 31 00 10 for backfilling and section 03 00 10 for removal of the foundation walls.

.2 Retaining Walls: Timber retaining walls to remain in place to minimize disturbance to landscaping. Remove timber crib retaining walls only where absolutely necessary or where they will impose a safety hazard if left in place.

.3 Cabins: Demolish the structures and remove from the site and dispose of. Refer to section 31 00 10 for backfilling and section 03 00 10 for removal of the foundation walls.

.4 Lodge: Glu lam beams, columns, joists and sheathing exist in certain parts of the building, notably in the conference rooms. Remove and dispose of all of the wood structures within the limitations and governing regulations and as follows:

.1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

.2 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

3.2 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities or landfills except where otherwise specified, in accordance with approving authority.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 GENERAL

.1 Unless shown otherwise on the contract drawings the materials specified in 2.2 of this Section are approved for their respective uses.

2.2 MATERIALS

.1 Refer to Section 31 00 11 – Aggregates and Granular Materials for specifications for approved granular materials and approved native materials.

Part 3 Execution

3.1 SITE PREPARATION

.1 Cut pavement or sidewalk neatly along limits of proposed excavation or demolition.

.2 Before rough grading or backfilling operations take place, strip topsoil after area has been cleared, and stockpile in locations specified by Departmental Representative.

3.2 STOCKPILING

.1 Stockpile fill materials in areas designated by the Departmental Representative. Stockpile granular materials in a manner to prevent segregation. Stockpile different types of fill material separately to avoid mixing.

3.3 EXCAVATION

.1 Surface drainage: Provide suitable temporary ditches or other approved means of handling drainage prior to excavation and during construction to protect construction area and adjacent and other affected properties. Provide siltation controls to protect natural watercourses or existing municipal drainage facilities.

.2 Excavation drainage: Keep all excavations free of water by pumping or other appropriate means. Provide pumps and dewatering equipment and take precautions to prevent any damage structures, roads or land from prolonged or excessive pumping by installing shoring, sheeting or other supportive measures. Discharge water from excavations in such a manner as not to cause erosion, nuisance, injury, loss or damage. Piping through flexible hose to an appropriate location may be necessary.

3.4 BACKFILL AND COMPACTION

.1 Approval: Proposed soils other than specified in section 31 00 11 are subject to approval by the Departmental Representative.

.2 Subgrade Prep: remove disturbed or softened material from excavation bottom before backfilling. Maintain excavation free from water and soft materials during backfilling to ensure proper compaction of backfill materials.

.3 Backfill & Materials:

.1 Lodge and parking lot footprint: Backfill Lodge foot print with recycled concrete as per Section 31 00 11 produced from demolishing on site concrete as per Section 03 00 10. Place concrete rubble in maximum 400mm depth lifts and compact. Cap all areas of placed concrete rubble with 500mm of Native material, Pitrun, Drainrock, or Granular Subbase as per Section 31 00 11. Finish grade with 100mm of topsoil as per section 32 91 19. Finish grade elevations to match proposed contours in Drawing L-3.00.

.2 Cabin Footprint: After the Cabins and surrounding area are demolished as per Section 06 00 10, the building footprints are to be backfilled as per drawing L-3.00. Recycled concrete can be used to backfill areas requiring greater than 600mm of fill; otherwise Native material, Pitrun, Drainrock, or Granular Subbase as per Section 31 00 11 should be used.

.3 Cast in Place Retaining wall: Backfill cast in place retaining walls to 600mm below proposed Finish Grade using recycled concrete. Cap all areas of placed concrete rubble with 500mm of Native material, Pitrun, Drainrock, or Granular Subbase as per Section 31 00 11. Finish grade with 100mm of topsoil as per section 32 91 19. Finish grade elevations to match contours in Drawing L-3.00.

.4 Precast Retaining wall: Backfill against the precast retaining wall with Recycled Concrete for Snake Habitat as per Detail ‘F’ on Drawing L-4.00.

.5 Rough Grading: For general areas of fill, recycled concrete may be used for backfilling and rough grading purposes to an elevation of 600mm below Finish Grade. All material must be placed in maximum 400 mm lifts and compacted as per specifications. Cap all areas of placed concrete rubble with 500mm of Native material, Pitrun, Drainrock, or Granular Subbase as per Section 31 00 11. Alternate fills, such as fill material

provided by the owner, are subject to gradation testing and/or engineer review prior to use. Finish grade with 100mm of topsoil as per section 32 91 19. Finish grade elevations to match contours in Drawing L-3.00.

.6 Elevator Shaft: Fill elevator shaft with recycled concrete as per Drawing S-2.0. The lower horizontal portion of the elevator tunnel is to be recycled concrete placed with no additional mechanical compaction necessary. The vertical shaft is to be filled to Finish Grade with Recycled Concrete for Snake Habitat.

.7 Superintendent's House: Fill basement with Recycled Concrete for Snake Habitat. Refer to Section 31 00 11 for gradation.

.8 Surface Erosion on Slopes: Angular rock rip rap stones shall be placed with their beds at right angles to the slope, the larger stones being placed first in the bottom courses and graduating to the smaller stones at the top. Stones shall be laid in close contact so as to break joints, and in such manner that the weight is carried by the earth and not by the adjacent stones. The spaces between the larger stones shall be filled with spalls, securely rammed into place. The finished work shall present an even, tight surface as shown on the drawings.

.9 Large Rock Placement for the purposes of barrier protection: Place large rock securely on firm ground.

.4 Compaction:

.1 Native Material: Compact to 95% SPD (Standard Proctor Density ASTM 698)

.2 Pit Run Gravel: Compact to 95% SPD

.3 Drain Rock: Compact to 95% SPD

.4 Granular Subbase: Compact to 95% SPD

.5 Recycled Concrete: Compact to 90% SPD

.6 Recycled Concrete for Snake Habitat: No Compactive Effort Required

3.5 COMPACTION TESTING

.1 The contractor shall, as part of the Work, perform, or cause to be performed, all tests, inspections, and approvals of the Work as required by the contract documents. It is the responsibility of the contractor to provide quality control testing for compaction.

.2 The contractor must submit to the Departmental Representative a Quality Control Plan for testing that will outline the planned systematic actions needed to provide adequate compaction and placement of fill materials as per the contract documents.

.3 All quality control test results must be made available to the Departmental Representative within one day of their availability.

3.6 SURFACE RESTORATION

.1 Restore all disturbed surfaces with 100mm depth topsoil as per Section 32 91 19 and 31 22 13.

.2 Make good any damage to adjacent lands or improvements.

3.7 DISPOSAL

.1 Dispose of excess materials, to appropriate recycling facilities or landfills except where otherwise specified, in accordance with approving authority.

END OF SECTION

Part 1 General

1.1 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.

1.2 APPROVALS

.1 Inform Departmental Representative of proposed source and provide samples or access for sampling at least 2 weeks prior to commencing production.

.2 If materials from proposed source do not meet specified requirements, locate alternative source or demonstrate that materials from source in question can be processed to meet specified requirements.

.3 Acceptance of material does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified.

.4 Provide photos of large rocks proposed.

Part 2 Products

2.1 MATERIALS GENERAL

.1 Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles.

.2 All crushed gravel when tested according to ASTM C136 and ASTM C117, or latest revised issue, to have a generally uniform gradation and conform to following gradation limit and 60% of the material passing each sieve must have one or more fractured faces.

2.2 NATIVE MATERIAL

.1 To be any workable soil obtained from the project limits, free of organic or foreign matter; any material obtained within the limits of the contract may be deemed native material for purposes of payment if it approved by the Departmental Representative. Native Material is not acceptable if it is impracticable to control its water content or compact to specified density.

2.3 PITRUN MATERIAL

.1 To be well graded granular material, substantially free from clay lumps, organic matter and other extraneous material, screened to remove all stones in excess of maximum diameter specified in material description. Compact Material to specified density and conform to following gradations:

Sieve Designation	Percent Passing		
250 mm	90	-	100
50 mm	50	-	100
4.75 mm	20	-	80
0.075 mm	2	-	15

2.4 DRAIN ROCK

.1 To be consist of clean round stone or crushed rock conforming to following gradations:

Sieve Designation	Percent Passing		
50 mm	60	-	100
19 mm	25	-	100
4.75 mm	0	-	10
0.075 mm	0	-	2

.2 Drain rock to be used only where specified on Standard Detail Drawings or Contract Drawings. Use of drainrock other than as specified requires approval of Departmental Representative after examination of soils against which drain rock will be placed.

2.5 GRANULAR SUBBASE

.1 To be well graded granular material, substantially free from lumps and organic matter, screen if required, compact material to specified density, and conform to following gradations:

Sieve Designation	Percent Passing		
75 mm			100
25 mm	50	-	85
0.15 mm	0	-	15
0.075 mm	0	-	8

2.6 LARGE ROCK

.1 Local, native stone to be minimum 750 x 750 x 750mm size.

2.7 ANGULAR ROCK RIP RAP

.1 To be consist of clean angular stone or crushed rock conforming to following gradations:

300 mm			100
75 mm	0	-	10

.2 Angular Rock Rip Rap to be used only where specified on Standard Detail Drawings or Contract Drawings for the purposes of repairing surface erosion due to concentrated stormwater runoff. Use of rip rap other than as specified requires approval of Departmental Representative after examination of representative sample and method of placement.

2.8 RECYCLED CONCRETE

.1 Recycled concrete produced from the demolition of the Lodge and surrounding structures shall be used as backfill where indicated on the contract drawing and in Section 03 00 10. Recycled concrete must be free from contaminated and other extraneous material, compacted to the specified density, and must conform to the gradation below:

Sieve Designation	Percent Passing		
400 mm			100
250 mm	90	-	100
75 mm	40	-	100
25 mm	10	-	80
0.075 mm	0	-	15

.2 Recycled material should only consist of crushed Portland cement concrete; other construction and demolition materials such as asphaltic pavements, bricks, steel plaster, etc. are not acceptable.

2.9 RECYCLED CONCRETE FOR SNAKE HABITAT

.1 Recycled concrete produced from the demolition of the Lodge and surrounding structures shall be used as backfill where indicated on the contract drawing and in Section 03 00 10. Recycled concrete must be free from contaminated and other extraneous material, and must conform to the gradation below.

Designation	Passing		
500 mm			100
250 mm	0	-	10

.2 Recycled material should only consist of crushed Portland cement concrete; other construction and demolition materials such as asphaltic pavements, bricks, plaster, etc. are not acceptable.

Part 3 Execution

3.1 HANDLING

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

.2 Do not use intermixed or contaminated materials. Remove and dispose rejected materials within 48 hrs or rejection.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Environmental Protection Act.

1.2 DEFINITIONS

.1 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris. Removal of specified (by Parks Canada) non-native vegetation.

.2 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments to not less than 100 mm below ground surface.

1.3 STORAGE AND PROTECTION

.1 Prevent damage to natural features which are to remain.

.2 Protect trees to remain as indicated on drawings.

Part 2 Products

2.1 CHEMICALS

.1 No chemicals are to be used to remove plant material. Use mechanical means only.

Part 3 Execution

3.1 TEMPORARY EROSION CONTROL

.1 Provide temporary erosion control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 PREPARATION

.1 Inspect site and verify with Departmental Representative, items designated to remain and to be removed.

.2 Tag or identify designated plant life to remain.

3.3 PROTECTION

.1 Locate, identify and protect utilities that remain, from damage.

.2 Protect trees, plant growth, and features designated to remain, as final landscaping. Protection as per drawing L-3.00 and L-4.00.

.3 Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 APPLICATION

.1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.5 CLEARING OF ISOLATED NON NATIVE TREES AND SHRUBS

.1 Cut off isolated trees as directed by Departmental Representative at height of not more than 300 mm above ground surface.

.2 Grub out isolated tree stumps.

.3 All trees felled in the clearing site are the property of Parks Canada and must be topped and bucked to approximately 305mm – 406mm length for firewood. Tops and root sections not utilized by Parks Canada firewood should be chipped for mulch and used to cover the exposed concrete. Firewood is to be taken to Redstreak Campground approximately 5km away.

3.6 CLEARING OF ISOLATED NATIVE TREES AND SHRUBS

.1 Cut off isolated trees as directed by Departmental Representative at height of not more than 300 mm above ground surface.

.2 No grubbing required.

.3 All trees felled in the clearing site are the property of Parks Canada and must be topped and bucked to approximately 305mm – 406mm length for firewood. Tops and root sections not utilized by Parks Canada firewood should be chipped for mulch and used to cover the exposed concrete. Firewood is to be taken to Redstreak Campground approximately 5km away.

3.7 UNDERBRUSH CLEARING

.1 Clear underbrush from areas as indicated at ground level.

3.8 GRUBBING

.1 Remove and dispose of roots larger than 75 mm in diameter, matted roots, and designated stumps from indicated grubbing areas.

.2 Grub out stumps and roots to not less than 100 mm below ground surface.

.3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m^3.

.4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

.5 Care must be taken during grubbing operations to ensure that the trees and roots on the edge of the clearing limits are not disturbed or damages.

3.9 REMOVAL AND DISPOSAL

.1 Remove cleared and grubbed materials off site.

3.10 FINISHED SURFACE

.1 Leave ground surface in condition suitable for immediate grading operations to approval of Departmental Representative.

3.11 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION CONTROL

.1 Provide temporary erosion control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

.2 Stabilization of bared soils and excavation materials will be required in the event of a work program shutdown during inclement weather, e.g. winter conditions unfavourable for construction.

3.2 STRIPPING OF TOPSOIL

.1 Ensure that procedures are conducted in accordance with applicable Federal, Provincial and Municipal requirements.

.2 Native topsoil stripping will be avoided, however if required it must be done in accordance with direction provided by the Parks Canada Surveillance Officer.

.3 Remove topsoil before construction procedures commence to avoid compaction of topsoil.

.4 Handle topsoil only when it is dry and warm.

.5 Strip topsoil by scraper to depths as directed by Departmental Representative.

.1 Avoid mixing topsoil with subsoil.

.6 Pile topsoil by mechanical hoe in berms in locations as directed by Departmental Representative.

.1 Stockpile height not to exceed 1.5 m.

.7 Stripping piles may require erosion control, sedimentation protection, or stabilization depending on the location and duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of stripping pile.

.8 Dispose of unused topsoil in location as indicated by Departmental Representative for later use.

.9 Protect stockpiles from contamination and compaction.

.10 Cover topsoil that has been piled for long term storage, with grass to maintain agricultural potential of soil.

3.3 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D698-[91(1998)], Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ;).

1.2 EXISTING CONDITIONS

.1 Known underground and surface utility lines and buried objects are as indicated on site plan.

1.3 PROTECTION

.1 Protect trees, natural features, bench marks, 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 at the expense of the Contractor.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products

2.1 MATERIALS

.1 Imported Common Fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Departmental Representative.

Part 3 Execution

3.1 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Slope rough grade away from structures at 2% or as indicated on drawings.

.3 Grade ditches to depth required for maximum run-off.

.4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.5 Care will be taken by the Contractor when removing asphalt and underlying gravels so as to not expose potentially hazardous materials from the old Radium

Village that are known to have been buried under the lodge parking lot and in areas between RHSL and the Superintendent's house. If hazardous materials are uncovered, notify Departmental Representative immediately of any uncovered materials discovered. Do not disturb material until instructed by Departmental Representative.

.6 Ensure drainage is not concentrated at the sites and that erosion and drainage control measures are in place until all disturbed areas have been stabilized.

.7 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:

.1 85% under landscaped areas.

.8 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

END OF SECTION

Division 32 – Surface Works Removals

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is or is not identified in Ballast Environmental Hazardous Material report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features to remain in place.

.2 Keep noise, dust, and inconvenience to minimum.

.3 Do Work in accordance with Section 01 35 29 - Health and Safety Requirements.

3.3 SALVAGE

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

.2 Remove items to be reused, store as directed by Departmental Representative, and re-install under appropriate section of specification.

3.4 SITE REMOVALS

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

3.5 DEMOLITION

.1 Sort materials into appropriate piles for reuse and recycling.

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

3.6 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.7 SURFACE WORKS REMOVALS

.1 All asphalt within the project area should be removed from site and disposed of or recycled. The underlying base and subbase gravels can be used as common fill. There are areas noted within the EA that are marked as environmentally sensitive where the base and subbase gravels cannot be removed or disturbed. These areas should be noted by a biologist prior to demolition.

.2 If ground squirrel burrows or other critical wildlife features are found, contact Parks Canada Officer to review area for activity.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-[95], Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131-[96], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136-[96a], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D698-[00a], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.5 ASTM D1557-[00], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).

.6 ASTM D1883-[99], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.7 ASTM D4318-[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 QUALITY ASSURANCE

.1 Obtain materials from same source throughout.

1.3 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

.1 Trail Mix: Trail Mix is gravelly sand, with some silt and trace of clay. Grain size distribution is as follows:

Gravel	-	21.8%
Sand	-	61.5%
Silt	-	12.8%
Clay	-	3.9%

.3 The combined aggregates to meet the following gradation:

Sieve Size (mm)	Percent Passing By Mass
16.0	100
12.5	98 – 100
10.00	80 – 98
5.00	55 – 80
2.50	40 – 60
1.250	35 – 50
0.63	28 – 43
0.315	23 – 36
0.160	15 – 25
0.080	8 – 18

Part 3 Execution

3.1 INSTALLATION

.1 Verify that compacted subgrade, and granular base is dry and ready to support imposed loads. Subgrade to be compacted to 98% S.P.D..

.2 Excavation of all organic and native material in line with work to designed subgrade. Wasting of material on site.

.3 Verify gradients and elevations of base are correct.

.4 Fill previously cored trench 150mm depth with 150mm of approved gravel trail mix. Ensure the trench is over-filled to allow for crowning and compaction.

.5 Gravel trails are to be centre crowned or cross sloped at a grade of 3 – 5%.

.6 Ensure there are no trap low areas on the trail surface and provide positive drainage away from the surface with drainage dips, diagonal water bars, swales and culverts.

.7 Compact the trail mix to 95% of maximum dry density. Multiple passes by a vibrating roller with the application of water may be required to achieve the specified lever of compaction.

.8 Place topsoil (raked and rolled) and grass seed mix, as approved by Departmental Representative on trail edges and areas damaged by construction. Ensure that the topsoil surface is flush with trail edges.

.9 The finished gravel trail surface will be at the same elevation as any connecting existing trails or pathways, as directed by Departmental Representative. All grading will be free draining and is not to impede existing drainage.

3.2 TESTING

.1 Testing requirements to be carried out by Departmental Representative. Contractor to facilitate testing.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment

.1 PN1340-[2005], Guidelines for Compost Quality.

1.3 SOIL TESTING

.1 Submit to the Departmental Representative, for review and acceptance, the name of the testing company who will conduct the soils analysis.

.2 Prepare a soils analysis report and test the topsoil for NPK, particle size, soluble salt content, organic matter and pH. Recommendations must clearly state type, quantity and application procedure that is used.

.3 Submit two copies of the soils analysis report including the location of the stockpile or source and recommendations for correction to Departmental Representative.

.4 Contractor shall select and pay for services of accredited testing laboratory to perform soil quality analysis on Contractor supplied topsoil. Contractor to ensure soil is free of weeds.

1.4 SOURCE OF TOPSOIL SUPPLY

.1 Only use imported topsoil meeting specified requirements.

Part 2 Products

2.1 TOPSOIL

.1 Imported Topsoil for seeded areas: natural, fertile, friable, agricultural soil meeting following requirements:

.1 Not less than 6% organic material.

.2 pH value ranging from 6.0 to 7.5 and contain not less than 5% organic matter.

.3 Non-toxic to plant growth.

.4 E.C.-Salinity reading not exceeding 1.5.

.5 Soil texture: loam soil as defined by Canadian System of Soil Classification.

.6 Reasonably free from subsoil, slag, clay, stone, lumps, live plants, roots, sticks, quack-grass, noxious weeds and foreign matter.

.7 All topsoil must be screened.

2.2 IMPORTED COMMON FILL

.1 Imported Common Fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials

2.3 WOODCHIP MULCH

.1 Woodchip Mulch: shall be made if available from on site plant material that has been removed as part of the work of this contract. Size to be course with a range of sizes from 10mmX10mmx5mm to 40mmx60mmx35mm. No more than 5% by volume of soil, sawdust, peat moss, or needles. Apply at depth of 75mm at locations indicated on drawings.

2.4 SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing. Submit soil test results to Departmental representative. Sources of topsoil introduced into the park will be approved by the Departmental Representative and Parks Canada before being allowed into the park.

Part 3 Execution

3.1 VERIFICATION OF CONDITIONS

.1 Conduct site visit to examine existing conditions and verify that subgrade is ready to receive work. Coordinate work as required.

3.2 PROTECTION OF EXISTING WORK

.1 Protect and prevent damage to adjacent features which are to remain. Make good any damage.

3.3 TEMPORARY EROSION CONTROL

.1 Provide temporary erosion control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.4 PREPARATION OF SUBGRADE

.1 Locate utility lines before commencement of work and protect from damage.

.2 Remove foreign material, undesirable plants (non-native vegetation), roots, stones in excess of 25 mm diameter, debris and soil contaminated with toxic

materials and petroleum products, from site. Do not bury foreign material beneath areas to be landscaped.

.3 Grade and finish subgrade to eliminate uneven areas, low spots and ensure positive drainage.

.4 Compacted subgrades shall be scarified to a minimum depth of 150mm immediately before placing topsoil.

3.5 PLACEMENT AND SPREADING OF TOPSOIL

.1 Place topsoil only upon loose friable graded subgrade surfaces approved by Departmental Representative.

.2 Place and spread approved topsoil in dry weather on dry unfrozen grade.

.3 Spread topsoil to obtain minimum depth after settlement of 100 mm depth for seeded areas.

.4 Manually spread topsoil around trees, plants and surface obstacles to prevent damage.

3.6 PREPARATION OF FINAL GRADE

.1 Rough place topsoil.

.2 Thoroughly cultivate topsoil to minimum depth of 100 mm by roto-tilling or hand methods where compaction has occurred.

.3 Grade to eliminate rough or low areas and to ensure drainage. Maintain levels, profiles and contours of subgrade.

.4 Do not cover catch basins, valve covers or manholes.

.5 Use water trucks and sprinklers as necessary to control all airborne dust caused by topsoil placement and grading operations when necessary. Do not saturate sloped areas susceptible to erosion.

3.7 CLEAN-UP

.1 Clean up, immediately, any soil or debris spilled onto roadway, walks and mulched areas.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Seed Act and Regulations, Weed Seeds Order 2005.

.2 Canada Fertilizers Act

1.2 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 Fertilizer.

.3 Mulch.

1.3 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.

.3 Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

.4 Hydroseeding to be installed by licensed installers only.

1.4 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00 - Product Requirements: Transport, handle, store, and protect products.

.2 Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

.3 Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 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.

1.6 SEED TESTING

.1 Submit to the Departmental Representative, for review and acceptance, the name of the testing company who will conduct the seed testing.

.2 Contractor shall select and pay for services of accredited testing laboratory to perform seed testing on Contractor supplied seed.

.3 Test seed for purity, presence of invasive and noxious species, and germianation percentage.

Part 2 Products

2.1 GRASS SEED

.1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".

.1 Seed Mix to include:

.1 10% Awned wheatgrass (Agropyron subsecundum "Hillcrest")

.2 15% Broadglumed wheatgrass (Agropyron violaceum "Mountaineer")

.3 20% Rocky Mountain Fescue (Festuca saximontana)

.4 10% Mountain brome (Bromus carinatus)

.5 10% Alpine bluegrass (Poa alpina)

.6 15% Junegrass (Koeleria macrantha)

.7 10% Tufted Hair grass (Deschampsia Caespitosa “Nutracoat”)

.8 10% Bluebunch wheatgrass (Agropyron spicatum)

.2 In packages individually labelled in accordance with "Seeds Regulations" and indicating name of supplier.

.3 Seed shall have a minimum germination rate of 75% and minimum purity of 97%.

2.2 WATER

.1 Free of impurities that would inhibit germination and growth.

.2 Supplied by Parks Canada at designated source.

.3 On steep slopes apply water carefully so as not to create erosion of topsoil, seed and mulch.

2.3 FERTILIZER

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

2.4 MULCH

.1 Mulching Material: MulchMax (Supplied by Nilex), or approved alternative to be free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable. Mulch is to include tacifier. To be applied as per manufacturers' specifications.

.2 Nilex contact Ian Corne (1-604-226-6141).

Part 3 Execution

3.1 QUALITY OF WORK

.1 Do not perform work under adverse field conditions as determined by Departmental Representative.

.2 Remove and dispose of weeds; debris; stones 150 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; in location as directed by Departmental Representative.

3.2 SEED BED PREPARATION

.1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

3.3 SEED PLACEMENT

.1 All disturbed areas to be hydroseeded via hydro-mulch complete with tackifier and fertilizer in lieu of an erosion control mat.

.2 Apply seeded slurry with a hydraulic seeder evenly in two intersecting directions as per manufacturers' specifications.

.3 Do not hydroseed area in excess of that which can be mulched on same day.

.4 Immediately following seeding, apply mulch to a thickness as per manufacturers' specifications. Maintain clear of shrubs and trees.

.5 Apply water with a fine spray immediately after each area has been mulched. Saturate to 100 mm of soil.

.6 Areas of blending into existing turf will not be measured for payment.

.7 On cultivated surfaces, sow seed uniformly at rate of:

.1 100 kg/hectare ground cover mixture.

.8 Blend applications 500mm into adjacent grass areas to form uniform surfaces.

.9 Sow half of required amount of seed in one direction and remainder at right angles as applicable.

.10 Incorporate seed by light raking in cross directions.

3.4 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.2 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.

1.3 SITE CONDITIONS

.1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Ballast Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 UNDERGROUND UTILITY REMOVALS AND ABANDONMENT

.1 Sewer Mains/Services: Minimize the length of abandoned infrastructure connected to existing mains. All abandoned sewers (storm and sanitary) shall be plugged and sealed as close to the existing (live) main as practically possible, at the Property line, and/or as indicated on the drawings.

For all types of pipe 200mm and smaller, leave pipes in place and removed/abandoned as follows: seal the pipe to be abandoned at all exposed ends with a manufactured compression/mechanical type plug. Place concrete over top of the plug with a free flowing, low strength concrete (1-2 MPa Fillcrete) to prevent water ingress/egress within the abandoned system.

If the sewer main discharges into an active manhole within public or Highway property, then only the upstream end of the sewer line shall be abandoned. The downstream end of the sewer line discharging into the active MH may be left ‘as is’ to minimize disturbance to public or Highway right of ways.

Pipes larger than 200 mm in diameter, located within the project area, may be left in place and deemed abandoned as follows: For concrete pipe, place sandbags and/or bricks 300 mm inside of the pipe to be abandoned, and seal with Fillcrete.

For PVC pipe, place sandbags and/or bricks 300 mm inside of the pipe to be abandoned. Coat the inner pipe with a layer of approved sewer pipe sealant in order to create a watertight barrier. Place concrete over top of the sandbag/brick barrier with low slump cast-in-place concrete.

.2 Watermains/Services: All piping to be abandoned shall have a minimum length of one metre removed at the point of abandonment. The abandoned end as well as all exposed ends shall then be sealed to prevent groundwater infiltration in a manner as described in section 3.1. Service tees larger than 50mm to be abandoned shall be cut out and replaced with a straight section of piping if tying to an active watermain unless otherwise noted on the drawings; in which case, the service shall be shut off and capped as close to the existing main as reasonably possible, such as at the Property line. The main stop for abandoned services 50mm and smaller shall be removed and the tap hole sealed with an approved brass plug. A Robar 6635AS sleeve or approved equal may be used to abandon the service. All valves should be turned completely off before removing the top box as per section 3.6. Similarly to section 3.1, water mains shall be capped and sealed as close to the main to minimize the amount of live joints and fittings that could potentially leak/fail in the future.

.3 Manholes: For manholes located within the project area, plug all pipes at the manhole as per Section 3.1 Abandonment of Sewer Pipe. Excavate and remove each manhole lid and frame and barrels to at least 1.0m below finished grade. Additional barrels may be left in place or removed to their base. The base can remain unless it is a very shallow manhole and does not sit at least 1.0m below finished grade. Fill base with Fillcrete such that it covers all ingoing and outgoing pipes entirely. Sand/gravel or other suitable compacted backfill may be used to fill the remaining manhole base/barrels up to grade (if required).

For manholes to be abandoned within a paved surface that is to remain in place, such as, at or near the highway right of way, the manhole structure shall remain in place (i.e. the base, barrels, frame and lid etc.) and should be abandoned by having all inlets and outlets abandoned as above, and filled with sand/gravel or other suitable compacted backfill to the bottom of the manhole lid.

.4 Catchbasins: All shallow catchbasins within the project area (1.2m deep or less) should be removed in their entirety and are to be crushed and used as fill as per the geotechnical report unless they are otherwise noted on the drawings to remain in place. Catchbasin leads are typically shallow and constructed from thinner (SDR28), smaller diameter PVC pipe. As such, the leads should be removed in their entirety as well to avoid long term complications. However, in the event of longer lead lengths that would case too much disturbance during removal, or larger in diameter pipe is installed (>200mm), or the pipe is at depths greater than 1.0m below finished grade, then the leads can be abandoned as per section 3.1 above. Similarly, if the catchbasins are uncharacteristically deep, then they can be abandoned as per section 3.3 above.

.5 Septic Tanks: When removing septic tanks, the contents of the tank shall be pumped out and disposed of properly as per environmental requirements. If the septic tank remains 1.0m below finish grade, then it should be filled with sand; however, if the tank is in an area of cut where it will be exposed, break down and remove the tank to an elevation not less than 1.0m below the proposed finished ground surface. Before backfilling, break a hole in the bottom of any remaining

portion of the tank to allow drainage. Backfill as specified for trenches and general fill placement as described in the geotechnical report. All septic field lines should be removed and disposed of off-site if at risk of being exposed, otherwise, they may be left in place.

.6 Hydrants and Appurtenances: Hydrant assemblies should be removed entirely to the pipe where it can potentially be salvaged by the contractor and sold or kept storage. The pipe should be abandoned as per section 3.1. Abandonment of gate valves and curbstops should include the removal of the operating rod, top box and casing to a minimum of 1.0 m below finished grade. Alternatively, the Gate valve can possibly be salvaged depending on assessment of condition once excavated.

.7 CSP culverts: Culverts should be completely removed and disposed of offsite. Backfill of the exposed trench with approved fill as per backfill specifications. Where it is unpractical to remove a culvert, the culvert may be abandoned as per section 33 00 10.3.1

3.2 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities or landfills except where otherwise specified, in accordance with approving authority.

3.3 RESTORATION

.1 Areas of disturbance shall be restored as per sections 31 22 13 – Rough Grading and 32 91 19 – Finish Grading.

END OF SECTION

APPENDIX A

HAZARDOUS MATERIALS ASSESSMENT

RADIUM HOT SPRINGS LODGE

Prepared for:

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File No. 11192

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EXECUTIVE SUMMARY

Ballast Environmental Consulting Ltd. (Ballast Environmental) was contracted by Professional & Technical Services, Real Property Services Branch Public Works & Government Services Canada (PWGSC) to conduct a Hazardous Building Material Assessment at the Radium Hot Springs Lodge. The Radium Hot Springs Lodge is located adjacent Highway 93 in Kootenay National Park, approximately 2 kilometres east of Radium Hot Springs, BC. The assessment was conducted October 3-7 and 11-12, 2011 and October 26, 2011. The information obtained will be used for abatement and demolition purposes.

The study objective includes:

- providing a Hazardous Materials Report as per the Terms of Reference with the following information included in the report:
  - Site investigation, sample collection/location and laboratory analysis
  - Assessing the degree of risk/health hazard to workers
  - Estimating types, quantities and locations of hazardous materials and preparing a report in tabular format
  - Specifying QA/QC procedures and laboratory investigation methodologies

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials, mould; and
- analysis and reporting of findings with recommendations.

Summary of Findings for the Lodge

ASBESTOS

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
Original Lodge		
ACM Drywall Putty	All drywall Estimated: 1250 m^2 (size of Original Lodge)	The drywall must be abated prior to demolition.
ACM Floor Tiles	Estimated: 600 m^2	The floor tiles must be abated prior to demolition.
ACM Freezer Caulking	2 Walk-in coolers Estimated: 1 m^2	The caulking must be abated prior to demolition.
ACM Pipe Elbow Insulation	Estimated: 8 (visible)	The pipe elbow insulation must be abated prior to demolition. Moderate Risk assuming work is performed using a glove bag procedure.
ACM Gasket	Estimated: All fittings	The gaskets should be abated during equipment decommissioning. All gaskets should be treated as an ACM or tested as they are encountered.
ACM Window Caulking	Estimated: 3 windows	The caulking must be abated prior to demolition.

ACM	EXTENT	RECOMMENDATION*
ACM Vermiculite Insulation	All interior and exterior cinderblocks Estimated: 100 m (length of cinderblock wall)	The vermiculite must be abated prior to demolition. Moderate Risk abatment is possible depending on procedures.
New Lodge		
ACM Drywall Putty	All drywall Estimated: 650 m^2 (size of New Lodge)	The drywall must be abated prior to demolition.
ACM Pipe Elbow Insulation	Estimated: 15 (visible)	The pipe elbow insulation must be abated prior to demolition. Moderate Risk assuming work is performed using a glove bag procedure.
ACM Window Caulking	All guest room balcony doors Estimated: 30	The window caulking must be abated prior to demolition.
ACM Gasket	Estimated: All fittings	The gaskets should be abated during equipment decommissioning. All gaskets should be treated as an ACM or tested as they are encountered.
ACM Ceiling Stipple	All ceiling stipple Estimated: 650 m^2	The ceiling stipple must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

PCBs

All fluorescent light ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There are several hundred of fluorescent tubes and some compact fluorescent bulbs throughout the buildings. All fluorescent lights should be stored to protect from breakage and recycled accordingly.

There were mercury thermostats located throughout the Lodge, with the majority being found in the guest rooms and other public areas.

Any mercury items should be recycled and disposed of according to current regulations.

OZONE-DEPLETING SUBSTANCES

There were several ODS located throughout the building. The ODS units should be recovered/recycled by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

RADIOACTIVE MATERIALS

There were numerous radioactive smoke detectors located throughout the Lodge in the guest rooms.

When radioactive materials are not in use and are to be disposed of, they should be disposed of according to the current regulations of the Nuclear Safety Control Act and Nuclear Substances and Radiation Devices Regulations.

MISCELLANEOUS CHEMICALS

All miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

MOULD

Water damage accompanied by a strip of mould was observed in Hall 1 on the lower floor. Mould was also found in room 130 in the washroom, in the Smoking room and at the back of the Main stairs on the lower floor.

Since the building is to be demolished, the mould-contaminated materials may be left in place; however, in this instance mould was observed on drywall which will be abated with asbestos removal. Although the mould did not pose a risk at the time of the assessment, conditions may change and if additional mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

OTHER

The batteries and electronic equipment should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

The sump should be checked for integrity and possibly sampled to determine if there have been any soil or groundwater impacts.

If any other suspect materials become exposed during demolition, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,

- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

Summary of Findings for Cabin #3

ASBESTOS

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
ACM Roof Tar	Estimated: 80 m^2	The tar associated with the asphalt shingles must be abated prior to demolition.
ACM Linoleum	Estimated: 4 m^2	The linoleum must be abated prior to demolition.
ACM Vermiculite Insulation	Entire ceiling space Estimated: 80 m^2	The vermiculite must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There were approximately two dozen fluorescent light tubes being stored in Bedroom 2. All mercury-containing items should be stored to protect from breakage and recycled according to the applicable regulations.

MOULD

There was water damage, which may lead to mould, observed on the ceiling in Entry 2. Caution should be exercised in this area as water damage may also weaken the ceiling tiles to the point of collapse which could result in spillage of vermiculite from the ceiling space.

Since the building is to be demolished, the water-damaged materials may be left in place. Although no mould was observed at the time of the assessment, conditions may change and if mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

PESTS

Animal feces were observed throughout Cabin #3. Persons entering this building should take precautions to reduce the risk of contact with rodent saliva, urine or feces, including using PPE (disposable gloves if touching surfaces and disposable N95 respirator) and following appropriate decontamination procedures, such as disinfecting shoes and other exposed surfaces, upon leaving the building.

The feces may pose a significant health risk and should be cleaned up by experienced and trained personnel.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

Summary of Findings for Cabin #1 & Cabin #2

ASBESTOS

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
Cabin #2 unit 2		
ACM Drywall Putty	Estimated: 24 m^2	The drywall must be abated prior to demolition.
Cabin #2 unit 3		
ACM Drywall Putty	Estimated: 4 m^2	The drywall must be abated prior to demolition.
Cabin #1 unit 2		
ACM Vinyl Floor Tile	Estimated: 6 m^2	The floor tile must be abated prior to demolition.

ACM	EXTENT	RECOMMENDATION*
Cabin #1 unit 3		
ACM Vinyl Floor Tile	Estimated: 4 m^2	The floor tile must be abated prior to demolition.
Cabin #1 unit 4		
ACM Vinyl Floor Tiles	Estimated: 30 m^2	The floor tile must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

LEAD

Lead-based paint was found at several locations on the exterior of Cabins #1 and #2.

LEAD PAINT	EXTENT	RECOMMENDATION*
Exterior White	Entire cabins Total Estimate: 240 m^2 (size of cabins)	Disturbance of lead-based paint causes the release of lead in the dust. If the lead-based paint is to be disturbed, then the workers must wear appropriate PPE. When there is disposal of the lead-based paint materials the landfill must be notified of the lead content and leachability of the paint. This lead paint is considered hazardous waste.
Exterior Gray	All cabin porches Total Estimate: 16 m^2	
Exterior Red	2 Fire extinguisher boxes Total Estimate: 4 m^2	
Exterior Brown	Entire cabins Total Estimate: 240 m^2 (size of cabins)	

*NOTE: any lead based materials must only be handled/abated by trained and experienced personnel.

PCBs

There were six unlabeled, leaking light ballasts located in Cabin #1 units 1 and 2. All fluorescent light and HID ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

The lead paint samples tested for PCBs were all below detection limits; therefore the paints do not contain PCBs.

MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found associated with the light ballasts in Cabin #1units 1 and 2. All fluorescent lights should be stored to protect from breakage and recycled accordingly.

OZONE-DEPLETING SUBSTANCES

There were two items confirmed to contain R-12 - a cooler and a compressor - located in Cabin #1 unit 2 and unit 3, respectively. There are suspected ODS items located in the Cabin #2 unit 3 Bedroom, the Cabin #1 unit 4 Living room and the Cabin #1 unit 3 Living room.

The ODS units should be recycled/recovered by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

MISCELLANEOUS CHEMICALS

All miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

MOULD

Some water damage and conditions which may lead to mould were observed on the ceiling of the Cabin #1 unit 3 Living room.

Since the building is to be demolished, the water-damaged materials may be left in place. Although no mould was observed at the time of the assessment, conditions may change and if mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

OTHER

PESTS

Cabins #1 and #2 had a significant amount of rodent feces. A rat's nest was observed in the Washroom of Cabin #1 unit 4 and rats were observed in the attic. Persons entering these buildings should take precautions to reduce the risk of contact with rodent saliva, urine or feces, including using PPE (disposable gloves if touching surfaces and disposable N95 respirator) and following appropriate decontamination procedures, such as disinfecting shoes and other exposed surfaces, upon leaving the building.

The feces may pose a significant health risk and should be cleaned up by experienced and trained personnel.

APPLIANCES AND ELECTRONICS

Several appliances and electronic items were found throughout the cabins including stoves (electric and gas), computer equipment and photocopiers. These items should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

TIRES

Several tires were found in the Cabin #2 unit 4 Washroom, the Cabin #1 unit 2 and unit 3 Living rooms and in the Cabin #1 unit 4 Bedroom. The tires should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the buildings are not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

Summary of Findings for the Superintendent's House

ASBESTOS

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
ACM Floor Tile	Estimated: 24 m^2	The floor tiles must be removed prior to demolition or any disturbance using moderate risk procedures.
ACM Skim Coat	Estimated: 7 m^2	The skim coat on the exterior stairs and walls will need to be abated prior to disturbance.
ACM Pipe Insulation; Elbows and Aircell	Estimated: 33 elbows 100 m (length of insulated pipe)	The pipe insulation located in the basement must be abated prior to demolition or to the house being moved. Moderate Risk assuming work is done using glove bag and wrap and cut procedures.
ACM White Mosaic and Red/orange Mosaic Sheet Flooring	Estimated: 43 m^2	The linoleum must be abated prior to demolition using high risk procedures.
ACM Off-white Sheet Linoleum	Estimated: 5 m^2	The linoleum will need to be removed prior to demolition or any disturbance

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

LEAD

The exterior paints on the trim and wood logs were found to be lead-containing. Lead-based paint does not pose a risk unless it is disturbed and dust is created allowing for the lead to become airborne. Any lead-based materials must only be handled/abated by trained and experienced personnel.

Batteries should be recycled.

According to BC Hazardous Waste Legislation, the brown exterior paint is considered hazardous waste and requires special disposal.

PCBs

All fluorescent light ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

As long as the PCB-containing fluorescent light ballasts are in good condition and not damaged and PCBs remain enclosed (not leaking) there is low risk to occupants.

It is recommended that any leaking fluorescent light ballasts are removed and disposed of immediately.

MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were located throughout the house. All mercury-containing items should be stored to protect from breakage and recycled according to the applicable regulations.

OZONE-DEPLETING SUBSTANCES

There was a fridge remaining in the Kitchen. The type of refrigerant contained in the fridge could not be identified. The ODS units should be recycled/recovered by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

MISCELLANEOUS CHEMICALS

Any miscellaneous chemicals need to be stored or disposed of according to current regulations and manufacturers recommendations.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,

- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

Summary of Findings for the Outbuildings

LEAD

The tan over blue paint located in the Bus shelter on the benches and trim is lead paint. The leachable lead content of this paint was below guideline and it is not considered to be hazardous waste.

Disturbance of lead-based paint causes the release of lead in the dust. If the lead-based paint is to be disturbed, then the workers must wear appropriate PPE. Any lead-based materials must only be handled by trained and experienced personnel.

When there is disposal of the lead-based paint materials the landfill must be notified of the lead content leachability of the paint. The landfill may require abatement or further testing of the lead paint before disposal if the paint is in poor condition.

MISCELLANEOUS CHEMICALS

Any miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

OTHER

The tire and electronic items should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the buildings are not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,

- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

1.0 INTRODUCTION

Ballast Environmental Consulting Ltd. (Ballast Environmental) was contracted by Professional & Technical Services, Real Property Services Branch Public Works & Government Services Canada (PWGSC) to conduct a Hazardous Building Material Assessment at the Radium Hot Springs Lodge. The Radium Hot Springs Lodge is located adjacent Highway 93 in Kootenay National Park, approximately 2 kilometres east of Radium Hot Springs, BC. The assessment was conducted October 3-7 and 11-12, 2011 and October 26, 2011. The information obtained will be used for abatement and demolition purposes.

1.1 STUDY OBJECTIVES

The study objective includes:

- providing a Hazardous Materials Report as per the Terms of Reference with the following information included in the report:
    - Site investigation, sample collection/location and laboratory analysis
    - Assessing the degree of risk/health hazard to workers
    - Estimating types, quantities and locations of hazardous materials and preparing a report in tabular format
    - Specifying QA/QC procedures and laboratory investigation methodologies

1.2 SCOPE OF WORK

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials, mould; and
- analysis and reporting of findings with recommendations.

The buildings assessed for this report were:

- the Lodge
- Cabin #3
- Cabins #1 and #2, and
- the Outbuildings (sheds and exterior structures).

The Superintendent's House has been addressed in a separate report. However, a visual inspection of the house and additional sampling were completed as part of this assessment.

1.3 SITE DESCRIPTION

The subject site is located adjacent to Highway 93, across from the Hot Springs Pools, in Kootenay National Park. The Radium Lodge is approximately 2 kilometres east of the town of Radium Hot Springs, BC. The site consists of seven different buildings and various exterior structures such as elevator rooms, retaining walls, a gazebo, propane tanks and debris piles. The buildings and the elevator room are addressed in this report. Refer to Appendix 1b-1 - 2 for a vicinity map and site plan.

2.0 METHODOLOGY

A room-by-room inspection was completed in all accessible rooms. Samples were taken of materials suspected to contain asbestos and of paint suspected to contain lead. Sampling of asbestos materials follows the recommendations set out in the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, for bulk sampling. A visual survey was completed for polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials and mould and/or water damage. Observations and sampling locations were documented and diagrams are provided in the Appendices.

The building names in this report and in the appendices were changed from the names assigned during the field investigation in order to be consistent with the entire project.

2.1 HEALTH AND SAFETY

All work carried out was consistent with a site-specific health and safety plan. A hazard assessment and a job task analysis were completed each day before the commencement of work and hazard controls were identified.

2.2 ASBESTOS-CONTAINING MATERIALS (ACM)

A room-by-room (where accessible) and systematic visual survey was conducted in order to identify materials which may contain asbestos. Suspect materials were sampled and the location, type, estimated amount and condition were documented. Homogenous materials such as drywall compound or ceiling tile were sampled in various locations within a building and composites were made from each sampling location because of the variable nature of asbestos in these substances. The asbestos testing was completed by International Asbestos Testing Laboratory (IATL) in Mt. Laurel, New Jersey using polarized light microscopy US EPA method 600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials for bulk samples. If the initial screening of asbestos in vermiculite was 'none detected', additional testing was carried out using EPA 600/R-04/004 Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation.

Some samples were not repeated on a room-by-room basis if it was obvious that the subject material was the same. For example: drywall putty was tested several times in each of the Original and New Lodges. The results from these samples apply to all areas with drywall. This type of extrapolation is site-dependent and is dependent on the material, amount, suspected date of installation, renovations, etc.

For homogenous material, bulk samples were collected based on the guidelines set out in the BC Occupational Health and Safety Guidelines. Generally, samples were collected as follows:

<90 m^2	= 3 samples
90 – 450 m^2	= 5 samples
>450 m^2	= 7 samples

Where anomalous results were encountered, a step-out procedure was used to re-sample the material. This involved taking three additional samples, arranged in a triangle, around the area where the original sample was taken.

The following procedures were adhered to during sampling:

- The sampling was performed by a competent person
- Only the person sampling was in the area being sampled
- The material sampled was sprayed lightly with amended water
- Samples were collected carefully, trying not to disturb more material than necessary
- Any protective coverings that were disturbed were repaired/replaced/covered immediately
- Representative samples of all suspect materials were sampled, penetrating the entire depth of the material, and sampling was done at random locations (where accessible)
- Materials with different appearances were sampled separately
- Collected samples were placed into sealed, impervious containers and they were labeled as a laboratory sample and had a WHMIS label on them
- The WHMIS label contained the following information:
    - Product identifier
    - The sample may contain asbestos
    - The statement "hazardous laboratory sample, for hazardous information and in an emergency call…" and provided an emergency telephone number
- Where appropriate, plastic drop cloths were used to collect any debris from sampling and any debris was vacuumed up using a vacuum equipped with a HEPA filtered exhaust or by wet wiping
- The sampler wore the appropriate half-mask respirator with P100 filters, disposable, impermeable coveralls, rubber boots, safety glasses and disposable nitrile gloves
- The gloves were changed for each sample
- All waste, including gloves, was placed in an appropriate bag labeled "asbestos waste"
- All tools and sampling equipment were decontaminated between samples and at the end of the day

2.3 LEAD PRODUCTS

Paint samples were taken from various locations and from various substrates. Every effort was made to remove the paint without removing the underlying substrate. Disposable, impermeable coveralls, rubber boots, disposable nitrile gloves and half-mask respirators with P100 filters were worn by the samplers. A razor scraper was used to scrape the paint from the substrate which was then placed in a plastic, re-sealable, labeled bag. The samples were shipped to the laboratory via courier as soon as possible. No preservation or refrigeration is required for the paint samples.

IATL tested for lead content using the ASTM D3335-85A Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry. Any lead samples which contained greater than 0.5% lead by weight were submitted to ALS Environmental (Calgary) for toxicity characteristic leaching procedure (TCLP) as per landfill requirements.

Visual observations were made for other materials containing lead, such as emergency backup batteries.

2.4 POLYCHLORINATED BIPHENYLS (PCB)

Generally, fluorescent light ballasts were noted and, if possible, inspected. If the ballasts were not marked as being PCB-free, the manufacture and date codes were compared to the Environment Canada publication: Identification of Lamp Ballasts Containing PCBs, revised August 1991, for PCB identification.

If accessible, suspect hydraulic fluids or transformer fluids were tested. Otherwise the suspect fluid was noted for testing when access becomes available.

Several paint samples were collected into re-sealable plastic bags and were sent to a CALA-accredited laboratory for analysis of PCBs. No preservation or refrigeration is required for paint samples.

2.5 MERCURY

A visual survey was completed to identify and document the locations of any possible mercury-containing items such as fluorescent light tubes, thermostats, gauges etc.

2.6 OZONE-DEPLETING SUBSTANCES (ODS)

Generally, a visual survey was completed and compressors, refrigerators, water coolers and air conditioning units were checked for labels, if present, specifying the refrigerant type used. The type and location of ozone-depleting substances or any unlabeled suspected ODS-containing items were noted.

2.7 RADIOACTIVE MATERIALS

A visual survey was completed for radioactive material in smoke detectors and other potential sources.

2.8 MISCELLANEOUS CHEMICALS

In general, a visual survey was completed and any miscellaneous chemicals, along with the location and estimated amount, were noted.

2.9 MOULD

A visual survey was completed for mould and conditions which promote mould growth, such as water damage. If mould and/or water damage was encountered, the location, amount and potential source were noted.

3.0 LODGE

The following are the results of the investigation at the Lodge building. Please refer to Appendix 1 for detailed room descriptions, sampling diagrams, a photographic log and copies of the laboratory reports.

3.1 SCOPE OF WORK

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials and mould; and
- analysis and reporting of findings with recommendations.

3.2 SITE DESCRIPTION

The Lodge is built into a slope and consists of the "Original" portion of the building, constructed in the 1960's, and an addition on the northwest side - the "New" portion - which was constructed in the 1970's. For this reason, the Original and New portions were treated as separate buildings for sampling purposes. The Lodge has three floors (2nd, Main and Lower) containing guest rooms, maintenance/mechanical rooms and hotel facilities including, but not limited to, a kitchen, dining room, laundry room, Roman bath, theatre, lounge and games room. There is also a mechanical room located below the Lower floor pool area. The elevator used to get down to the Hot Springs Pool is located outside of the building on the southeast side, facing the highway.

The exterior walls of the Lodge consist of wood siding, cinderblock and concrete. The interior walls are drywall, cinderblock or concrete. Both the interior and exterior cinderblocks in the Original Lodge contain vermiculite insulation. The roof is tar, while the interior ceilings are concrete with or without stipple, drywall, t-bar or flat tile. Floors are primarily concrete covered with carpet, ceramic tile, vinyl tile or, occasionally, linoleum.

For a detailed list of the rooms and construction materials, refer to Appendix 1a.

3.3 RESULTS

3.3.1 ASBESTOS-CONTAINING MATERIALS (ACM)

One hundred and seventeen samples (including six duplicates) of suspected ACM were collected and sent for analysis. Thirty of the samples were found to contain chrysotile asbestos and three of the samples were found to contain actinolite asbestos. The results are contained in Appendix 1 and are summarized in the table below.

Table 1: Asbestos Analysis Results Summary for the Lodge

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)+	CONDITION	RESULT* (ASBESTOS TYPE)
A1	White	Drywall putty	#383 2nd floor (N)	Good	None detected
A2	White	Drywall putty	#377 2nd floor (N)	Good	None detected
A3	**White**	**Drywall putty**	**Hall 1 Main (N)**	**Good**	**1.6% (chrysotile)**
A4	**White**	**Drywall putty**	**Hall 2 Main (N)**	**Good**	**1.5% (chrysotile)**
A5	**White**	**Drywall putty**	**#253 Main (N)**	**Good**	**1.4% (chrysotile)**
A6	White	Drywall putty	#128 Washroom Lower (N)	Good	None detected
A7	**White**	**Drywall putty**	**Laundry 2 Lower (N)**	**Good**	**1.6% (chrysotile)**
A8	**White**	**Ceiling stipple**	**#378 2nd floor (N)**	**Good**	**1.3% (chrysotile)**
A9	**White**	**Ceiling stipple**	**Hall 1 2nd floor (N)**	**Good**	**1.2% (chrysotile)**
A10	**White**	**Ceiling stipple**	**#256 Main (N)**	**Good**	**1.3% (chrysotile)**
A11	**White**	**Ceiling stipple**	**Stair 1 Main (N)**	**Good**	**1.2% (chrysotile)**
A12	**White**	**Ceiling stipple**	**#233 Main (N)**	**Good**	**1.3% (chrysotile)**
A13	**White**	**Ceiling stipple**	**Hall 1 Lower (N)**	**Good**	**1.2% (chrysotile)**
A14	**White**	**Ceiling stipple**	**Hall 2 Lower (N)**	**Good**	**1.2% (chrysotile)**
A15a	White with flecks	Vinyl floor tile	Laundry 1 Lower (N)	Fair	Trace (chrysotile)
A15b	Black/tan	Mastic	Laundry 1 Lower (N)	Fair	None detected
A16a	White with flecks	Vinyl floor tile	Laundry 2 Lower (N)	Fair	None detected
A16b	Black/tan	Mastic	Laundry 2 Lower (N)	Fair	None detected
A17a	White with flecks	Vinyl floor tile	Laundry 2 Lower (N)	Fair	None detected
A17b	Black/tan	Mastic	Laundry 2 Lower (N)	Fair	None detected
A18	White	Ceiling tile (flat)	Pool room (men's washroom) Lower (N)	Good	None detected
A19	White	Ceiling tile (flat)	Pool room (women's washroom) Lower (N)	Good	None detected
A20	White	Ceiling tile (pinhole)	Hall 1 Main (N)	Good	None detected
A21	White	Ceiling tile (pinhole)	Hall 2 Main (N)	Good	None detected
A22	White	Ceiling tile (spackle)	Hall 1 Main (N)	Good	None detected
A23	White	Ceiling tile (spackle)	Hall 2 Main (N)	Good	None detected
A24	Gray	Floor leveling compound	Pool room Lower (N)	Good	None detected
A25	Gray	Floor leveling compound	Laundry 2 Lower (N)	Good	None detected
A26	Gray	Floor leveling compound	#126 Lower (N)	Good	None detected
A27	White	Skim coat	Linen room 2nd floor (N)	Fair	None detected

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)+	CONDITION	RESULT* (ASBESTOS TYPE)
A28	**Gray**	**Window caulking**	**#382 2nd floor (N)**	**Fair**	**2.4% (chrysotile)**
A29	Gray	Window caulking	#257 Main (N)	Fair	None detected
A30	Gray	Pipe elbow insulation	Hall 1 Main (N)	Fair	None detected
A31	Gray	Pipe elbow insulation	Pool mechanical room Basement (N)	Fair	None detected
A33	White	Wall texture	Hall 1 2nd floor (N)	Good	1.7% (chrysotile)
A109	White	Wall texture	Hall 1 2nd floor (N) Step-out of A33	Good	None detected
A110	White	Wall texture	Hall 1 2nd floor (N) Step-out of A33	Good	None detected
A111	White	Wall texture	Hall 1 2nd floor (N) Step-out of A33	Good	None detected
A34	White	Wall texture	#257 Main (N)	Good	None detected
A35	White	Wall texture	Hall 2 Lower (N)	Good	None detected
A36	White	Wall texture	#370 2nd floor (O)	Good	None detected
A37	White	Wall texture	#363 2nd floor (O)	Good	None detected
A38	White	Wall texture	#241 Main (O)	Good	None detected
A39	White	Wall texture	#117 Lower (O)	Good	None detected
A40	**White**	**Drywall putty**	**Satellite receiving room (O)**	**Good**	**1.5% (chrysotile)**
A41	White	Drywall putty	Smoking Room 2nd floor (O)	Good	None detected
A42	White	Drywall putty	Main stairs Main (O)	Good	None detected
A43	**White**	**Drywall putty**	**Dining Room Main (O)**	**Good**	**1.6% (chrysotile)**
A44	**White**	**Drywall putty**	**#249 Main (O)**	**Good**	**1.4% (chrysotile)**
A45	White	Drywall putty	Main stairs Lower (O)	Good	None detected
A46	**White**	**Drywall putty**	**#111 Lower (O)**	**Good**	**1.5% (chrysotile)**
A47	White	Ceiling stipple	Main stairs 2nd floor (O)	Fair	None detected
A48	White	Ceiling stipple	Hall 4 2nd floor (O)	Fair	None detected
A49	White	Ceiling stipple	Main stairs Main (O)	Fair	None detected
A50	White	Ceiling stipple	Gift shop Main (O)	Fair	None detected
A51	White	Ceiling stipple	#250 Main (O)	Fair	None detected
A52	White	Ceiling stipple	#111 Lower (O)	Fair	None detected
A53	White	Ceiling stipple	#120 Lower (O)	Fair	None detected
A54	White	Ceiling tile (texture)	#234 Washroom Main (O)	Good	None detected
A55	White	Ceiling tile (spackle)	Hall 3 Main (O)	Good	None detected
A56	White	Ceiling tile (texture)	#241 Washroom Main (O)	Good	None detected
A57	White	Ceiling tile (texture)	#250 Main (O)	Good	None detected
A58a	**Tan**	**Vinyl floor tile**	**Dining room Main (O)**	**Fair**	**1.2% (chrysotile)**

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)+	CONDITION	RESULT* (ASBESTOS TYPE)
A58b	Tan	Mastic	Dining room Main (O)	Fair	None detected
A58c	Black	Mastic	Dining room Main (O)	Fair	None detected
A59	**Tan**	**Vinyl floor tile**	**Satellite receiving room 2nd floor (O)**	**Poor**	**1.4% (chrysotile)**
Dup A4 (A59)	Tan	Vinyl floor tile	Satellite receiving room 2nd floor (O)	Poor	0.75% (chrysotile)
A60a	**Tan**	**Vinyl floor tile**	**Reception Main (O)**	**Poor**	**1.3% (chrysotile)**
A60b	Tan	Mastic	Reception Main (O)	Poor	None detected
A60c	Black	Mastic	Reception Main (O)	Poor	None detected
A61a	**Tan**	**Vinyl floor tile**	**Lounge bar Main (O)**	**Poor**	**1.2% (chrysotile)**
A61b	Black	Mastic	Lounge bar Main (O)	Poor	None detected
A62a	**Tan**	**Vinyl floor tile**	**Games room storage Lower (O)**	**Poor**	**1.3% (chrysotile)**
A62b	Black	Mastic	Games room storage Lower (O)	Poor	None detected
A63	Gray	Fireplace mortar	Dining room Main (O)	Good	None detected
A64	Gray	Fireplace mortar	Games room Lower (O)	Good	None detected
A65	Gray	Fire brick	Games room Lower (O)	Good	None detected
A66	Gray	Floor leveling compound	#365 Washroom 2nd floor (O)	Good	None detected
A67	Gray	Floor leveling compound	Lobby Main (O)	Fair	None detected
A68	Gray	Floor leveling compound	Men's washroom Main (O)	Fair	None detected
Dup A7 (A68)	Gray	Floor leveling compound	Men's washroom Main (O)	Fair	None detected
A69	**Black**	**Caulking**	**Cooler 1 Main (O)**	**Good**	**1.8% (chrysotile)**
A70	**Black**	**Caulking**	**Cooler 2 Main (O)**	**Good**	**1.6% (chrysotile)**
A71	Green	Chalk board	Infirmary storage Lower (O)	Good	None detected
A72	**Gray**	**Pipe elbow insulation**	**Infirmary storage Lower (O)**	**Fair**	**10% (chrysotile)**
A73	**Gray**	**Pipe elbow insulation**	**Linen room Lower (O)**	**Good**	**5.7% (chrysotile)**
Dup A5 (A73)	**Gray**	**Pipe elbow insulation**	**Linen room Lower (O)**	**Good**	**6.3% (chrysotile)**
A74	Brown	Peg board	Mechanical room Lower (O)	Good	None detected
A75	White	Roof caulking	Exterior, dining room area (O)	Poor	None detected
A76	White	Wall caulking	Exterior, outside #375 (O)	Poor	None detected
A77	Black	Tar paper	Exterior, office (O)	Good	None detected
Dup A8 (A77)	Black	Tar paper	Exterior; office (O)	Good	None detected
A78	Black	Roof tar	Exterior, above main entrance (O)	Fair	None detected

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)+	CONDITION	RESULT* (ASBESTOS TYPE)
A79a	Black	Roof tar	Exterior, adjacent smoking room (O)	Fair	None detected
A79b	Black	Roof tar	Exterior, adjacent smoking room (O)	Fair	None detected
A80	Black	Asphalt sheeting	Exterior, dining room area (O)	Good	None detected
A81	Black	Asphalt sheeting	Exterior, kitchen stairs (O)	Good	None detected
A82	Gray	Window caulking	Exterior; Hall 3 2nd floor (O)	Poor	None detected
A83	White	Window caulking	Exterior; Hall 4 Main (O)	Poor	None detected
Dup A6 (A83)	White	Window caulking	Exterior; Hall 4 Main (O)	Poor	None detected
A84	Black	Window caulking	Elevator room Top (O)	Fair	None detected
A85	**Brown**	**Vermiculite**	**Hall 3/Theatre 2nd floor (O)**	**Good**	**0.25% (actinolite)**
A86	**Brown**	**Vermiculite**	**Hall 3/Exterior Main (O)**	**Good**	**Trace (actinolite)**
A87	**Brown**	**Vermiculite**	**#117 Balcony Lower (O)**	**Good**	**0.25% (actinolite)**
A88	Gray	Mortar	Exterior; Hall 4, adjacent stairs (O)	Fair	None detected
A89	Gray	Mortar	Exterior; Main entrance stonework (O)	Fair	None detected
A90	Gray	Skim coat	Exterior; Staff quarters stairs (N)	Poor	None detected
Dup A9 (A90)	Gray	Skim coat	Exterior; Staff quarters stairs (N)	Poor	None detected
A91	Gray	Cement Firestop	Hall 1 Main (N)	Good	None detected
A92	White	Wall texture	Pool room Lower (N)	Good	None detected
A93	Gray	Ceiling texture	Pool room Lower (N)	Good	None detected
A94	Black	Roof tar	Exterior; above #384 (N)	Fair	None detected
A95	Brown	Caulking	Exterior; above #384 (N)	Fair	None detected
A96	Black	Tar paper	Exterior; above theatre (O)	Good	None detected
A97	Gray	Caulking	Exterior; above dining room (O)	Poor	None detected
A98	Black	Tar paper	Exterior; kitchen stairs (O)	Good	None detected
A99a	White squares	Linoleum	Linen room Main (O)	Poor	None detected
A99b	Tan	Mastic	Linen room Main (O)	Poor	None detected
A100	Gray	Brick mortar	Dining room Main (O)	Good	None detected
A101	**Black**	**Gasket**	**Mechanical room Lower (O)**	**Fair**	**60% (chrysotile)**
A102	Gray	Skim coat	Elevator room Lower (O)	Poor	None detected

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)+	CONDITION	RESULT* (ASBESTOS TYPE)
A103	Green/white	Linoleum	Games room Lower (O)	Poor	None detected
A104	**White**	**Window caulking**	**Exterior; Games room Lower (O)**	**Poor**	**1.6% (chrysotile)**
A105	**Black**	**Gasket**	**Pool mechanical room Basement (N)**	**Poor**	**70% (chrysotile)**
A106	Black	Gasket	Pool mechanical room Basement (N)	Fair	None detected
A107	White	Ceiling texture	Laundry 2 ceiling Lower (N)	Good	None detected
A108	White	Insulation	Electrical room Lower (O)	Good	None detected

BOLD – over criteria*
* Criteria: ≥1% asbestos: asbestos-containing material as defined by the WorkSafe BC Occupational Health and Safety Regulation, Part 6, Updated February 2011. Vermiculite is positive for asbestos when asbestos is present in any amount.
+ (O) denotes Original Lodge, (N) denotes New Lodge

Due to the size and amount of ACM possibly present on this site, representative sampling was conducted. It was not practical or necessary to sample every item which may be an ACM. If the representative samples test positive for asbestos, it is assumed that identical materials, which were not tested, are also positive. For example, the drywall mud and ceiling stipple in the New Lodge tested positive, therefore all drywall mud and ceiling stipple in the New Lodge is assumed to be positive for asbestos.

Below is a list of the types of materials sampled and the results for asbestos (# samples positive and/or # samples negative) in brackets.

Original Lodge (73 asbestos samples)

- White wall texture (4 negative)
- Drywall putty (4 positive, 3 negative)
- White ceiling stipple (7 negative)
- Ceiling tile (4 negative)
- Tan vinyl floor tile (5 positive)
    - Tan mastic (2 negative)
    - Black mastic (4 negative)
- Fireplace mortar (2 negative)
- Beige fire brick (1 negative)
- Floor leveling compound (3 negative)
- Black cooler caulking (2 positive)
- Chalk board (1 negative)
- Gray pipe elbow insulation (2 positive)
- Brown pegboard (1 negative)
- White roof caulking (1 negative)
- White exterior caulking (1 negative)
- Black tar paper (3 negative)
- Black roof tar (3 negative)

- Black asphalt roof sheeting (2 negative)
- Gray window caulking (1 negative)
- White insulation (1 negative)
- White window caulking (1 positive, 1 negative)
- Brown vermiculite (3 positive)
- White squares linoleum (1 negative)
  Tan mastic (1 negative)
- Black gasket (1 positive)
- Green/white linoleum (1 negative)
- Gray roof caulking (1 negative)
- White insulation (1 negative)
- Gray block mortar (3 negative)
- Gray skim coat (1 negative)
- Black window caulking (1 negative)

New Lodge (50 asbestos samples)

- Drywall putty (4 positive, 3 negative)
- White ceiling stipple (7 positive)
- Gray window caulking (1 positive, 1 negative)
- Gray pipe elbow insulation (2 negative)
- White wall texture (1 positive, 6 negative)
- Gray skim coat (1 negative)
- Gray cement firestop (1 negative)
- Gray ceiling texture (1 negative)
- Black roof tar (1 negative)
- Brown roof caulking (1 negative)
- Black gasket (1 positive, 1 negative)
- White with flecks vinyl floor tile (1 trace, 2 negative)
  Black/tan mastic (3 negative)
- White flat ceiling tile (2 negative)
- White pinhole ceiling tile (2 negative)
- White spackle ceiling tile (2 negative)
- Gray floor leveling compound (3 negative)
- White skim coat (1 negative)
- White ceiling texture (1 negative)

The following is considered to be ACM (refer to Appendix 1 for room details, diagrams showing the sample locations and a photographic log):

- The **drywall putty** in the Original and New portions of the Lodge contained up to 1.6% chrysotile asbestos. Most areas of the building contained various amounts of drywall on either the walls and/or ceiling. The top elevator room also contained drywall.

- The **tan vinyl floor tile** in the Original Lodge contained up to 1.4% chrysotile asbestos. There was no asbestos found in the associated mastic. The vinyl tile was found in the following areas:
  - Main stairwell, including the sitting area. The tile was covered by carpet.
  - Main entrance. The vinyl tile was covered by ceramic tile.
  - Lobby and reception areas. The tile was covered by carpet.
  - Lounge bar and closet
  - Dining room. The tile was covered by carpet.
  - Kitchen. The vinyl tile was covered by ceramic tile.
  - Games room. The tile was covered by carpet.
  - Games room storage

- The **black caulking** in the kitchen walk-in coolers contained up to 1.8% chrysotile asbestos.

- The **gray pipe elbow insulation** found in the infirmary storage and lower floor linen rooms in the Original Lodge contained up to 10% chrysotile asbestos. Pipe elbows may be located throughout the Original Lodge. No asbestos was detected in similar pipe elbow insulation located in the New Lodge.

- The **white window caulking** on the exterior games room window tested positive for 1.6% chrysotile asbestos.

- The **vermiculite insulation** found in the interior and exterior cinderblocks of the Original Lodge contained trace amounts to 0.25% actinolite asbestos. Vermiculite insulation poses a high level of risk of exposure when it is disturbed because it is highly friable.

- **Black gaskets** located in the mechanical room and in the pool mechanical room contained 60% to 70% chrysotile asbestos. However, not all gaskets could be sampled due to their location and number.

- The **white ceiling stipple** in the New Lodge contained 1.2% to 1.3% chrysotile asbestos.

- The **gray window caulking** located on the exterior guest room balcony doors in the New Lodge contained 2.4% chrysotile asbestos.

Three step-out samples of white wall texture were taken from Hall 1 on the 2nd floor of the New Lodge following the initial single, positive asbestos result. The step-out samples were all negative for asbestos; therefore the white wall texture is not considered asbestos-containing material.

The elevator brake shoes were suspected to contain asbestos, but could not be accessed for sampling.

3.3.2 LEAD PRODUCTS

Thirty two (including two duplicates) representative samples were collected and placed into sealable containers for lead content analysis. Please refer to Appendix 1 for a detailed description, a sampling diagram and copies of the laboratory reports. None of the samples tested contained 0.5% or greater lead by weight, therefore none are considered to be lead-based paints.

Table 2: Lead in Paint Analysis Results Summary for the Lodge

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)+	RESULTS (% LEAD BY WEIGHT)*
P1	White over yellow	#380 2nd floor (N)	0.022**
P2	White	#130 Washroom Lower (N)	0.0063**
P3	Gray	Mechanical room Lower (O)	0.13
P4	Gray	Exterior; walkway to elevator (O)	<0.0077
P5	Yellow	Exterior; main rear entrance (O)	0.31
P6	Light yellow	Exterior; #116 siding (O)	0.033
P7	White ceramic tile	#380 Washroom 2nd floor (N)	0.062**
P8	White ceramic tile	#383 Washroom 2nd floor (N)	0.0064**
P9	White flower ceramic tile	#383 Washroom 2nd floor (N)	0.02**
P10	Gray ceramic tile	Men's washroom Main (O)	<0.0051**
P11	Pink mosaic ceramic tile	Women's washroom Main (O)	<0.0059**
P12	Brown mosaic ceramic tile	#365 Washroom 2nd floor (O)	<0.0057**
P13	Orange-brown ceramic tile	Kitchen Main (O)	<0.0031**
P14	Orange-brown with flecks ceramic tile	Kitchen Main (O)	<0.0061**
P15	White with yellow flecks ceramic tile	Kitchen Main (O)	<0.0056**
Dup P6 (P15)	White with yellow flecks ceramic tile	Kitchen Main (O)	0.0044**
P16	White	Kitchen Main (O)	0.017
P17	Yellow over green	Exterior; #334 balcony railing (N)	0.013
P18	Gray	Exterior; #334 concrete stairs (N)	<0.0070
P19	White	Exterior; #334 wall (N)	0.017**
P20	White	Pool room Lower (N)	<0.0086
P21	Yellow ceramic tile	Pool room Women's washroom Lower (N)	<0.0038**
P22	Yellow ceramic tile	Pool room Men's washroom Lower (N)	<0.0034**
P23	Tan	Satellite receiving room 2nd floor (O)	0.0067
P24	Tan	Elevator room Lower	<0.0045

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)+	RESULTS (% LEAD BY WEIGHT)*
P25	White over yellowish	Elevator walkway Lower	<0.0092
P26	Gray over gray	Elevator walkway Lower	<0.0069**
P27	Yellow with white flecks ceramic tile	Kitchen Main (O)	0.022**
P28	Red	Exterior; stairs to elevator (O)	<0.0080
P29	Yellow	Exterior; Hall 3 (O)	<0.0075
Dup P5 (P29)	Yellow	Exterior; Hall 3 (O)	<0.0049
P30	White	Exterior; Hall 3 (O)	0.0073**

BOLD – over criteria
* lead >0.5% by weight is considered to be lead-containing paint (Federal Hazardous Products Act)
**Matrix/substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks
***Insufficient sample provided to perform QC re-analysis
+ (O) denotes Original Lodge, (N) denotes New Lodge

Below is a list of the colours of paints and ceramic tile sampled and the results (# samples positive and/or # samples negative for lead-based paint) in brackets.

Original Lodge (16 paint/tile samples)

- Gray interior (1 negative)
- Gray exterior (1 negative)
- Yellow exterior (2 negative)
- Light yellow exterior (1 negative)
- Gray ceramic tile (1 negative)
- Pink mosaic ceramic tile (1 negative)
- Brown mosaic ceramic tile (1 negative)
- Orange-brown ceramic tile (1 negative)
- Orange-brown with flecks ceramic tile (1 negative)
- White with yellow flecks ceramic tile (1 negative)
- White interior (1 negative)
- Tan interior (1 negative)
- Yellow with white flecks ceramic tile (1 negative)
- Red exterior (1 negative)
- White exterior (2 negative)
- White over yellowish exterior (1 negative)
- Gray over gray exterior (1 negative)

New Lodge (11 paint/tile samples)

- White over yellow interior (1 negative)
- White interior (1 negative)
- White ceramic tile (2 negative)
- White flower ceramic tile (1 negative)
- Yellow over green exterior (1 negative)
- Gray exterior (1 negative)
- White exterior (1 negative)

- White interior (1 negative)
- Yellow ceramic tile (2 negative)

3.3.3 POLYCHLORINATED BIPHENYLS (PCBs)

There were fluorescent light fixtures found throughout the entire building and in the elevator rooms. There were also transformers located on the outdoor light posts on the subject site. Fluorescent light ballasts and transformers would be suspect to contain PCBs. Most of the fluorescent light ballasts inspected were found to be PCB-free. PCB-containing ballasts were observed in:

- the Kitchen Storage room,
- the Infirmary Storage (1 leaking),
- the Mechanical room,
- the Guest Laundry, and
- Hall 2 on the main floor.

Labels were absent and/or date stamps were not visible on some of the inspected light ballasts, therefore all light ballasts should be checked.

Elevator grease may also contain PCBs; however, it was not accessible for sampling.

3.3.4 MERCURY

Fluorescent light tubes may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were ubiquitous throughout the Lodge and compact fluorescent bulbs were observed as well.

There were mercury thermostats in the majority of the guest rooms, as well as in some hallways and in other rooms. The covers of some thermostats and switches could not be removed and the presence of mercury could not be confirmed.

Table 3: Mercury Results Summary for the Lodge

BUILDING	LOCATION	TYPE/QUANTITY
Throughout building	Light bulbs and tubes	Fluorescent light tubes and bulbs
Throughout building	Guest rooms and staff accommodations	68 mercury thermostats
Original Lodge	Hall 2 - 2nd floor; outside Linen room	1 mercury thermostat
New Lodge	Hall 1 - 2nd floor; between rooms 383 and 384	1 mercury thermostat
Original Lodge	Hall 3 - Main floor; outside Linen room	1 mercury thermostat
Original Lodge	Theatre stage	2 mercury thermostats
Original Lodge	Smoking room	1 mercury thermostat
Original Lodge	Dining room	2 mercury thermostats
Original Lodge	Office	1 mercury thermostat
Original Lodge	Lobby	1 mercury thermostat

BUILDING	LOCATION	TYPE/QUANTITY
Original Lodge	Rear main entrance	1 mercury thermostat
Original Lodge	Games room	1 mercury thermostat
Original Lodge	Electrical switchgear room	1 mercury thermostat
New Lodge	Pool mechanical room	1 mercury thermometer

3.3.5 OZONE-DEPLETING SUBSTANCES (ODS)

Several ODS were still present in the building. The table below outlines the ODS of concern.

Table 4: ODS Results Summary for the Lodge

LOCATION (BUILDING/FLOOR/ROOM)	DESCRIPTION OF THE SYSTEM	TYPE OF ODS	ESTIMATED QUANTITY
Throughout building/Guest rooms	Air conditioner	R-22	71 x 9.9 oz or <6 lbs
New Lodge/2nd floor/Room 378	Air conditioner	R-22	14.1 oz
Original Lodge/Lower floor/Linen room	Fridge	R-12	145 g
Original Lodge/2nd floor/Smoking room	Air conditioner	R-22	9.9 oz
Original Lodge/Main floor/Reception	Freezer	R-12	*
Original Lodge/Main floor/Kitchen	Fridge	R-12	*
Original Lodge/Main floor/Room 245	Fridge	R-12	*
Original Lodge/Lower floor/Games room storage	Air conditioner	R-22	9.9 oz
Original Lodge/Main floor/Lounge bar	Coolers	*	*
Original Lodge/Main floor/Coolers 1 and 2	Walk-in coolers	*	*
Original Lodge/Lower floor/Room 118	Fridge	*	*
New Lodge/Lower floor/Linen room	Air conditioner	*	*
Original Lodge/Lower floor/Mechanical room	Compressors (2)	*	*

* Unable to verify type and/or quantity

The following is a summary of the ozone-depleting substances confirmed at the time of the assessment:

- There were approximately 71 **air conditioners** which contained R-22.
- There was 1 **freezer** which contained R-12.
- There were 3 **fridges** which contained R-12.

3.3.6 RADIOACTIVE MATERIALS

Numerous radioactive smoke detectors were found on the subject site.

Table 5: Radioactive Materials Results Summary for the Lodge

LOCATION (BUILDING, FLOOR, ROOM)	DESCRIPTION	ESTIMATED QUANTITY
Throughout building/Guest rooms	Smoke detectors	68

3.3.7 MISCELLANEOUS CHEMICALS

Miscellaneous chemicals were observed at the following locations:

Table 6: Miscellaneous Chemicals Summary for the Lodge

LOCATION (BUILDING, FLOOR, ROOM)	DESCRIPTION	ESTIMATED QUANTITY
New Lodge/Lower floor/Storage LH2	Vector floor finish, cleaning chemicals, floor stripper	5 gal (floor finish)
Original Lodge/Lower floor/Paint storage	Paint, paint thinner, cleaners, spray cans	3.64 L x 30 (paint cans) 3.78 L x 2 (paint thinner) 15 (spray cans)
Original Lodge/Lower floor/Mechanical room	Cleaning supplies, ceiling stipple, drywall compound, contact cement, polish, paint/primer, grout, Raid, engine oil, floor finish, TSP, hydrochloric acid, propane tanks, solder paste, WD40, fertilizer, heat transfer fluid	400 g x 3 (propane tanks) 15 kg (fertilizer)
New Lodge/Basement/Pool mechanical room	Aerosol paint cans, hydrochloric acid	5 (paint cans)
New Lodge/Main floor/Linen room	Paint cans	2
Original Lodge/Main floor/Linen room	Liquid ice melter	-

3.3.8 MOULD

Water damage and visible mould were observed at the subject site. The table below summarizes the locations of the damage.

Table 7: Mould/Water Damage Results Summary for the Lodge

LOCATION (BUILDING, FLOOR, ROOM)	DESCRIPTION	ESTIMATED QUANTITY
New Lodge/Lower floor/Hall 1	Water damage between rooms 130 and 131; strip of black mould	1 m x 1 m (water damage); 0.5 m strip (mould)
New Lodge/Lower floor/Room 130	Mould in washroom	0.5 m x 0.5 m
Original Lodge/2nd floor/Smoking room	Mould beneath heater	2 m strip
Original Lodge/Lower floor/Main stairs	Mould on back wall under stairs	2 m x 0.1 m

3.3.9 OTHER

BATTERIES

Found in the smoke detectors located **throughout the building**.
Car batteries (2) found in the 2nd floor **Emergency Power room** (New Lodge) and in the main floor **Linen room** (Original Lodge).
Battery backups (3) located in the lower floor **Infirmary** (Original Lodge).
Emergency lights located in **hallways** and in the **Theatre** (Original Lodge).

ELECTRONICS

Various appliances (washer/dryers, microwaves, coffeemakers, vacuums, televisions) and office equipment (photocopiers, computers, printers, monitors) were observed throughout the building, including guest rooms, storage areas and hotel, guest and maintenance facilities.

SUMP

There is a floor sump with a concrete bottom located in the Basement Pool mechanical room in the New Lodge.

3.3.10 SUMMARY OF RESULTS FOR THE LODGE BY LOCATION

Original Lodge

The following table is a summary of the hazardous materials identified in the Original Lodge. Refer to Appendix 1b-6 – 1b-8 and 1b-9 for diagrams and to Appendix 1c-2 - 5 for photographs.

Table 8: Hazardous Materials Summary for the Original Lodge

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Drywall Putty	Assumed all rooms with drywall, including elevator room	1250 m^2 (size of Original Lodge)
ACM Vermiculite Insulation	Assumed all areas with cinderblock	100 m (length of cinderblock walls)
ACM Vinyl Floor Tile	Main stairwell, Satellite receiving room, Reception, Lobby, Lounge bar and closet, Dining room, Kitchen, Games room and storage	600 m^2
ACM Freezer Caulking	Cooler 1 and Cooler 2	1 m^2
ACM Pipe Elbow Insulation	Infirmary storage, lower floor Linen room, Pool mechanical room There will be ACM pipe elbow insulation in areas not accessible during this assessment	15 (visible)
ACM Gasket	Mechanical room	All fittings
ACM Window Caulking	Games room	3 windows

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
Mercury Thermostat	Guest rooms, 2nd floor Hall 2, Main floor Hall 3, Theatre stage, Smoking room, Dining room, Office Lobby, Rear main entrance, Games room, Electrical switchgear room	50
Mercury - fluorescent light bulbs/tubes	Throughout building, elevator rooms, elevator walkway	100
Radioactive Smoke Detector	Guest rooms	40
PCBs	Kitchen storage, Mechanical room, Infirmary storage	20
ODS	Guest rooms, Lower floor Linen room, Smoking room, Reception, Kitchen, Room 245, Games room storage, Mechanical room, Room 118, Lounge bar	60
Miscellaneous Chemicals	Lower floor Paint storage Lower floor Mechanical room Main floor Linen room	-
Mould	2nd floor Smoking room, Lower floor Main stairs	1 m^2
Batteries	Guest rooms, Hallways, Main floor Linen room, Infirmary, Theatre	120
Electronics	Throughout the building	-

New Lodge

The following table is a summary of the hazardous materials identified in the New Lodge. Refer to Appendix 1b-3 - 1b-5 and 1b-9 for diagrams and to Appendix 1c-1 and 1c-5 for photographs.

Table 9: Hazardous Materials Summary for the New Lodge

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Drywall Putty	Assumed all rooms with drywall	650 m^2 (size of New Lodge)
ACM Ceiling Stipple	Guest rooms, hallways and stairs	650 m^2
ACM Window Caulking	Guest rooms	30 balcony doors
ACM Gasket	Pool Mechanical room	All fittings
ACM Pipe Elbow Insulation	Pool Mechanical room	15 (visible)
Mercury Thermostat	Guest rooms, 2nd floor Hall 1, Pool Mechanical room	30
Mercury - fluorescent light tubes/bulbs	Throughout building	70
Radioactive Smoke Detector	Guest rooms	30
PCBs	Main floor Hall 2	2
ODS	Guest rooms, Room 378, Lower floor Linen room	30
Miscellaneous Chemicals	Lower floor Storage LH2 Basement Pool mechanical room Main floor Linen room	-
Mould	Lower floor Hall 1 Lower floor Room 130	1 m^2

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
Batteries	Guest rooms, Hallways, Emergency Power room	60
Electronics	Throughout the building	-
Sump	Basement Pool mechanical room	-

3.4 ASSESSING RISK EXPOSURE FOR ASBESTOS

There are eight major factors which assist in evaluating the condition of a particular asbestos installation.

The eight factors include:

1. Condition of Material
2. Water Damage
3. Exposed Surface Area
4. Accessibility
5. Activity and Movement
6. Air Plenum or Direct Air Stream
7. Friability
8. Asbestos Content

These factors have been put together into the following tables to allow for assessment to determine the degree of risk associated with existing asbestos. The parameters in Table 10 are applied to the ACM to derive a risk rating. These risk ratings are then compared to Table 11 to determine what type of action is required. The risk assessment method described in the Alberta Asbestos Abatement Manual is an acceptable risk assessment method as per the BC Occupational Health and Safety Guidelines, Section G6.6-1. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the controls are not applicable to a demolition.

Table 10: Assessing Risk Exposure*

FACTOR	DESCRIPTION	RATING OF RISK EXPOSURE
Accessibility of Material	Accessible in high activity areas	High (H)
	Accessible in low activity areas beyond the reach of the area occupants	Medium (M)
	Enclosed	Low (L)
Condition of Materials	Severely damaged	High (H)
	Mild to moderate damage	Medium (M)
	Good condition	Low (L)
Friability of Materials	Easily breaks apart	High (H)
	Mild to moderate friability	Medium (M)
	Non-friable	Low (L)

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

Table 11: Determining Level of Control Required*

	Asbestos Not Present in Return Air Plenum		Asbestos Present in Return Air Plenum
	Less than 20% Asbestos Content in Material	Greater than 20% Asbestos Content in Material	
Immediate Control Required	2 Hs or 3 Ms	1 H or 2 Ms	Control required unless 3 Ls and less than 20% asbestos content in material
Control Required	1 H or 2 Ms	1 M	
No Control Required	1 M or 3 Ls	3 Ls	

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

The table below outlines the results of the above methodology to determine priorities for dealing with ACM.

Table 12: ACM Risk of Exposure for the Lodge

Sample	Description	Location+	Condition	Result	Risk Exposure (accessible) (condition) (friability)	Control Required
A3	White drywall putty	Hall 1 Main (N)	Good	1.6% (chrysotile)	(L)(L)(H)	Control
A4	White drywall putty	Hall 2 Main (N)	Good	1.5% (chrysotile)	(L)(L)(H)	Control
A5	White drywall putty	#253 Main (N)	Good	1.4% (chrysotile)	(L)(L)(H)	Control
A7	White drywall putty	Laundry 2 Lower (N)	Good	1.6% (chrysotile)	(L)(L)(H)	Control
A8	White ceiling stipple	#378 2nd floor (N)	Good	1.3% (chrysotile)	(M)(L)(H)	Control
A9	White ceiling stipple	Hall 1 2nd floor (N)	Good	1.2% (chrysotile)	(M)(L)(H)	Control
A10	White ceiling stipple	#256 Main (N)	Good	1.3% (chrysotile)	(M)(L)(H)	Control
A11	White ceiling stipple	Stair 1 Main (N)	Good	1.2% (chrysotile)	(M)(L)(H)	Control
A12	White ceiling stipple	#233 Main (N)	Good	1.3% (chrysotile)	(M)(L)(H)	Control
A13	White ceiling stipple	Hall 1 Lower (N)	Good	1.2% (chrysotile)	(M)(L)(H)	Control
A14	White ceiling stipple	Hall 2 Lower (N)	Good	1.2% (chrysotile)	(M)(L)(H)	Control
A28	Gray window caulking	#382 2nd floor (N)	Fair	2.4% (chrysotile)	(M)(M)(L)	Control
A40	White drywall putty	Satellite receiving room (O)	Good	1.4% (chrysotile)	(L)(L)(H)	Control
A43	White drywall putty	Dining room Main (O)	Good	1.6% (chrysotile)	(L)(L)(H)	Control

SAMPLE	DESCRIPTION	LOCATION+	CONDITION	RESULT	RISK EXPOSURE (ACCESSIBLE) (CONDITION) (FRIABILITY)	CONTROL REQUIRED
A44	White drywall putty	#249 Main (O)	Good	1.4% (chrysotile)	(L)(L)(H)	Control
A46	White drywall putty	#111 Lower (O)	Good	1.5% (chrysotile)	(L)(L)(H)	Control
A58	Tan vinyl floor tile	Dining room Main (O)	Fair	1.2% (chrysotile)	(L)(M)(L)	No Control
A59	Tan vinyl floor tile	Satellite receiving room (O)	Poor	1.4% (chrysotile)	(H)(H)(L)	Immediate
A60	Tan vinyl floor tile	Reception Main (O)	Poor	1.3% (chrysotile)	(M)(H)(L)	Control
A61	Tan vinyl floor tile	Lounge bar Main (O)	Poor	1.2% (chrysotile)	(H)(H)(L)	Immediate
A62	Tan vinyl floor tile	Games room storage Lower (O)	Poor	1.3% (chrysotile)	(H)(H)(L)	Immediate
A69	Black caulking	Cooler 1 Main (O)	Good	1.8% (chrysotile)	(M)(L)(L)	No Control
A70	Black caulking	Cooler 2 Main (O)	Good	1.6% (chrysotile)	(M)(L)(L)	No Control
A72	Gray pipe elbow insulation	Infirmary storage Lower (O)	Fair	10% (chrysotile)	(L)(M)(H)	Control
A73	Gray pipe elbow insulation	Linen room Lower (O)	Good	5.7% (chrysotile)	(L)(L)(H)	Control
A85	Brown Vermiculite	Hall 3/Theatre 2nd floor (O)	Good	0.25% (actinolite)	(L)(L)(H)	Control
A86	Brown Vermiculite	Hall 3/Exterior Main (O)	Good	Trace (actinolite)	(L)(L)(H)	Control
A87	Brown vermiculite	#117 balcony Lower (O)	Good	0.25% (actinolite)	(L)(L)(H)	Control
A101	Black gasket	Mechanical room Lower (O)	Fair	60% (chrysotile)	(L)(M)(L)	Control
A104	White window caulking	Exterior; Games room Lower (O)	Poor	1.6% (chrysotile)	(M)(H)(L)	Control
A105	Black gasket	Pool mechanical room Basement (N)	Poor	70% (chrysotile)	(L)(M)(L)	Control

+ (O) denotes Original Lodge, (N) denotes New Lodge

According to the above risk assessment, the following ACM items should be dealt with immediately:

- Any tan vinyl floor tile in poor condition which is exposed
- Any ACM gaskets in poor condition

3.5 CONCLUSIONS

➢ ASBESTOS

- Eight out of fourteen **drywall putty** samples, taken throughout the Lodge, contained up to 1.6% chrysotile asbestos. It is assumed that all drywall putty in the Lodge and Elevator rooms contains asbestos.

- The **white ceiling stipple** throughout the New Lodge contained 1.2% to 1.3% chrysotile asbestos. It is assumed that all ceiling stipple throughout the New Lodge contains asbestos.

- One of two **gray window caulking** samples from the exterior balcony doors of guest rooms in the New Lodge contained 2.4% chrysotile asbestos, while there was no asbestos detected in the second sample. It is assumed that all the guest room balcony doors in the New Lodge contain asbestos.

- The **tan vinyl floor tile** located in several areas of the Original Lodge contained up to 1.4% chrysotile asbestos. The tile is only exposed in the Satellite receiving room, the Lounge bar and closet and in the Games room storage area. In all other areas it is covered by carpet or other flooring.

- The **black caulking** located in the kitchen walk-in coolers contained up to 1.8% chrysotile asbestos. This type of caulking was only observed in the coolers.

- Only **gray pipe elbow insulation** in the Original Lodge tested positive for up to 10% chrysotile asbestos. Insulated pipe elbows in the New Lodge appeared to be similar but samples tested negative for asbestos; however, it is assumed that all insulated pipe elbows in the Lodge contain asbestos.

- The **brown vermiculite** found in the cinderblocks of the Original Lodge contained up to 0.25% actinolite asbestos. It is assumed that all interior and exterior cinderblocks in the Original Lodge contain vermiculite.

Elevator brake pads are suspected to contain asbestos.

Caution must be taken not to disturb ceiling tiles in guest room washrooms where there is a cinderblock wall located in the adjacent hallway as there may be spillage of vermiculite onto the ceiling tiles.

Only one out of seven **white wall texture** samples tested positive for asbestos. Three step-out samples of the same wall texture were taken subsequently and all three were negative for asbestos. It is assumed that the white wall texture located in the guest rooms and hallways does not contain asbestos.

The Lodge is currently unoccupied; therefore the ACM does not pose an immediate risk.

- **LEAD**

  - None of the paint or ceramic tile samples tested in the Lodge or the Elevator rooms were considered lead-containing.

- **PCBs**

  - Fluorescent light fixtures were found throughout the building and in the elevator rooms. Most of the fluorescent light ballasts inspected, notably those in the guest room washrooms, were found to be PCB-free; however, some light ballasts were confirmed to contain PCBs.
  - Labels were absent and/or date stamps were not visible on some of the inspected light ballasts, therefore all light ballasts should be checked.
  - There are transformers located on the outdoor light posts. These appeared to be in good condition.
  - Elevator grease may also contain PCBs.

- **MERCURY**

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There are hundreds of fluorescent tubes and some compact fluorescent bulbs throughout the buildings.

There were mercury thermostats located throughout the building; the majority was found in the guest rooms.

- **OZONE-DEPLETING SUBSTANCES**

Most guest rooms contained air conditioning units containing R-22. Similar air conditioners were found randomly throughout the Lodge. Several fridges/freezers were found containing R-12. The type of refrigerant used in the kitchen walk-in coolers, the Lounge bar coolers, the Mechanical room compressors and the fridge in room 118 could not be determined and are assumed to be ODS.

- **RADIOACTIVE MATERIALS**

Radioactive smoke detectors were found in the guest rooms throughout the Lodge.

- **MISCELLANEOUS CHEMICALS**

Miscellaneous chemicals such as cleaners, paints, primer, hydrochloric acid, floor finish, aerosol paints, heat transfer fluid and lubricants were found on site.

Miscellaneous chemicals were observed in the lower floor Storage LH2, the Paint storage room, the Mechanical rooms and the Linen rooms.

- **MOULD**

Water damage was observed in Hall 1 on the lower floor. Mould was found in the washroom in room 130, in the Smoking room and on the back wall of the Main stairs on the lower floor.

- **OTHER**

Batteries were found throughout the Lodge in the guest room smoke detectors, emergency lights and in the battery backups located in the Infirmary. Two car batteries were also found on site.

There were also numerous household appliances and computer equipment located throughout the Lodge.

There is a floor sump with a concrete bottom located in the Basement Pool mechanical room.

3.6 RECOMMENDATIONS

➢ ASBESTOS

The table below summarizes the extent of ACM and the risk level associated with abatement. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the determination of risk level for the work procedures was based on the more stringent criteria provided by WorkSafe BC.

Table 13: Extent of ACM and Recommendations for the Lodge

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
Original Lodge		
ACM Drywall Putty	All drywall Estimated: 1250 m^2 (size of Original Lodge)	The drywall must be abated prior to demolition.
ACM Floor Tiles	Estimated: 600 m^2	The floor tiles must be abated prior to demolition.
ACM Freezer Caulking	2 Walk-in coolers Estimated: 1 m^2	The caulking must be abated prior to demolition.
ACM Pipe Elbow Insulation	Estimated: 8 (visible)	The pipe elbow insulation must be abated prior to demolition. Moderate Risk assuming work is performed using a glove bag procedure.
ACM Gasket	Estimated: All fittings	The gaskets should be abated during equipment decommissioning. All gaskets should be treated as an ACM or tested as they are encountered.
ACM Window Caulking	Estimated: 3 windows	The caulking must be abated prior to demolition.
ACM Vermiculite Insulation	All interior and exterior cinderblocks Estimated: 100 m (length of cinderblock wall)	The vermiculite must be abated prior to demolition. Moderate Risk abatment is possible depending on procedures.
New Lodge		
ACM Drywall Putty	All drywall Estimated: 650 m^2 (size of New Lodge)	The drywall must be abated prior to demolition.
ACM Pipe Elbow Insulation	Estimated: 15 (visible)	The pipe elbow insulation must be abated prior to demolition. Moderate Risk assuming work is performed using a glove bag procedure.
ACM Window Caulking	All guest room balcony doors Estimated: 30	The window caulking must be abated prior to demolition.

ACM	EXTENT	RECOMMENDATION*
ACM Gasket	Estimated: All fittings	The gaskets should be abated during equipment decommissioning. All gaskets should be treated as an ACM or tested as they are encountered.
ACM Ceiling Stipple	All ceiling stipple Estimated: 650 m^2	The ceiling stipple must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

- **PCBs**

All fluorescent light ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

- **MERCURY**

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There are several hundred of fluorescent tubes and some compact fluorescent bulbs throughout the buildings. All fluorescent lights should be stored to protect from breakage and recycled accordingly.

There were mercury thermostats located throughout the Lodge, with the majority being found in the guest rooms and other public areas.

Any mercury items should be recycled and disposed of according to current regulations.

- **OZONE-DEPLETING SUBSTANCES**

There were several ODS located throughout the building. The ODS units should be recovered/recycled by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

- **RADIOACTIVE MATERIALS**

  There were numerous radioactive smoke detectors located throughout the Lodge in the guest rooms.

  When radioactive materials are not in use and are to be disposed of, they should be disposed of according to the current regulations of the Nuclear Safety Control Act and Nuclear Substances and Radiation Devices Regulations.

- **MISCELLANEOUS CHEMICALS**

  All miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

- **MOULD**

  Water damage accompanied by a strip of mould was observed in Hall 1 on the lower floor. Mould was also found in room 130 in the washroom, in the Smoking room and at the back of the Main stairs on the lower floor.

  Since the building is to be demolished, the mould-contaminated materials may be left in place; however, in this instance mould was observed on drywall which will be abated with asbestos removal. Although the mould did not pose a risk at the time of the assessment, conditions may change and if additional mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

- **OTHER**

  The batteries and electronic equipment should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

  The sump should be checked for integrity and possibly sampled to determine if there have been any soil or groundwater impacts.

If any other suspect materials become exposed during demolition, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report

and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

4.0 CABIN #3

The following are the results of the investigation at Cabin #3. Please refer to Appendix 2 for detailed room descriptions, sampling diagrams, a photographic log and copies of the laboratory reports.

4.1 SCOPE OF WORK

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials and mould; and
- analysis and reporting of findings with recommendations.

4.2 SITE DESCRIPTION

Cabin #3 is located north of the Lodge and consists of two units with separate entrances combined into one dwelling. The first unit has a kitchen, a dining room and a bedroom with an ensuite washroom. The second unit has a living room, two bedrooms, a washroom and a laundry room.

The exterior walls consist of wood siding. The roof has green and white asphalt shingles over older green asphalt shingles. Interior walls are generally wood panel and drywall, while the ceilings are either tile or drywall. The floors are either linoleum, carpet, or carpet over linoleum.

For a detailed list of the rooms and construction materials, refer to Appendix 2a.

4.3 RESULTS

4.3.1 ASBESTOS-CONTAINING MATERIALS (ACM)

Eighteen samples of suspected ACM were collected and sent for analysis. Two samples contained chrysotile asbestos and one sample contained actinolite asbestos. The results are contained in Appendix 2 and are summarized in the table below.

Table 14: Asbestos Analysis Results Summary for Cabin #3

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A1a	Green	Roof shingles	Exterior roof	Good	None detected
A1b	**Black**	**Tar**	**Exterior roof**	**Good**	**3.5% (chrysotile)**
A1c	Black	Tar paper	Exterior roof	Good	None detected
A2	Black	Tar paper	Under wood siding	Good	None detected
A3	Gray	Cardboard insulation	Under wood siding	Good	None detected

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A4	Yellow	Window glazing	Front window	Fair	None detected
A5	Yellow	Window glazing	Rear window	Fair	None detected
A6	Gray	Drywall putty	Kitchen ceiling	Poor	None detected
A7	Gray	Drywall putty	Dining room wall	Poor	None detected
A8	Gray	Drywall putty	Kitchen ceiling	Poor	None detected
A9	Beige squares	Linoleum	Washroom 1 floor	Poor	None detected
A10	**Beige rectangles**	**Linoleum**	**Laundry room floor**	**Fair**	**25% (chrysotile)**
A11	Beige squares	Linoleum	Entry 2 floor	Poor	None detected
A12a	Black and green	Vinyl tile	Washroom 2 wall	Fair	None detected
A12b	Brown	Mastic	Washroom 2 wall	Fair	None detected
A13	White	Ceiling tile	Entry 1 ceiling	Fair	None detected
A14	White	Ceiling tile	Kitchen/dining room	Fair	None detected
A15	White	Ceiling tile	Entry 2 ceiling	Poor	None detected
A16	White	Ceiling tile	Bedroom 3 ceiling	Good	None detected
A17	White	Ceiling tile	Living room	Fair	None detected
A18	**Brown**	**Vermiculite**	**Laundry room ceiling space**	**Poor**	**0.13% (actinolite)**

BOLD – over criteria*

* Criteria: ≥1% asbestos: asbestos-containing material as defined by the WorkSafe BC Occupational Health and Safety Guidelines, Part 6, Updated February 2011. Vermiculite is positive for asbestos with asbestos present in any amount.

Below is a list of the types of materials sampled and the results for asbestos (# samples positive and/or # samples negative) in brackets.

- Green shingles (1 negative)
  - Tar (1 positive)
- Black tar paper (1 negative)
- Gray cardboard insulation (1 negative)
- Yellow window glazing (2 negative)
- Gray drywall putty (3 negative)
- Beige squares linoleum (2 negative)
- Beige rectangles linoleum (1 positive)
- Black and green vinyl tile (1 negative)
- White ceiling tile 1 x 1 (2 negative)
- White ceiling tile 1 x 2 (3 negative)
- Brown vermiculite insulation (1 positive)

The following is considered to be ACM (refer to Appendix 2 for room details, diagrams showing the sample locations and a photographic log):

- The **black tar** underlying the older green shingles on the roof contained 3.5% chrysotile asbestos.

- The **beige rectangles linoleum** in the laundry room contained 25% chrysotile asbestos.

- The **brown vermiculite insulation** located in the laundry room ceiling space contained 0.13% actinolite asbestos.

4.3.2 LEAD PRODUCTS

Five representative samples were collected and placed into sealable containers for lead content analysis. Please refer to Appendix 2 for a detailed description, a sampling diagram, a photographic log and copies of the laboratory reports. None of the samples tested contained 0.5% or greater lead by weight, therefore none are considered to be lead-based paints.

Table 15: Lead in Paint Analysis Results Summary for Cabin #3

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (% LEAD BY WEIGHT)*
P1	White over red	Exterior rear wall	0.11
P2	Yellow over white	Exterior trim	0.022
P3	Pink	Kitchen wall	<0.0087**
P4	White	Kitchen ceiling	<0.0040
P5	Gray	Exterior stairs and porch	0.32

BOLD – over criteria
* lead >0.5% by weight is considered to be lead-containing paint (Federal Hazardous Products Act)
**Matrix/substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks
***Insufficient sample provided to perform QC re-analysis

Below is a list of the colours of paints sampled and the results (# samples positive and/or # samples negative for lead-based paint) in brackets.

- White over red exterior (1 negative)
- Yellow over white exterior (1 negative)
- Pink interior (1 negative)
- White interior (1 negative)
- Gray exterior (1 negative)

4.3.3 POLYCHLORINATED BIPHENYLS (PCBs)

There were no items observed containing PCBs.

4.3.4 MERCURY

Fluorescent light tubes may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There were approximately two dozen fluorescent light tubes being stored in Bedroom 2.

4.3.5 OZONE-DEPLETING SUBSTANCES (ODS)

There were no items observed containing ODS.

4.3.6 RADIOACTIVE MATERIALS

There were no items containing radioactive materials.

4.3.7 MISCELLANEOUS CHEMICALS

There were no miscellaneous chemicals observed.

4.3.8 MOULD

Some water damage and conditions which may lead to mould were observed on the ceiling in Entry 2. The water damage comprises approximately 1 m^2.

4.3.9 OTHER

The building had an extensive rodent problem. Animal feces were observed throughout Cabin #3. Rodents were disturbing and redistributing the ACM vermiculite.

4.3.10 SUMMARY OF RESULTS FOR CABIN #3

The following table is a summary of the hazardous materials identified in Cabin #3. Refer to Appendix 2b for a diagram and to Appendix 2c-1 – 2 for photographs.

Table 16: Hazardous Materials Summary for Cabin #3

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Roof Tar	Entire roof	80 m^2
ACM Beige rectangles Linoleum	Laundry room	4 m^2
ACM Vermiculite Insulation	Entire ceiling space	80 m^2
Mercury - fluorescent light tubes	Bedroom 2	24
Water Damage	Entry 2	1 m^2
Pests/Animal feces	Throughout building	80 m^2

4.4 ASSESSING RISK EXPOSURE FOR ASBESTOS

There are eight major factors which assist in evaluating the condition of a particular asbestos installation.

The eight factors include:

1. Condition of Material
2. Water Damage
3. Exposed Surface Area
4. Accessibility
5. Activity and Movement
6. Air Plenum or Direct Air Stream
7. Friability
8. Asbestos Content

These factors have been put together into the following tables to allow for assessment to determine the degree of risk associated with existing asbestos. The parameters in Table 17 are applied to the ACM to derive a risk rating. These risk ratings are then compared to Table 18 to determine what type of action is required. The risk assessment method described in the Alberta Asbestos Abatement Manual is an acceptable risk assessment method as per the BC Occupational Health and Safety Guidelines, Section G6.6-1. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the controls are not applicable to a demolition.

Table 17: Assessing Risk Exposure*

FACTOR	DESCRIPTION	RATING OF RISK EXPOSURE
Accessibility of Material	Accessible in high activity areas	High (H)
	Accessible in low activity areas beyond the reach of the area occupants	Medium (M)
	Enclosed	Low (L)
Condition of Materials	Severely damaged	High (H)
	Mild to moderate damage	Medium (M)
	Good condition	Low (L)
Friability of Materials	Easily breaks apart	High (H)
	Mild to moderate friability	Medium (M)
	Non-friable	Low (L)

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

Table 18: Determining Level of Control Required*

	Asbestos Not Present in Return Air Plenum		Asbestos Present in Return Air Plenum
	Less than 20% Asbestos Content in Material	Greater than 20% Asbestos Content in Material	
Immediate Control Required	2 Hs or 3 Ms	1 H or 2 Ms	Control required unless 3 Ls and less than 20% asbestos content in material
Control Required	1 H or 2 Ms	1 M	
No Control Required	1 M or 3 Ls	3 Ls	

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

The table below outlines the results of the above methodology to determine priorities for dealing with ACM.

Table 19: ACM Risk of Exposure for Cabin #3

Sample	Description	Location	Condition	Result	Risk Exposure (accessible) (condition) (friability)	Control Required
A1b	Black roof tar	Exterior roof	Good	3.5% (chrysotile)	(L)(L)(L)	No Control
A10	Beige rectangles linoleum	Laundry room	Fair	25% (chrysotile)	(H)(M)(L)	Control
A18	Brown vermiculite	Laundry room ceiling space	Poor	0.13% (actinolite)	(L)(H)(H)	Immediate

According to the above risk assessment the following ACM items should be dealt with immediately:

- Brown vermiculite in the laundry room ceiling space

4.5 CONCLUSIONS

➢ ASBESTOS

- The **black tar** associated with the asphalt shingles contained 3.5% chrysotile asbestos.
- The **beige rectangles linoleum** in the Laundry room contained 25% chrysotile asbestos. This linoleum was only found in the Laundry room.
- The **vermiculite insulation** in the Laundry room ceiling space contained 0.13% actinolite asbestos. It is assumed that there is vermiculite in the ceiling space of the entire cabin, although this could not be confirmed as the attic was inaccessible.

The ceiling is in poor condition in some of the rooms, which may result in vermiculite spillage. Rodents have also been redistributing the vermiculite as there was vermiculite observed under the kitchen sink and in the space heater cavities.

Cabin #3 is currently unoccupied; therefore the ACM does not pose an immediate risk.

➢ MERCURY

- Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There were approximately two dozen fluorescent light tubes found in Bedroom 2.

➢ MOULD

- Water damage, which may lead to mould, was observed on the ceiling in Entry 2. The water damage covered an area approximately $1m^2$.

➢ OTHER

Cabin #3 had an extensive rodent problem, as evidenced by the extensive amount of feces. Rodents may spread diseases such as hantavirus, which is contracted through contact (bites) or by breathing in the virus found in urine, saliva or feces.

The rodents had disturbed/redistributed the ACM vermiculite.

4.6 RECOMMENDATIONS

➢ ASBESTOS

The table below summarizes the extent of ACM and the risk level associated with abatement. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the determination of risk level for the work procedures was based on the more stringent criteria provided by WorkSafe BC.

Table 20: Extent of ACM and Recommendations for Cabin #3

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
ACM Roof Tar	Estimated: 80 m^2	The tar associated with the asphalt shingles must be abated prior to demolition.
ACM Linoleum	Estimated: 4 m^2	The linoleum must be abated prior to demolition.
ACM Vermiculite Insulation	Entire ceiling space Estimated: 80 m^2	The vermiculite must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

➢ MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. There were approximately two dozen fluorescent light tubes being stored in Bedroom 2. All mercury-containing items should be stored to protect from breakage and recycled according to the applicable regulations.

➢ MOULD

There was water damage, which may lead to mould, observed on the ceiling in Entry 2. Caution should be exercised in this area as water damage may also weaken the ceiling tiles to the point of collapse which could result in spillage of vermiculite from the ceiling space.

Since the building is to be demolished, the water-damaged materials may be left in place. Although no mould was observed at the time of the assessment, conditions may change and if mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

- **PESTS**

Animal feces were observed throughout Cabin #3. Persons entering this building should take precautions to reduce the risk of contact with rodent saliva, urine or feces, including using PPE (disposable gloves if touching surfaces and disposable N95 respirator) and following appropriate decontamination procedures, such as disinfecting shoes and other exposed surfaces, upon leaving the building.

The feces may pose a significant health risk and should be cleaned up by experienced and trained personnel.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

5.0 CABIN #1 & CABIN #2

The following are the results of the investigation at Cabins #1 and #2. Please refer to Appendix 3 for detailed room descriptions, sampling diagrams, a photographic log and copies of the laboratory reports.

5.1 SCOPE OF WORK

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials and mould; and
- analysis and reporting of findings with recommendations.

5.2 SITE DESCRIPTION

Cabins #1 and #2 are located north of the Lodge and west of Cabin #3. Cabin #1 was north of Cabin #2. The units within each cabin were designated 1 to 4 moving from south to north. Refer to Appendix 1b-2 for a site diagram. Cabins #1 and #2 were similar in layout, with each containing four units with separate entrances. The middle two units (2 and 3) of each cabin were adjoined to form a single functional unit with kitchen and living room areas, a bedroom and washroom. The outer units (1 and 4) of each cabin were stand-alone.

Cabins #1 and #2 were similar in construction with exterior walls of wood siding over tar paper and parchment over wood around the crawlspace exterior. The roofs were asphalt shingles over wood shingles. Interior walls were variable and consisted of wood, wood panel or drywall over fiberglass insulation, fibreboard or cardboard insulation. Ceilings were wood, wood panel, ceiling tile, fibreboard or drywall. Flooring was also variable and consisted of carpet, linoleum, vinyl tile or hardwood, often with one type layered over another.

Unit 1 in Cabin #1 had an interior fire in the past. The wood frame under the finishing materials (drywall and panel board) was black and obviously burnt.

For a detailed list of the rooms and construction materials, refer to Appendix 3a.

5.3 RESULTS

5.3.1 ASBESTOS-CONTAINING MATERIALS (ACM)

Forty three (including three duplicates) of suspected ACM were collected and sent for analysis. Six samples were found to contain chrysotile asbestos. The results are contained in Appendix 3 and are summarized in the table below.

Table 21: Asbestos Analysis Results Summary for Cabin #1 & Cabin #2

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A1	Yellow	Window glazing	Cabin #2 unit 4 window	Fair	None detected
A2	Gray	Parchment	Cabin #2 unit 1 crawlspace side wall	Fair	None detected
A3	Gray	Parchment	Cabin #2 unit 4 crawlspace rear wall	Fair	None detected
A4	White and black	Rubber wire insulation	Cabin #2 crawlspace	Good	None detected
A5	Black	Double wire insulation	Cabin #2 crawlspace	Good	None detected
A6	Gray	Chimney mortar	Cabin #2 crawlspace	Good	None detected
A7	White squares	Linoleum	Cabin #2 unit 1 washroom	Good	None detected
A8	White	Ceiling tile	Cabin #2 unit 1 living room	Good	None detected
A9	White squares	Linoleum	Cabin #2 unit 2 entrance	Good	None detected
Dup A1 (A9)	White squares	Linoleum	Cabin #2 unit 2 entrance	Good	None detected
A10	**Gray**	**Drywall putty**	**Cabin #2 unit 2 kitchen wall**	**Fair**	**2.4% (chrysotile)**
A11	**Gray**	**Drywall putty**	**Cabin #2 unit 2 kitchen wall**	**Fair**	**2.2% (chrysotile)**
A12	White	Wall texture	Cabin #2 unit 3 bedroom wall	Fair	None detected
A13	White	Wall texture	Cabin #2 unit 3 bedroom wall	Fair	None detected
A14	White	Ceiling tile	Cabin #2 unit 3 bedroom	Poor	None detected
A15	**Gray**	**Drywall putty**	**Cabin #2 unit 3 washroom**	**Poor**	**1.9% (chrysotile)**
Dup A2 (A15)	**Gray**	**Drywall putty**	**Cabin #2 unit 3 washroom**	**Poor**	**2.2% (chrysotile)**
A16	White	Wall texture	Cabin #2 unit 4 living room wall	Fair	None detected
A17	Brown	Vinyl floor tile	Cabin #2 unit 4 living room floor	Good	None detected
A18a	Brown	Vinyl floor tile	Cabin #2 unit 4 hallway floor	Good	None detected

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A18b	Brown	Mastic	Cabin #2 unit 4 hallway floor	Good	None detected
A19	Black	Tar paper	Cabin #2 unit 4 exterior wall	Good	None detected
A20	Black	Tar paper	Cabin #1 unit 3 near front door	Good	None detected
A21	Yellow	Window glazing	Cabin #1 unit 2 washroom window	Good	None detected
A22	White	Parchment	Cabin #1 unit 1 crawlspace side wall	Poor	None detected
A23	Gray	Brick mortar	Chimney in Cabin #1 crawlspace	Good	None detected
A24	White and black	Wire insulation	Cabin #1 crawlspace	Poor	None detected
A25	Black and red	Subflooring with red mastic	Cabin #1 unit 1 washroom floor	Good	None detected
A26a-1	Brown	Vinyl floor tile	Cabin #1 unit 1 washroom floor	Good	None detected
A26a-2	Tan	Mastic	Cabin #1 unit 1 washroom floor	Good	None detected
A26a-3	Blue	Paper	Cabin #1 unit 1 washroom floor	Good	None detected
A26b	Brown	Vinyl floor tile	Cabin #1 unit 1 kitchen floor	Good	None detected
A27	White	Ceiling tile panel	Cabin #1 unit 1 washroom	Good	None detected
A28	Brown	Fibreboard	Cabin #1 unit 3 wall	Poor	None detected
A29a	Beige/ brown	Linoleum	Cabin #1 unit 2 washroom	Good	None detected
A29b	Tan	Mastic	Cabin #1 unit 2 washroom	Good	None detected
A30a	**Light and dark brown streaks**	**Vinyl floor tile**	**Cabin #1 unit 2 kitchen**	**Good**	**3.8% (chrysotile)**
A30b	Brown	Mastic	Cabin #1 unit 2 kitchen	Good	None detected
A31	**Light brown with white streaks**	**Vinyl floor tile**	**Cabin #1 unit 3 washroom**	**Good**	**4.2% (chrysotile)**
A32	Brown	Insulation paper	Cabin #1 unit 3 wall	Poor	None detected
Dup A3 (A32)	Brown	Insulation paper	Cabin #1 unit 3 wall	Poor	None detected
A33a	**Light brown with white streaks**	**Vinyl floor tile**	**Cabin #1 unit 4 entrance**	**Good**	**4.8% (chrysotile)**

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A33b	Black	Mastic	Cabin #1 unit 4 entrance	Good	None detected

BOLD – over criteria*

* Criteria: ≥1% asbestos: asbestos-containing material as defined by the WorkSafe BC Occupational Health and Safety Guidelines, Part 6, Updated February 2011. Vermiculite is positive for asbestos with asbestos present in any amount.

Due to the size and amount of ACM possibly present on this site, representative sampling was conducted. It was not practical or necessary to sample every item which may be an ACM. If the representative samples test positive for asbestos, it is assumed the identical materials, which were not tested, are also positive. For example, the drywall putty tested positive and therefore all drywall putty is assumed to be positive for asbestos.

Below is a list of the types of materials sampled and the results for asbestos (# samples positive and/or # samples negative) in brackets.

Cabin #2 (20 asbestos samples)

- Yellow window glazing (1 negative)
- Gray parchment (2 negative)
- White and black single wire insulation (1 negative)
- Black double wire insulation (1 negative)
- Gray chimney mortar (1 negative)
- White squares linoleum (2 negative)
- White ceiling tile (2 negative)
- Gray drywall putty (3 positive)
- White wall texture (3 negative)
- Brown vinyl floor tile (2 negative)
  - Brown mastic (1 negative)
- Black tar paper (1 negative)

Cabin #1 (20 asbestos samples)

- Black tar paper (1 negative)
- Yellow window glazing (1 negative)
- White parchment (1 negative)
- Gray chimney mortar (1 negative)
- White and black wire insulation (1 negative)
- Black and red subfloor with mastic (1 negative)
- Brown vinyl floor tile (2 negative)
  - Tan mastic (1 negative)
  - Blue paper (1 negative)
- White tile panel (1 negative)
- Brown fibreboard (1 negative)
- Beige/brown linoleum (1 negative)
  - Tan mastic (1 negative)
- Light and dark brown streaks vinyl floor tile (1 positive)

Brown mastic (1 negative)
- Light brown with white streaks vinyl floor tile (2 positive)
  Black mastic (1 negative)
- Brown insulation paper (1 negative)

The following is considered to be ACM (refer to Appendix 3 for room details, diagrams showing the sample locations and a photographic log):

- The **drywall putty** in Cabin #2 unit 2 Kitchen and Cabin #2 unit 3 Washroom contained between 1.9% and 2.4% chrysotile asbestos.

- The **light and dark brown streaks vinyl floor tile** in Cabin #1 unit 2 Kitchen contained 3.8% chrysotile asbestos.

- The **light brown with white streaks vinyl floor tile** in Cabin #1 unit 3 Washroom and Cabin #1 unit 4 entrance contained 4.2% to 4.8% chrysotile asbestos.

5.3.2 LEAD PRODUCTS

Eighteen (including two duplicates) representative samples were collected and placed into sealable containers for lead content analysis. Please refer to Appendix 3 for a detailed description, a sampling diagram, a photographic log and copies of the laboratory reports. Six of the samples are considered lead-based paint containing 0.5% or greater lead by weight.

Table 22: Lead in Paint Analysis Results Summary for Cabin #1 & Cabin #2

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (% LEAD BY WEIGHT)*
P1	**White**	**Cabin #2 unit 1 porch railing**	**5.3**
Dup P1 (P1)	**White**	**Cabin #2 unit 1 porch railing**	**1.1**
P2	Yellow	Cabin #2 unit 1 window trim	0.024
P3a	Gray over white	Cabin #2 unit 1 porch	0.13
Dup P2 (P3a)	**Gray over white**	**Cabin #2 unit 1 porch**	**1.1**
P3b	White striped ceramic tile	Cabin #2 unit 3 washroom	0.0064
P4	**Red over white**	**Cabin#2 unit 3 fire extinguisher box**	**3.2**
P5	Green	Cabin #2 unit 4 outside crawlspace wall	0.028
P6	White	Cabin #2 unit 1 living room/kitchen	0.0044
P7	Yellow	Cabin #2 unit 1 living room/kitchen	0.041
P8	White	Cabin #2 unit 2 kitchen ceiling	<0.0086
P9	Yellow	Cabin #2 unit 2 kitchen wall	<0.0095
P10	**Brown**	**Cabin #2 unit 4 porch**	**4.6**
P11	White	Cabin #1 unit 1 siding	0.17
P12	Yellow	Cabin #1 unit 2 window trim	0.20

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (% LEAD BY WEIGHT)*
P13	**Gray**	**Cabin #1 unit 1 porch**	**8.7**
P14	**White over brown over gray**	**Cabin #1 unit 1 exterior crawlspace wall**	**1.7**
P15	White over green	Cabin #1 unit 1 outside wall of crawlspace	0.015**

BOLD – over criteria
* lead >0.5% by weight is considered to be lead containing paint (Federal Hazardous Products Act)
**Matrix/substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks
***Insufficient sample provided to perform QC re-analysis

Below is a list of the colours of paints and ceramic tile sampled and the results (# samples positive and/or # samples negative for lead-based paint) in brackets.

Cabin #2 (11 paint/tile samples)
- White exterior (1 positive)
- Yellow exterior (1 negative)
- Gray over white exterior (1 negative)
    - Duplicate (1 positive)
- Red over white exterior (1 positive)
- Green exterior (1 negative)
- White interior (2 negative)
- Yellow interior (2 negative)
- Brown exterior (1 positive)
- White striped ceramic tile (1 negative)

Cabin #1 (5 paint samples)
- White exterior (1 negative)
- Yellow exterior (1 negative)
- Gray exterior (1 positive)
- White over brown over gray (1 positive)
- White over green (1 negative)

The following is considered lead-containing paint:

- **White** exterior paint on the Cabin #2 unit 1 porch railing.
- **Gray over white exterior** paint on the Cabin #2 unit 1 porch.
- **Red over white** exterior paint on the Cabin #2 unit 3 fire extinguisher box.
- **Brown** exterior paint on the Cabin #2 unit 4 porch.
- **Gray** exterior paint on the Cabin #1 unit 1 porch.

- **White over brown over gray** exterior paint on the Cabin #1 unit 1 exterior crawlspace wall.

All areas of Cabins #1 and #2 have been painted over several times with various colours of paint. It was not always possible to collect paint samples containing only a single colour or layer of paint.

Three samples of lead-containing paint (white, gray and brown) with 0.5% or greater lead by weight were collected and sent for leachable lead content analysis. The results are summarized in the table below. The red paint was not sampled for leachable lead because the paint is only found on the fire extinguisher boxes and sufficient sample for this analysis could not be collected.

Table 23: Leachable Lead Content Analysis Results Summary for Cabin #1 & Cabin #2

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/L)*
T1	**White**	**Cabin #2 unit 1 porch railing**	**42.7**
T2	**Gray**	**Cabin #2 unit 1 and unit 4 porch**	**11.7**
T3	**Brown under white or gray**	**Cabin #1 unit 3 siding**	**11.2**

BOLD – over criteria
* paint with leachable lead >5 mg/L is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)

The following is considered hazardous waste:

- **White** exterior paint on the Cabin #2 unit 1 porch railing.
- **Gray** exterior paint on the Cabin #2 unit 1 and unit 4 porches.
- **Brown** under white or gray exterior paint on the Cabin #1 unit 3 siding.

5.3.3 POLYCHLORINATED BIPHENYLS (PCBs)

Light ballasts were checked for PCBs, where accessible. There were two unlabeled, leaking light ballasts located in the Cabin #1 unit 1 Living room, and four leaking Philips light ballasts in the Cabin #1 unit 2 Kitchen. The date stamps could not be seen, therefore it could not be determined whether the ballasts contained PCBs.

Three lead paint samples (white, gray and brown) were collected and submitted for PCB analysis. The results are summarized in the table below.

Table 24: PCB Content Analysis Results Summary for Cabin #1 & Cabin #2

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/Kg)*
T1	White	Cabin #2 unit 1 porch railing	<0.30**
T2	Gray	Cabin #2 unit 1 and unit 4 porch	<3.0**
T3	Brown under white or gray	Cabin #1 unit 3 siding	<3.0**

BOLD – over criteria
* paint containing >50 ppm by weight of PCBs is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)
** 1 mg/Kg = 0.001/1000 = 0.000001 and
1 ppm = 1/1,000,000 = 0.000001; therefore 1 mg/Kg = 1 ppm

All three paint samples tested were below the hazardous waste guideline for PCBs.

5.3.4 MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found associated with the light ballasts in the Cabin #1 unit 1 Living room and in the Cabin #1 unit 2 Kitchen.

5.3.5 OZONE-DEPLETING SUBSTANCES (ODS)

Several ODS were still present in Cabins #1 and #2. The table below outlines the ODS of concern.

Table 25: ODS Results Summary for Cabin #1 & Cabin #2

LOCATION (BUILDING/FLOOR/ROOM)	DESCRIPTION OF THE SYSTEM	TYPE OF ODS	ESTIMATED QUANTITY
Cabin #2 unit 3/Bedroom	Fridge	*	*
Cabin #1 unit 2/Kitchen	Cooler	R12	9.5 oz
Cabin #1 unit 3/Living room	Compressor	R12	*
Cabin #1 unit 4/Living room	Fridge	*	*
Cabin #1 unit 3/Living room	Fridge	*	*

* unable to verify type and quantity

The following is a summary of the confirmed ozone-depleting substances present at the time of the assessment:

- There was 1 **fridge** which contained R-12.
- There was 1 **compressor** which is contained R-12.

5.3.6 RADIOACTIVE MATERIALS

No radioactive materials were observed.

5.3.7 MISCELLANEOUS CHEMICALS

Miscellaneous chemicals were observed at the following locations:

Table 26: Miscellaneous Chemicals Summary for Cabin #1 & Cabin #2

LOCATION (BUILDING, FLOOR, ROOM)	DESCRIPTION	ESTIMATED QUANTITY
Cabin #2 unit 1/Living room	Armor All	1 L
Cabin #2 unit 2/Kitchen	Household cleaners	-
Cabin #2 unit 3/Bedroom	Propane tank	20 lbs
Cabin #1/Exterior Storage	Herbicides, Pesticides, Engine oil, Car wash	-
Cabin #1 unit 1/Living room	Fire extinguishers	4
Cabin #1 unit 4/Living room	Chlorine, paint cans	-

5.3.8 MOULD

Some water damage and conditions which may lead to mould were observed on the ceiling of the Cabin #1 unit 3 Living room.

5.3.9 OTHER

PESTS

Cabins #1 and #2 had a significant amount of rodent feces. A possible rat's nest was observed in the Washroom of Cabin #1 unit 4 and rats were observed in the attics.

APPLIANCES AND ELECTRONICS

Several appliances and electronic items were found throughout the cabins including stoves (electric and gas), computer equipment and photocopiers.

TIRES

Several tires were found in the Cabin #2 unit 4 Washroom, in the Cabin #1 unit 2 and unit 3 Living rooms and in the Cabin #1 unit 4 Bedroom.

5.3.10 SUMMARY OF RESULTS BY LOCATION

Cabin #2

The following table is a summary of the hazardous materials identified in Cabin #2. Refer to Appendix 3b-1 - 4 for diagrams and to Appendix 3c-1 and 3c-3 for photographs.

Table 27: Hazardous Materials Summary for Cabin #2

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Drywall Putty	Unit 2 Kitchen and unit 3 Washroom	30 m^2
Lead in Paint	Exterior	120 m^2 (size of cabin)
ODS	Unit 3 Bedroom	1
Miscellaneous Chemicals	Unit 1 Living room, unit 2 Kitchen, unit 3 Bedroom	1 L - 20 lbs
Pests/Animal feces	Throughout units	-

Cabin #1

The following table is a summary of the hazardous materials identified in Cabin #1. Refer to Appendix 3b-5 - 8 for a diagram and to Appendix 3c-1 - 4 for photographs.

Table 28: Hazardous Materials Summary for Cabin #1

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Light and Dark Brown Streaks Vinyl Floor Tile	Unit 2 Kitchen	6 m^2
ACM Light Brown with White Streaks Vinyl Floor Tile	Unit 3 Washroom, unit 4 Entry, unit 4 Living room/Kitchen/Hall	35 m^2
Lead in Paint	Exterior	120 m^2 (size of Cabin)
PCBs	Unit 1 Living room, unit 2 Kitchen	6 (leaking)
Mercury	Unit 1 Living room, unit 2 Kitchen	12
ODS	Unit 2 Kitchen, unit 3 Living room, unit 4 Living room	4
Miscellaneous Chemicals	Exterior Storage, unit 1 Living room, unit 4 Living room	-
Water Damage	Unit 3 Living room	2 m^2
Pests/Animal feces	Throughout all units	-

5.4 ASSESSING RISK EXPOSURE FOR ASBESTOS

There are eight major factors which assist in evaluating the condition of a particular asbestos installation.

The eight factors include:

1. Condition of Material
2. Water Damage
3. Exposed Surface Area
4. Accessibility
5. Activity and Movement
6. Air Plenum or Direct Air Stream
7. Friability
8. Asbestos Content

These factors have been put together into the following tables to allow for assessment to determine the degree of risk associated with existing asbestos. The parameters in Table 29 are applied to the ACM to derive a risk rating. These risk ratings are then compared to Table 30 to determine what type of action is required. The risk assessment method described in the Alberta Asbestos Abatement Manual is an acceptable risk assessment method as per the BC Occupational Health and Safety Guidelines, Section G6.6-1. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the controls are not applicable to a demolition.

Table 29: Assessing Risk Exposure*

FACTOR	DESCRIPTION	RATING OF RISK EXPOSURE
Accessibility of Material	Accessible in high activity areas	High (H)
	Accessible in low activity areas beyond the reach of the area occupants	Medium (M)
	Enclosed	Low (L)
Condition of Materials	Severely damaged	High (H)
	Mild to moderate damage	Medium (M)
	Good condition	Low (L)
Friability of Materials	Easily breaks apart	High (H)
	Mild to moderate friability	Medium (M)
	Non-friable	Low (L)

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

Table 30: Determining Level of Control Required*

	Asbestos Not Present In Return Air Plenum		Asbestos Present in Return Air Plenum
	Less than 20% Asbestos Content in Material	Greater than 20% Asbestos Content in Material	
Immediate Control Required	2 Hs or 3 Ms	1 H or 2 Ms	Control required unless 3 Ls and less than 20% asbestos content in material
Control Required	1 H or 2 Ms	1 M	
No Control Required	1 M or 3 Ls	3 Ls	

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

The table below outlines the results of the above methodology to determine priorities for dealing with ACM.

Table 31: ACM Risk of Exposure for Cabin #1 & Cabin #2

Sample	Description	Location	Condition	Result	Risk Exposure (accessible) (condition) (friability)	Control Required
A10	Gray Drywall Putty	Cabin #2 unit 2 Kitchen	Fair	2.4% (chrysotile)	(L)(M)(H)	Control
A11	Gray Drywall Putty	Cabin #2 unit 2 Kitchen	Fair	2.2% (chrysotile)	(L)(M)(H)	Control
A15	Gray Drywall Putty	Cabin #2 unit 3 Washroom	Poor	1.9% (chrysotile)	(L)(H)(H)	Immediate
A30a	Light and Dark Brown Streaks Vinyl Floor Tile	Cabin #1 unit 2 Kitchen	Good	3.8% (chrysotile)	(H)(L)(L)	Control
A31	Light Brown with White Streaks Vinyl Floor Tile	Cabin #1 unit 3 Washroom	Good	4.2% (chrysotile)	(H)(L)(L)	Control
A33a	Light Brown with White Streaks Vinyl Floor Tile	Cabin #1 unit 4 Entrance	Good	4.8% (chrysotile)	(H)(L)(L)	Control

According to the above risk assessment the following items should be dealt with immediately:

- Gray drywall putty in the Cabin #2 unit 3 Washroom

5.5 CONCLUSIONS

➢ ASBESTOS

- The **gray drywall putty** in the Cabin #2 unit 2 Kitchen and unit 3 Washroom contained 1.9% to 2.4% chrysotile asbestos. The drywall in the unit 3 Washroom was in poor condition. These were the only areas where drywall was observed.

- The **light and dark brown streaks vinyl floor tile** in the Cabin #1 unit 2 Kitchen contained 3.8% chrysotile asbestos.

- The **light brown with white streaks vinyl floor tile** in the Cabin #1 unit 3 Washroom and unit 4 Entrance contained 4.2% to 4.8% chrysotile asbestos. Identical vinyl floor tile was found in the Kitchen, Living room and Hall in unit 4.

Cabins #1 and #2 are currently unoccupied; therefore the ACM does not pose an immediate risk.

➢ LEAD

- The **white exterior paint** on the wood siding and porches of Cabins #1 and #2 is lead paint.

- The **gray over white exterior paint** on the porches of Cabins #1 and #2 is lead paint.

- The **red over white exterior paint** on the fire extinguisher boxes located on the outside east wall of Cabins #1 and #2 is lead paint.

- The **brown exterior paint** taken from the Cabin #2 unit 4 porch contained 4.6% lead by weight. Brown paint was also found under white or gray paint on the Cabin #1 siding.

- The **gray exterior paint** located under the white and gray paint is lead-based paint.

It is assumed that all the paint on the exterior of Cabins #1 and #2 is lead-containing.

All three samples collected for analysis of leachable lead were above the guideline. The paint on the cabins is therefore considered hazardous waste.

➢ PCBs

There were two unlabeled, leaking light ballasts located in the Cabin #1 unit 1 Living room. Four leaking Philips light ballasts were found in the Cabin #1 unit 2 Kitchen. They are assumed to be PCB-containing.

The exterior lead paints tested did not exceed the PCB guideline for hazardous materials.

- **MERCURY**

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found associated with the light ballasts in the Cabin #1 unit 1 Living room and in the Cabin #1 unit 2 Kitchen.

- **OZONE-DEPLETING SUBSTANCES**

There were two items confirmed to contain R-12 - a cooler and a compressor - located in Cabin #1 units 2 and 3, respectively. There are suspected ODS items located in the Cabin #2 unit 3 Bedroom, the Cabin #1 unit 4 Living room and the Cabin #1 unit 3 Living room.

- **MISCELLANEOUS CHEMICALS**

Miscellaneous chemicals were observed in the Cabin #2 unit 1 Living room, unit 2 Kitchen and unit 3 Bedroom. Chemicals were also found in the Cabin #1 Exterior storage room, the unit 1 Living room and the unit 4 Living room. The chemicals included household cleaners, pesticides, herbicides, engine oil, paint, fire extinguishers and chlorine.

- **MOULD**

Some water damage and conditions which may lead to mould were observed on the ceiling of the Cabin #1 unit 3 Living room.

- **OTHER**

PESTS

Cabins #1 and #2 had a significant amount of rodent feces. A rat's nest was observed in the Washroom of Cabin #1 unit 4 and rats were observed in the attics. The feces can be a source of bacteria and viruses harmful to humans.

APPLIANCES AND ELECTRONICS

Several appliances and electronic items were found throughout Cabins #1 and #2, including stoves (electric and gas), computer equipment and photocopiers.

TIRES

Several tires were found in the Cabin #2 unit 4 Washroom, Cabin #1 unit 2 and unit 3 Living rooms and in the Cabin #1 unit 4 Bedroom.

5.6 RECOMMENDATIONS

➢ ASBESTOS

The table below summarizes the extent of ACM and the risk level associated with abatement. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed; however, the determination of risk level for the work procedures was based on the more stringent criteria provided by WorkSafe BC.

Table 32: Extent of ACM and Recommendations for Cabin #1 & Cabin #2

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
Cabin #2 unit 2		
ACM Drywall Putty	Estimated: 24 m^2	The drywall must be abated prior to demolition.
Cabin #2 unit 3		
ACM Drywall Putty	Estimated: 4 m^2	The drywall must be abated prior to demolition.
Cabin #1 unit 2		
ACM Vinyl Floor Tile	Estimated: 6 m^2	The floor tile must be abated prior to demolition.
Cabin #1 unit 3		
ACM Vinyl Floor Tile	Estimated: 4 m^2	The floor tile must be abated prior to demolition.
Cabin #1 unit 4		
ACM Vinyl Floor Tiles	Estimated: 30 m^2	The floor tile must be abated prior to demolition.

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

➢ LEAD

Lead-based paint was found at several locations on the exterior of Cabins #1 and #2. The table below summarizes the locations and extent of the lead-based paint.

Table 33: Extent of Lead Based Paint and Recommendations for Cabin #1 & Cabin #2

LEAD PAINT	EXTENT	RECOMMENDATION*
Exterior White	Entire cabins Total Estimate: 240 m^2 (size of cabins)	Disturbance of lead-based paint causes the release of lead in the dust. If the lead-based paint is to be disturbed, then the workers must wear appropriate PPE. When there is disposal of the lead-based paint materials the landfill must be notified of the lead content and leachability of the paint. This lead paint is considered hazardous waste.
Exterior Gray	All cabin porches Total Estimate: 16 m^2	
Exterior Red	2 Fire extinguisher boxes Total Estimate: 4 m^2	
Exterior Brown	Entire cabins Total Estimate: 240 m^2 (size of cabins)	

*NOTE: any lead based materials must only be handled/abated by trained and experienced personnel.

- **PCBs**

There were six unlabeled, leaking light ballasts located in Cabin #1 units 1 and 2. All fluorescent light and HID ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

The lead paint samples tested for PCBs were all below detection limits; therefore the paints do not contain PCBs.

- **MERCURY**

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found associated with the light ballasts in Cabin #1units 1 and 2. All fluorescent lights should be stored to protect from breakage and recycled accordingly.

- **OZONE-DEPLETING SUBSTANCES**

There were two items confirmed to contain R-12 - a cooler and a compressor - located in Cabin #1 unit 2 and unit 3, respectively. There are suspected ODS items located in the Cabin #2 unit 3 Bedroom, the Cabin #1 unit 4 Living room and the Cabin #1 unit 3 Living room.

The ODS units should be recycled/recovered by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

- **MISCELLANEOUS CHEMICALS**

All miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

- **MOULD**

Some water damage and conditions which may lead to mould were observed on the ceiling of the Cabin #1 unit 3 Living room.

Since the building is to be demolished, the water-damaged materials may be left in place. Although no mould was observed at the time of the assessment, conditions may change and if mould is discovered a risk assessment will need to be conducted which may require a change in the scope of work.

- **OTHER**

PESTS

Cabins #1 and #2 had a significant amount of rodent feces. A rat's nest was observed in the Washroom of Cabin #1 unit 4 and rats were observed in the attic. Persons entering these buildings should take precautions to reduce the risk of contact with rodent saliva, urine or feces, including using PPE (disposable gloves if touching surfaces and disposable N95 respirator) and following appropriate decontamination procedures, such as disinfecting shoes and other exposed surfaces, upon leaving the building.

The feces may pose a significant health risk and should be cleaned up by experienced and trained personnel.

APPLIANCES AND ELECTRONICS

Several appliances and electronic items were found throughout the cabins including stoves (electric and gas), computer equipment and photocopiers. These items should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

TIRES

Several tires were found in the Cabin #2 unit 4 Washroom, the Cabin #1 unit 2 and unit 3 Living rooms and in the Cabin #1 unit 4 Bedroom. The tires should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the buildings are not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

6.0 SUPERINTENDENT'S HOUSE

The Superintendent's House has been assessed for asbestos-containing material and lead-based paint in a separate report completed by Golder Associates Ltd. Supplementary sampling was conducted as part of this assessment. The following are the results of the investigation at the Superintendent's House. Please refer to Appendix 4 for a copy of the Golder Associates Ltd. Hazardous Building Materials Assessment "Hazardous Building Materials Assessments, Various Buildings, Kootenay and Lake Louise National Parks", November 9, 2007 prepared by James Kiryakos, sampling diagrams, a photographic log and copies of the laboratory reports.

6.1 SCOPE OF WORK

A limited assessment was conducted on the Superintendent's House, as this building has been addressed in a separate report contained in Appendix 4a. However, supplementary sampling was conducted as part of this assessment.

The Superintendent's House was evaluated for both demolition and hazardous materials management purposes.

6.2 SITE DESCRIPTION

The Superintendent's House is located east of the Lodge. The house consisted of a main floor, a 2nd floor and a basement. The house had been used as offices and not as a residence.

6.3 RESULTS

6.3.1 ASBESTOS-CONTAINING MATERIALS (ACM)

Five samples of suspected ACM were collected and sent for analysis. The results are contained in Appendix 4 and are summarized in the table below.

Table 34: Asbestos Analysis Results Summary for the Superintendent's House

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A1	White	Window caulking	North side basement window	Poor	None detected
A2	Gray	Stucco	Exterior trim	Good	None detected
A3	**Off-white**	**Sheet linoleum**	**Interior porch**	**Good**	**1.1% (chrysotile)**
A4a	Gray	Skim coat	Exterior concrete	Fair	None detected
A4b	**Gray**	**Skim coat**	**Exterior concrete**	**Fair**	**1.2% (chrysotile)**
A5	Gray	Mortar	Exterior basement wall	Fair	None detected

BOLD – over criteria*
* Criteria: ≥1% asbestos: asbestos-containing material as defined by the WorkSafe BC Occupational Health and Safety Guidelines, Part 6, Updated February 2011. Vermiculite is positive for asbestos with asbestos present in any amount.

Below is a list of the types of materials sampled and the results for asbestos (# samples positive and/or # samples negative) in brackets.

- White window caulking (1 negative)
- Gray stucco (1 negative)
- Off-white sheet linoleum (1 positive)
- Gray skim coat (1 negative)
  Gray skim coat (1 positive)
- Gray mortar (1 negative)

The following is considered to be ACM (refer to Appendix 4 for diagrams showing the sample locations and a photographic log):

- The **off-white sheet linoleum** in the interior porch contained 1.1% chrysotile asbestos.

- The **gray skim coat** contained 1.2% chrysotile asbestos.

6.3.2 LEAD PRODUCTS

Two (including one duplicate) representative samples were collected and placed into sealable containers for lead content analysis. Please refer to Appendix 4 for a detailed description, a sampling diagram, a photographic log and copies of the laboratory reports. Both of the samples are considered lead-based paint containing 0.5%, or greater lead by weight.

Table 35: Lead in Paint Analysis Results Summary for the Superintendent's House

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (% LEAD BY WEIGHT)*
P1	**Brown**	**Exterior trim**	**5.4**
Dup P4 (P1)	**Brown**	**Exterior trim**	**5.8**
P2	**Taupe**	**Exterior wood logs**	**1.5**

BOLD – over criteria
*lead >0.5% by weight is considered to be lead-containing paint (Federal Hazardous Products Act)
**Matrix/substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks
***Insufficient sample provided to perform QC re-analysis

Below is a list of the colours of paints sampled and the results (# samples positive and/or # samples negative for lead-based paint) in brackets.

- Brown exterior (1 positive)
- Taupe exterior (1 positive)

The following is considered lead-containing paint:

- The **brown exterior paint** on the trim.
- The **taupe exterior paint** on the wood logs.

Two samples of lead-containing paint with 0.5% or greater lead by weight were collected and sent for leachable lead content analysis. The results are summarized in the table below.

Table 36: Leachable Lead Content Analysis Results Summary for the Superintendent's House

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/L)*
T4	**Brown**	**Exterior trim**	**57.3**
T5	Taupe	Exterior wood logs	3.30

BOLD – over criteria
* paint with leachable lead >5 mg/L is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)

The following is considered hazardous waste:

- The **brown exterior paint** on the trim.

6.3.3 POLYCHLORINATED BIPHENYLS (PCBs)

There were fluorescent light fixtures found throughout the house on all floors. Representative light ballasts were checked and were found to be PCB-free; however, all ballasts should be verified.

Two lead paint samples (brown and taupe) were collected and submitted for PCB analysis. The results are summarized in the table below.

Table 37: PCB Content Analysis Results Summary for the Superintendent's House

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/Kg)*
T4	Brown	Exterior trim	<0.30**
T5	Taupe	Exterior wood logs	1.37**

BOLD – over criteria
* paint containing >50 ppm by weight of PCBs is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)
** 1 mg/Kg = 0.001/1000 = 0.000001 and
1 ppm = 1/1,000,000 = 0.000001; therefore 1 mg/Kg = 1 ppm

Both paint samples tested were below the hazardous waste guideline for PCBs.

6.3.4 MERCURY

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found throughout the house.

6.3.5 OZONE-DEPLETING SUBSTANCES (ODS)

There was a fridge remaining in the kitchen; however, the type of refrigerant could not be verified.

6.3.6 SUMMARY OF RESULTS FOR THE SUPERINTENDENT'S HOUSE

The following table is a summary of the hazardous materials identified in the Superintendent's House, including the results of the Golder Associates Ltd. Hazardous Building Materials Assessment. Refer to Appendix 4b-1 - 3 for diagrams and to Appendix 4c for photographs.

Table 38: Hazardous Materials Summary for the Superintendent's House

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
ACM Sheet Linoleum	Interior porch	5 m^2
ACM Skim Coat	Exterior stairs to basement, north and east exterior basement walls	7 m^2
ACM Pipe Elbow Insulation*	Basement	33
ACM Aircell Pipe Insulation*	Basement	100 m (length of pipe)
ACM Sheet Flooring (white mosaic)*	Main floor living room, 2nd floor	40 m^2
ACM Sheet Flooring (red orange mosaic)*	Main floor washroom	3 m^2
ACM Vinyl Floor Tile (blue and white)*	2nd floor master bedroom	20 m^2
ACM Vinyl Floor Tile (white, orange and brown)*	2nd floor master bedroom	4 m^2
Lead in Paint	Exterior trim	10 m^2
Lead in Paint	Exterior wood logs	140 m^2 (size of house)
PCBs	Main floor office, main floor living room, 2nd floor main room, basement	30 light ballasts
Mercury	Main floor office, main floor living room, 2nd floor main room, basement	60 lights

* results taken from Golder Associates Inc. Hazardous Building Materials Assessment

6.4 ASSESSING RISK EXPOSURE FOR ASBESTOS

There are eight major factors which assist in evaluating the condition of a particular asbestos installation.

The eight factors include:

1. Condition of Material
2. Water Damage
3. Exposed Surface Area
4. Accessibility
5. Activity and Movement
6. Air Plenum or Direct Air Stream
7. Friability
8. Asbestos Content

These factors have been put together into the following tables to allow for assessment to determine the degree of risk associated with existing asbestos. The parameters in Table 39 are applied to the ACM to derive a risk rating. These risk ratings are then compared to Table 40 to determine what type of action is required. The risk assessment method described in the Alberta Asbestos Abatement Manual is an acceptable risk assessment method as per the BC Occupational Health and Safety Guidelines, Section G6.6-1. The PWGSC document DP 057, 1997-12-03, Asbestos Management was reviewed and compared to the risk matrix outlined below. The matrix listed below was used because it was more stringent and because the house may leave PWGSC jurisdiction.

Table 39: Assessing Risk Exposure*

FACTOR	DESCRIPTION	RATING OF RISK EXPOSURE
Accessibility of Material	Accessible in high activity areas	High (H)
	Accessible in low activity areas beyond the reach of the area occupants	Medium (M)
	Enclosed	Low (L)
Condition of Materials	Severely damaged	High (H)
	Mild to moderate damage	Medium (M)
	Good condition	Low (L)
Friability of Materials	Easily breaks apart	High (H)
	Mild to moderate friability	Medium (M)
	Non-friable	Low (L)

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

Table 40: Determining Level of Control Required*

	Asbestos Not Present in Return Air Plenum		Asbestos Present in Return Air Plenum
	Less than 20% Asbestos Content in Material	Greater than 20% Asbestos Content in Material	
Immediate Control Required	2 Hs or 3 Ms	1 H or 2 Ms	Control required unless 3 Ls and less than 20% asbestos content in material
Control Required	1 H or 2 Ms	1 M	
No Control Required	1 M or 3 Ls	3 Ls	

* Information from *Alberta Asbestos Abatement Manual*. Government of Alberta, Employment, Immigration and Industry. July 2009.

The table below outlines the results of the above methodology to determine priorities for dealing with ACM.

Table 41: ACM Risk of Exposure for the Superintendent's House

Sample	Description	Location	Condition	Result	Risk Exposure (accessible) (condition) (friability)	Control Required
A3	Off-white sheet linoleum	Interior porch	Good	1.1% (chrysotile)	(H)(L)(L)	Control
A4b	Gray skim coat	Exterior concrete	Fair	1.2% (chrysotile)	(H)(M)(L)	Control
*	Pipe elbow insulation	Basement	Poor	3% (chrysotile)	(H)(H)(H)	Immediate
*	Aircell pipe insulation	Basement	Poor	50% (chrysotile)	(H)(H)(H)	Immediate
*	White mosaic sheet flooring	Main floor living room	Poor	10% (chrysotile)	(H)(H)(L)	Immediate
*	Red orange mosaic sheet flooring	Main floor washroom	Poor	10% (chrysotile)	(H)(H)(L)	Immediate
*	Blue with white streaks vinyl floor tile	2nd floor master bedroom	Good	2% (chrysotile)	(H)(L)(L)	Control
*	White with orange and brown spots vinyl floor tile	2nd floor master bedroom	Good	2% (chrysotile)	(H)(L)(L)	Control

* results taken from Golder Associates Ltd. Hazardous Building Materials Assessment

According to the above risk assessment the following ACM items should be dealt with immediately:

- Pipe elbow insulation in the basement
- Straight run aircell pipe insulation in the basement
- White mosaic sheet flooring on the main floor in various rooms
- Red orange mosaic sheet flooring in the main floor washroom

6.5 CONCLUSIONS

➢ ASBESTOS

- The **off-white sheet linoleum** in the interior porch contained 1.1% chrysotile asbestos. This flooring was only found in the porch.
- The **gray skim coat** contained 1.2% chrysotile asbestos. Skim coat was only found on the exterior basement stairs and exterior basement walls on the north and east sides of the house.
- The **pipe elbow insulation** in the basement contained 3% chrysotile asbestos.
- The **straight run aircell pipe insulation** in the basement contained 50% chrysotile asbestos.
- The **white mosaic sheet flooring** in the main floor living room contained 10% chrysotile asbestos. This flooring was also found on the 2nd floor.
- The **red orange mosaic sheet flooring** in the main floor washroom contained 10% chrysotile asbestos. This flooring was only found in the washroom.
- The **blue with white streaks vinyl floor tile** in the 2nd floor master bedroom contained 2% chrysotile asbestos.
- The **white with orange and brown spots vinyl floor tile** in the 2nd floor master bedroom contained 2% chrysotile asbestos.

The Superintendent's House is currently unoccupied; therefore the ACM does not pose an immediate risk.

➢ LEAD

- The **brown exterior trim paint** contained between 5.4% and 5.8% lead by weight. The leachable lead content was above the guideline; therefore this paint is considered hazardous waste.
- The **taupe exterior paint** used on most the house exterior contained 1.5% lead by weight.

➢ PCBs

There were fluorescent light fixtures found throughout the house on all floors. Representative light ballasts were checked and were found to be PCB-free; however, all ballasts should be verified before disposal.

The exterior paints tested did not exceed the PCB guideline for hazardous materials.

- **MERCURY**

Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were found throughout the house.

- **OZONE-DEPLETING SUBSTANCES**

There was a fridge remaining in the kitchen; however, the type of refrigerant could not be verified.

6.6 RECOMMENDATIONS

➢ ASBESTOS

The table below summarizes the extent of ACM and the exposure risk level. The PWGSC document DP 057, 1997-12-03, Asbestos Management, Annex C: Appendix 1 - Evaluation of Asbestos-Containing Materials (ACM) and Recommendations for Control was reviewed; however, the determination of risk level for the work procedures was based on the more stringent criteria provided by WorkSafe BC.

Table 42: Extent of ACM and Recommendations for the Superintendent's House

ACM	EXTENT	RECOMMENDATION*
Moderate Risk Abatement		High Risk Abatement
ACM Floor Tile	Estimated: 24 m^2	The floor tiles must be removed prior to demolition or any disturbance using moderate risk procedures.
ACM Skim Coat	Estimated: 7 m^2	The skim coat on the exterior stairs and walls will need to be abated prior to disturbance.
ACM Pipe Insulation; Elbows and Aircell	Estimated: 33 elbows 100 m (length of insulated pipe)	The pipe insulation located in the basement must be abated prior to demolition or to the house being moved. Moderate Risk assuming work is done using glove bag and wrap and cut procedures.
ACM White Mosaic and Red/orange Mosaic Sheet Flooring	Estimated: 43 m^2	The linoleum must be abated prior to demolition using high risk procedures.
ACM Off-white Sheet Linoleum	Estimated: 5 m^2	The linoleum will need to be removed prior to demolition or any disturbance

*NOTE: any ACM materials must only be handled/abated by trained and experienced personnel.

Asbestos abatement must be carried out by qualified personnel who are experienced and trained in asbestos removal. Air monitoring and inspections must be completed during the abatement to ensure the safety of the abatement personnel and any unprotected persons in the area.

Maintenance staff, contractors and anyone working or entering the premises should be made aware of ACM.

- **LEAD**

  The exterior paints on the trim and wood logs were found to be lead-containing. Lead-based paint does not pose a risk unless it is disturbed and dust is created allowing for the lead to become airborne. Any lead-based materials must only be handled/abated by trained and experienced personnel.

  Batteries should be recycled.

  According to BC Hazardous Waste Legislation, the brown exterior paint is considered hazardous waste and requires special disposal.

- **PCBs**

  All fluorescent light ballasts should be checked for PCBs at the time of removal using the most current version of Environment Canada publication: Identification of Lamp Ballasts Containing PCBs. Those that do contain PCBs must be handled, packaged and disposed of by the current regulations and personnel must be equipped with proper PPE.

  As long as the PCB-containing fluorescent light ballasts are in good condition and not damaged and PCBs remain enclosed (not leaking) there is low risk to occupants.

  It is recommended that any leaking fluorescent light ballasts are removed and disposed of immediately.

- **MERCURY**

  Fluorescent light tubes in the fluorescent light fixtures may contain varying amounts of mercury vapor, even newly purchased tubes/bulbs. Fluorescent tubes were located throughout the house. All mercury-containing items should be stored to protect from breakage and recycled according to the applicable regulations.

- **OZONE-DEPLETING SUBSTANCES**

  There was a fridge remaining in the Kitchen. The type of refrigerant contained in the fridge could not be identified. The ODS units should be recycled/recovered by a qualified and experienced worker according to Ozone Depleting Substances and Halocarbons Regulations.

- **MISCELLANEOUS CHEMICALS**

  Any miscellaneous chemicals need to be stored or disposed of according to current regulations and manufacturers recommendations.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the building is not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
- include safe work procedures, developed by a qualified person, for work conducted near hazardous materials,
- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

7.0 OUTBUILDINGS

The following are the results of the investigation at the Outbuildings. Please refer to Appendix 5 for detailed room descriptions, sampling diagrams, a photographic log and copies of the laboratory reports.

7.1 SCOPE OF WORK

The hazardous materials assessment includes:

- assessment and sampling of suspect materials which may contain asbestos and lead-based paint;
- assessment of polychlorinated biphenyls (PCB), mercury, ozone-depleting substances (ODS), radioactive materials and mould;
- analysis and reporting of findings with recommendations.

7.2 SITE DESCRIPTION

The Outbuildings include the two sheds, one located north of Cabin #3 and the other located west of Cabin #2 along the driveway, the rock wall northeast of Cabin #3, the debris pile northeast of Cabins #1 and #2 and the bus shelter along the highway across from the Hot Springs Pools.

Shed 2 is constructed of wood siding over paper and plywood with asphalt shingles on the roof. The interior is plywood covering the wood frame. Shed 1 is built into a retaining wall and is constructed of vinyl siding over tar paper and plywood, as well as concrete. There are asphalt shingles over plywood on the roof. The interior is oriented strand board and concrete with a bare wood frame ceiling. The bus shelter is made of concrete and contains six benches. The rock wall is a retaining wall and is constructed of rocks with mortar.

For detailed descriptions of the sheds and construction materials, refer to Appendix 5a.

7.3 RESULTS

7.3.1 ASBESTOS-CONTAINING MATERIALS (ACM)

Five samples of suspected ACM were collected and sent for analysis. The results are contained in Appendix 5 and are summarized in the table below.

Table 43: Asbestos Analysis Results Summary for the Outbuildings

SAMPLE	COLOUR	DESCRIPTION	LOCATION (#- BUILDING NO.)	CONDITION	RESULT* (ASBESTOS TYPE)
A1	White	Insulation paper	Shed 2 under wood siding	Good	None detected
A2	Yellow over gray	Window glazing	Shed 2 window	Good	None detected
A3	Black and white	Asphalt shingle	Shed 2 roof	Good	None detected
A4	White	Insulation	Item in debris pile	Poor	None detected
A5	Gray	Mortar	Rock retaining wall	Fair	None detected

BOLD – over criteria*
* Criteria: ≥1% asbestos: asbestos-containing material as defined by the WorkSafe BC Occupational Health and Safety Guidelines, Part 6, Updated February 2011. Vermiculite is positive for asbestos with asbestos present in any amount.

Below is a list of the types of materials sampled and the results for asbestos (# samples positive and/or # samples negative) in brackets.

Shed 2 (3 asbestos samples)
- White paper insulation (1 negative)
- Yellow/gray window glazing (1 negative)
- Black/white asphalt shingle (1 positive)

Debris Pile (1 asbestos sample)
- White insulation (1 negative)

Rock Wall (1 asbestos sample)
- Gray mortar (1 negative)

7.3.2 LEAD PRODUCTS

Five (including one duplicate) representative samples were collected and placed into sealable containers for lead content analysis. Please refer to Appendix 5 for a detailed description, a sampling diagram, a photographic log and copies of the laboratory reports. One of the samples is considered lead-based paint containing 0.5% or greater lead by weight.

Table 44: Lead in Paint Analysis Results Summary for the Outbuildings

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (% LEAD BY WEIGHT)*
P1	White	Exterior Shed 2	0.17
P2	Yellow	Exterior Shed 2 trim	0.10
P3	Green	Exterior Shed 1 trim and door	0.25
P4	Yellow	Interior Shed 1 concrete walls	<0.0067
Dup P3 (P4)	Yellow	Interior Shed 1 concrete wall	<0.0059
P5	**Tan over blue**	**Bus shelter benches**	**0.65**

BOLD – over criteria
* lead >0.5% by weight is considered to be lead-containing paint (Federal Hazardous Products Act)
**Matrix/substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks
***Insufficient sample provided to perform QC re-analysis

Below is a list of the colours of paints sampled and the results (# samples positive and/or # samples negative for lead-based paint) in brackets.

Shed 2 (2 paint samples)
- White exterior (1 negative)
- Yellow exterior (1 negative)

Shed 1 (2 paint samples)
- Green exterior (1 negative)
- Yellow interior (1 negative)

Bus Shelter (1 paint sample)
- Tan over blue (1 positive)

The following is considered lead containing paint:

- **Tan over blue** on the benches and trim in the Bus Shelter.

A sample of lead-containing paint with 0.5% or greater lead by weight was collected and sent for leachable lead content analysis for hazardous waste classification. The results are summarized in the table below.

Table 45: Leachable Lead Content Analysis Results Summary for the Outbuildings

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/L)*
T6	Tan over blue	Bus shelter benches and trim	2.58

BOLD – over criteria
* paint with leachable lead >5 mg/L is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)

7.3.3 POLYCHLORINATED BIPHENYLS (PCBs)

A paint sample was collected and submitted for PCB analysis. The results are summarized in the table below.

Table 46: PCB Content Analysis Results Summary for the Outbuildings

SAMPLE	COLOUR	LOCATION (#- BUILDING NO.)	RESULTS (mg/Kg)*
T6	Tan over blue	Bus shelter benches and trim	<0.30**

BOLD – over criteria
* paint containing >50 ppm by weight of PCBs is considered hazardous waste (BC Hazardous Waste Legislation Guide, 2005)
** 1 mg/Kg = 0.001/1000 = 0.000001 and
1 ppm = 1/1,000,000 = 0.000001; therefore 1 mg/Kg = 1 ppm

The paint sample tested was below the hazardous waste guideline for PCBs.

7.3.4 MERCURY

There were no items suspected to contain mercury.

7.3.5 OZONE-DEPLETING SUBSTANCES (ODS)

There were no items suspected to contain ODS.

7.3.6 RADIOACTIVE MATERIALS

There were no items suspected to contain radioactive materials.

7.3.7 MISCELLANEOUS CHEMICALS

Miscellaneous chemicals were observed in Shed 1 and Shed 2:

Table 47: Miscellaneous Chemicals Summary for the Outbuildings

LOCATION (BUILDING, FLOOR, ROOM)	DESCRIPTION	ESTIMATED QUANTITY
Shed 2	Ceiling texture	6 x 15 kg
Shed 2	Patching mortar	2 bags
Shed 2	Pro-Set	3 bags
Shed 2	Interior texture	3 bags
Shed 1	Motor oil	4 L
Shed 1	Acrylic sealer	60 L
Shed 1	Hydraulic oil	18 L
Shed 1	Suspected hydrocarbon barrels	2
Shed 1	Metal barrel	-
Shed 1	Landscape mulch	1 bag

7.3.8 MOULD

There was no mould or water damage observed.

7.3.9 OTHER

- There was a projector and other miscellaneous items stored in Shed 2.
- There was a tire being stored in Shed 1.
- The floor of Shed 1 was cracked and stained with suspected hydrocarbon products. Past spills in the shed may have seeped through the floor crack.

7.3.10 SUMMARY OF RESULTS FOR OUTBUILDINGS

The following table is a summary of the hazardous materials identified in the Outbuildings. Refer to Appendix 5b-1 - 2 for diagrams and to Appendix 5c for photographs.

Table 48: Hazardous Materials Summary for Outbuildings

HAZARDOUS MATERIAL	ROOMS	ESTIMATED QUANTITY
Lead in Paint	Bus shelter	7 m^2
Miscellaneous Chemicals	Shed 2	200 kg
Miscellaneous Chemicals	Shed 1	18 L 3 barrels 1 car battery
Miscellaneous Items	Sheds 1 and 2	Electronics 1 tire

7.4 CONCLUSIONS

➢ ASBESTOS

There was no asbestos-containing material identified.

➢ LEAD

The tan paint located in the Bus shelter on the benches and trim contained 0.65% lead by weight. The leachable lead content of this paint was below guideline and it is not considered to be hazardous waste.

➢ PCBs

The tan over blue paint tested did not exceed the PCB guideline for hazardous materials.

➢ MISCELLANEOUS CHEMICALS

- Building materials were observed in Shed 2, including ceiling and interior texture and patching mortar.
- Shed 1 contained chemicals such as hydraulic oil, motor oil and barrels suspected to contain hydrocarbons.

➢ OTHER

The Sheds contained recyclable items, such as a tire and electronics.

7.5 RECOMMENDATIONS

- **LEAD**

  The tan over blue paint located in the Bus shelter on the benches and trim is lead paint. The leachable lead content of this paint was below guideline and it is not considered to be hazardous waste.

  Disturbance of lead-based paint causes the release of lead in the dust. If the lead-based paint is to be disturbed, then the workers must wear appropriate PPE. Any lead-based materials must only be handled by trained and experienced personnel.

  When there is disposal of the lead-based paint materials the landfill must be notified of the lead content leachability of the paint. The landfill may require abatement or further testing of the lead paint before disposal if the paint is in poor condition.

- **MISCELLANEOUS CHEMICALS**

  Any miscellaneous chemicals need to be stored and disposed of according to current regulations and manufacturers recommendations.

- **OTHER**

  The tire and electronic items should be collected and recycled at a proper facility as per the Recycling Council of British Columbia.

If any other suspect materials become exposed during demolition or maintenance activities, the suspect materials should be tested.

Procedures for hazardous materials identified in this report should be developed and communicated to anyone who may come in contact with these materials. Also, anyone who may come in contact with hazardous materials should be informed on how to identify where the hazards may be present and how to proceed if they observe any suspect materials.

If the buildings are not demolished, a management and monitoring plan should be developed and implemented to address the hazardous materials identified in this report and any possible future hazardous materials which may be encountered. According to the WorkSafe BC Safe Work Practices for Handling Asbestos, 2006, the management plan must:

- include a current inventory of the hazardous materials identified,
- ensure that all ACM is clearly identified,
- include a risk assessment, completed by a qualified person, of the potential for exposure,
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- include instruction in all aspects of the management plan for all workers who could be exposed,
- ensure that manufacturer's manuals and instructions are available to workers,
- include site-specific written work procedures and ensure that they are available to all workers required to follow the procedures,
- ensure that work is carried out under the supervision of experienced and qualified supervisors, and
- include accurate and complete records pertaining to hazardous materials management.

8.0 LIMITATIONS

Lodge
Sampling of most gaskets in the mechanical rooms would have required dismantling equipment; therefore most gaskets could not be sampled.

There were areas which were not accessible and/or not visible due to building dimensions and walls, for example, high ceilings or wall cavities. These areas were not sampled.

It is assumed that there are many more ACM pipe elbows in the walls and ceiling space. These were not visible and therefore were not included in the estimated number of ACM pipe elbows.

Cabin #3
The attic space in Cabin #3 could not be accessed because no access hatch was found. It is assumed to contain vermiculite insulation as seen in the laundry room ceiling space and from the spillage under the sink in the kitchen.

Superintendent's House
The Superintendent's House has been addressed in a separate report. The house was inspected during this assessment only to confirm the locations and estimate the amounts of ACM present. Additional samples for ACM and lead-based paint were collected when deemed necessary.

The diagrams provided and used in this report did not always correlate with the room layout observed at the time of the sampling. Every effort was made to correct discrepancies at the time of sampling, however, there may be discrepancies or/and omissions. If there are discrepancies, the location should be verified on site.

This report is for the exclusive use of the client. Any third party use of this report and subsequent reliance or decisions based on this report is made at the sole risk of the third party. Ballast Environmental Consulting Ltd. has no obligation to any third party and will accept no responsibility for any damages suffered by third party use.

This assessment and subsequent conclusions and recommendations have been conducted with a reasonable level of care and skill and in accordance with current environmental assessment standards and practices for this geographic location at the time of the assessment. The final assessment of the risk level for abatement work may need to be modified based on additional assessment by the abatement company and/or the condition of materials at the time of abatement.

This assessment is limited to the scope as previously defined under 1.2 Scope of Work. The data and findings are limited to the date of investigation. This assessment is not and should not be considered an opinion concerning past or present compliance of any

past or present owner with any municipal, provincial or federal regulations. No warranty or guarantee is expressed or implied.

Should you have any questions or comments, feel free to contact the undersigned at info@ballastenvironmental.com or 403.452.3110.

Sincerely,
Ballast Environmental Consulting Ltd.

(original document signed)

Erin Humeny, B.Sc.

(original document signed)

Elvie Reinson, P.Biol., RPBio, EP

(original document signed)

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Appendix 1a

Detailed Room Descriptions for the Lodge

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	2	Stair 1	stairwell	stipple	concrete; drywall; cinderblock; texture	concrete	pipes insulated with fiberglass	white	white	gray paint	-	-	-	-	-	-	-	-
Lodge (New)	2	Hall 1	hallway	stipple over concrete	textured concrete; double drywall on inside wall	carpet over concrete	mercury thermostat	white	white	blue and pink leafy	-	white ceiling stipple	A9	ceiling	-	-	-	positive
												white wall texture	A33	wall across from 384	-	-	-	positive
												white wall texture	A109	step-out of A33	-	-	-	negative
												white wall texture	A110	step-out of A33	-	-	-	negative
												white wall texture	A111	step-out of A33	-	-	-	negative
Lodge (New)	2	385	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	385	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery)	light yellow	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	384	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	384	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	light yellow	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	383	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	white ceramic tile	P8	bathtub wall	negative
												-	-	-	white flower ceramic tile	P9	bathtub wall	negative
Lodge (New)	2	383	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner	light yellow	light yellow	pink	-	white drywall putty	A1	bedroom/ washroom wall	-	-	-	negative
Lodge (New)	2	382	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-

* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	2	382	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (batter); mercury thermostat	light yellow	light yellow	pink	-	gray window caulking	A28	exterior door	-	-	-	positive
Lodge (New)	2	381	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	381	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner	light yellow	light yellow	pink	-	-	-	-	white over yellow	P1	bedroom/ washroom wall	negative
Lodge (New)	2	380	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	white ceramic tile	P7	floor	negatve
Lodge (New)	2	380	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat	light yellow	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	379	executive suite living room and 1/2 bath	stipple	drywall	carpet over concrete	fluorescent light; ceramic tile backsplash	light yellow	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	378	executive suite bedroom	stipple	drywall	carpet over concrete	R22 air conditioner	light yellow	light yellow	pink	-	white ceiling stipple	A8	ceiling	-	-	-	positive
Lodge (New)	2	378	executive suite full washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	377	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	377	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	mercury thermostat	light yellow	light yellow	pink	-	white drywall putty	A2	bedroom/ washroom wall	-	-	-	negative

* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	2	376	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	376	bedroom	stipple	drywall; texture on doorside wall and closet	carpet over concrete	-	light yellow	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	Linen Room	storage with shelves	concrete with skim coat	concrete; cinderblock	concrete	electronics	white	white	gray	-	white skim coat	A27	ceiling	-	-	-	negative
Lodge (New)	2	Storage Room	general storage	textured concrete	textured drywall	concrete	electronics	white	white	gray	-	-	-	-	-	-	-	-
Lodge (New)	2	Hall 2	hallway	stipple; concrete	textured concrete	carpet over concrete	-	white	white	blue and pink leafy	-	-	-	-	-	-	-	-
Lodge (New)	2	334	staff quarters; kitchen area	stipple over concrete	drywall	carpet	ceramic tile backsplash, white with floral accent	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	334	staff quarters; living room	stipple over concrete	drywall	carpet	mercury thermostat	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	334	staff quarters; washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; ceramic tile in bathtub and stand-up shower	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	334	bedroom	stipple over concrete	drywall	carpet	-	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (New)	2	Guest Laundry	guest laundry	stipple over concrete	textured drywall	ceramic tile	fluorescent lights	white	white	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	2	Emergency Power Room	mechanical room	stipple over concrete	textured drywall	concrete	fluorescent lights; car battery; Huebsch industrial dryer (model 37CGI)	white	white	gray	-	-	-	-	-	-	-	-
Lodge (New)	Main	Stair 1	stairwell	stipple over concrete	concrete; drywall; cinderblock	concrete	compact fluorescent light	white	white	gray	-	white ceiling stipple	A11	ceiling	-	-	-	positive

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Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	Main	Hall 1	hallway	t-bar	textured drywall	carpet over concrete	4 fluorescent lights; triangular area has 20 x 20 cm white ceramic tile	white spackle; white pinhole	white	blue and pink leafy	2 x 2	white drywall putty	A3	ceiling space	-	-	-	positive
												white ceiling tile (pinhole)	A20	ceiling	-	-	-	negative
												white ceiling tile (spackle)	A22	ceiling	-	-	-	negative
												gray pipe elbow insulation	A30	ceiling space between 258 and 259	-	-	-	negative
												gray cement firestop	A91	ceiling; pipe penetration	-	-	-	negative
Lodge (New)	Main	260	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	260	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	259	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	259	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	258	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	258	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-

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Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	Main	257	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	gray window caulking	A29	exterior door	-	-	-	negative
												white wall texture	A34	doorside wall	-	-	-	negative
Lodge (New)	Main	257	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	256	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	white ceiling stipple	A10	ceiling	-	-	-	positive
Lodge (New)	Main	256	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	255	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	255	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	254	executive suite living room	stipple over concrete	drywall	carpet	mercury thermostat	white	white	pink	-	-	-	-	-	-	-	-
Lodge (New)	Main	254	1/2 bath	drywall	drywall	ceramic tile	fluorescent light	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	253	executive suite bedroom	stipple over concrete	drywall	carpet	-	white	white	pink	-	white drywall putty	A5	door frame	-	-	-	positive
Lodge (New)	Main	253	executive suite full washroom	drywalll	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-

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Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	Main	252	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	252	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	251	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet	R22 air conditioner; smoke detector (battery); mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	251	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	Hall 2	hallway	t-bar	drywall; cinderblock	carpet	2 fluorescent lights	white	white	blue with pink leafy	2 x 2	white drywall putty	A4	ceiling space	-	-	-	positive
												white ceiling tile (pinhole)	A21	ceiling	-	-	-	negative
												white ceiling tile (spackle)	A23	ceiling	-	-	-	negative
Lodge (New)	Main	Linen Room	storage with shelves	concrete	concrete; cinderblock; drywall	concrete	fluorescent light; 2 paint cans; pipes with fiberglass insulation; vermiculite	white	white	gray	-	-	-	-	-	-	-	-
Lodge (New)	Main	Vending	vending machine area	stipple over concrete	cinderblock; drywall	ceramic tile	all walls texture coated	white	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Main	233	staff quarters; kitchen area	stipple over concrete	drywall	carpet with underpad over green indoor/ outdoor carpet over concrete	ceramic tile backsplash, white with floral accent	white	purple	pink	-	white ceiling stipple	A12	ceiling	-	-	-	positive
Lodge (New)	Main	233	staff quarters; living room	stipple over concrete	drywall	carpet over concrete	1 wall with wallpaper; mercury thermostat	white	white	pink	-	-	-	-	-	-	-	-
Lodge (New)	Main	233	staff quarters; washroom	drywall	drywall	ceramic tile	fluorescent light	white	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-

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Lodge (New)	Main	233	staff quarters; bedroom 1	stipple over concrete	drywall	carpet over concrete	-	white	brown	green	-	-	-	-	-	-	-	-
Lodge (New)	Main	233	staff quarters; bedroom 2	stipple over concrete	drywall	carpet over concrete	mercury thermostat	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	Stair 1	stairwell	stipple over concrete	drywall; textured concrete	concrete	compact fluorescent light	white	white	gray	-	-	-	-	-	-	-	-
Lodge (New)	Lower	132	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	microwave; mercury thermostat; McClary fridge R134A	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	132	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Lower	Hall 1	hallway	stipple over concrete	textured drywall; drywall over concrete	carpet over concrete	water damage, visible black mould (0.5m strip)	white	white	blue and pink leafy	-	white ceiling stipple	A13	ceiling	-	-	-	positive
Lodge (New)	Lower	131	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	microwave; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	131	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Lower	130	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	130	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent; mould	light yellow	light yellow	white	20 x 20 cm	-	-	-	white	P2	ceiling	negative
Lodge (New)	Lower	129	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-

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Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	Lower	129	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Lower	128	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	128	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	white drywall putty	A6	ceiling	-	-	-	negative
Lodge (New)	Lower	Pool Room	pool area	t-bar over concrete with insulation	drywall; wood over textured drywall	ceramic tile	7 fluorescent lights	white	white	white	20 x 20 cm; 4 x 2 flat	gray floor leveling compound	A24	floor near patio doors	-	-	-	negative
												white wall texture	A92	behind wood	-	-	-	negative
												gray ceiling texture	A93	concrete above ceiling panels	-	-	-	negative
												-	-	-	white	P20	interior pool room	negative
Lodge (New)	Lower	Pool Room	women's washroom	t-bar	drywall; ceramic tile; wood panel	ceramic tile	shower floor 1 x 1 tile; 2 fluorescent lights	white	white	white	20 x 20 cm; 4 x 2 flat	white ceiling tile (flat)	A19	ceiling	-	-	-	negative
												-	-	-	yellow ceramic tile 7.5 x 7.5 cm	P21	change room shower	negative
Lodge (New)	Lower	Pool Room	women's sauna	wood over foil, drywall	wood over foil, drywall	concrete	fibreglass insulation	bare wood	bare wood	bare concrete	-	-	-	-	-	-	-	-
Lodge (New)	Lower	Pool Room	men's washroom	t-bar	drywall; ceramic tile; wood panel	ceramic tile	2 fluorescent lights; mini-tile in shower	white	white	white	20 x 20 cm; 4 x 2 flat	white ceiling tile (flat)	A18	ceiling	-	-	-	negative
												-	-	-	yellow ceramic tile 5 x 5 cm	P22	change room shower	negative
Lodge (New)	Lower	Pool Room	men's sauna	wood over foil, drywall	wood over foil, drywall	concrete	fibreglass insulation	bare wood	bare wood	bare concrete	-	-	-	-	-	-	-	-
Lodge (New)	Lower	Hall 2	hallway	stipple over concrete	textured cinderblock and drywall	carpet over concrete	-	white	white	blue with pink leafy	-	white ceiling stipple	A14	ceiling	-	-	-	positive
												white wall texture	A35	cinderblock wall outside pool room	-	-	-	negative

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Lodge (New)	Lower	127	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	127	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Lower	126	bedroom	stipple over concrete	drywall; texture on doorside wall and closet	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (New)	Lower	126	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; bathtub and backsplash white ceramic tile with floral accent	light yellow	light yellow	white	20 x 20 cm	gray floor leveling compound	A26	floor	-	-	-	negative
Lodge (New)	Lower	Ice/ Vending	ice machine or vending area	stipple over concrete	cinderblock; concrete	ceramic tile	-	white	white	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (New)	Lower	Linen Room	storage	concrete	cinderblock; concrete; drywall	concrete	ants; appliances; old air conditioning unit; 1 fluorescent light ballast	white	white	gray	-	-	-	-	-	-	-	-
Lodge (New)	Lower	Storage LH2	under stairs chemical storage	concrete	concrete; cinderblock	concrete	5 gal. Vector floor finish; cleaning chemicals; floor stripper	white; bare	white; bare	bare	-	-	-	-	-	-	-	-
Lodge (New)	Lower	Laundry 1	laundry area	textured concrete	cinderblock; drywall	vinyl tile	2 fluorescent lights; television; fibreglass pipe insulation	white	white	white with flecks	30 x 30 cm	white with flecks vinyl tile	A15	floor near dividing wall	-	-	-	negative
Lodge (New)	Lower	Laundry 1	washroom	textured concrete	cinderblock; drywall	vinyl tile	-	white	white	white with flecks	30 x 30 cm	-	-	-	-	-	-	-

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Lodge (New)	Lower	Laundry 2	laundry machines	textured concrete	cinderblock; concrete; drywall	vinyl tile over concrete	7 fluorescent lights; 2 Maytag industrial washers	white	white	white with flecks	30 x 30 cm	white drywall putty	A7	corner of back wall	-	-	-	positive
												white with flecks vinyl tile	A16	floor near washing machines	-	-	-	negative
												white with flecks vinyl tile	A17	floor near laundry stairs	-	-	-	negative
												gray floor leveling compound	A25	floor near drain	-	-	-	negative
												white ceiling texture	A107	ceiling near shelves	-	-	-	negative
Lodge (New)	Lower	Laundry stairs	stairs from laundry to main floor	concrete; drywall	cinderblock; drywall	concrete	-	white	white	gray	-	-	-	-	-	-	-	-
Lodge (Original)	2	361	bedroom	stipple over concrete; drywall	drywall; stipple on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (Original)	2	361	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; backsplash is flower band ceramic tile	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	362	bedroom	stipple over concrete; drywall	drywall; texture on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (Original)	2	362	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light; backsplash is flower band ceramic tile	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	363	bedroom	stipple over concrete	drywall; texture on doorside and outside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	white wall texture	A37	exterior wall	-	-	-	negative
Lodge (Original)	2	363	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	364	bedroom	stipple over concrete	drywall; texture on doorside and outside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (Original)	2	364	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-

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Lodge (Original)	2	365	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (Original)	2	365	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	gray floor leveling compound	A66	floor	-	-	-	negative
												-	-	-	brown mosaic ceramic tile	P12	floor	negative
Lodge (Original)	2	366	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	green	-	-	-	-	-	-	-	-
Lodge (Original)	2	366	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	Theatre	conference room; stage and dance floor	wood plank	wood plank; cinderblock	carpet; wood; parquet	electronics; 21 fluorescent lights; emergency lights (batteries); HVAC vent	wood stain	wood stain	gray; wood stain	-	-	-	-	-	-	-	-
Lodge (Original)	2	Theatre	stage area	wood plank	wood; cinderblock (exterior wall)	carpet	2 mercury thermostats	wood stain	wood stain	gray	-	-	-	-	-	-	-	-
Lodge (Original)	2	Hall 4	hallway	stipple over concrete	cinderblock; textured drywall	carpet over concrete	-	white	white	blue with pink leafy	-	old white ceiling stipple	A48	ceiling outside 363	-	-	-	negative
Lodge (Original)	2	Main Stairwell	main stairs	newer stipple over concrete	drywall	carpet over vinyl tile over concrete	-	white	light yellow	blue and pink leafy; tan tile	-	newer white ceiling stipple	A47	ceiling	-	-	-	negative
Lodge (Original)	2	Smoking Room	usage unknown	stipple over concrete	drywall	carpet over concrete	R22 air conditioner; mercury thermostat; mould; ceramic tile backsplash; newer window	white	light yellow	blue and pink leafy	-	white drywall putty	A41	below window	-	-	-	negative
Lodge (Original)	2	Hall 3	hallway	stipple over concrete	textured drywall and cinderblock	carpet over concrete	different sized cinderblocks	white	light yellow	blue and pink leafy	-	gray window caulking	A82	exterior window	-	-	-	negative
												brown vermiculite	A85	cinderblock wall between theatre	-	-	-	positive

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Lodge (Original)	2	Satellite Receiving Room	electronics room	concrete	cinderblock; drywall	vinyl tile over concrete	many electronics	tan	tan	tan	23 x 23 cm	white drywall putty	A40	near light switch	-	-	-	positive
												tan vinyl floor tile	A59	floor	-	-	-	positive
												-	-	-	tan	P23	wall	negative
Lodge (Original)	2	367	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	R22 air conditioner; mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	367	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	368	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	368	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	369	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	R22 York air conditioner; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	369	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	370	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat	white	white	pink	-	white wall texture	A36	doorside wall	-	-	-	negative
Lodge (Original)	2	370	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	371	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	R22 York air conditioner; mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-

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Lodge (Original)	2	371	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	372	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	372	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (Original)	2	373	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	R22 York air conditioner; mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	373	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (Original)	2	374	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	374	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	white	20 x 20 cm	-	-	-	-	-	-	-
Lodge (Original)	2	375	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet over concrete	R22 York air conditioner; mercury thermostat	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	2	375	washroom	drywall	drywall; ceramic tile	ceramic tile	fluorescent light	light yellow	light yellow; white tile with floral accent	brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	2	Linen Room	janitor storage	concrete	cinderblock	concrete	R134A water cooler; pipe (uninsulated)	light yellow	light yellow	gray	-	-	-	-	-	-	-	-
Lodge (Original)	Main	241	bedroom	stipple over concrete; drywall	drywall; stipple on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	pink	-	white wall texture	A38	doorside wall	-	-	-	negative

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Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (Original)	Main	241	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	white textured ceililng tile	A56	ceiling	-	-	-	negative
Lodge (Original)	Main	Hall 4	hallway	newer stipple over concrete	drywall	carpet over concrete	-	white	light yellow	blue and pink leafy	-	white window caulking	A83	exterior east window	-	-	-	negative
Lodge (Original)	Main	242	bedroom	stipple over concrete; drywall	drywall; stipple on doorside wall	carpet over concrete	mercury thermostat	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	242	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	243	bedroom	stipple over concrete; drywall	drywall; stipple on doorside wall	carpet over concrete	mercury thermostat; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	243	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	white textured ceililng tile	A54	ceiling	-	-	-	negative
Lodge (Original)	Main	Office	office	stipple over concrete	cinderblock; fibreboard	carpet over concrete	mercury thermostat; 6 fluorescent lights; photocopier; space heater; strong urine smell	white	white; brown	gray	-	-	-	-	-	-	-	-
Lodge (Original)	Main	Gift Shop	gift shop area in reception	newer stipple over concrete	drywall	carpet over concrete	2 fluorescent lights	white	white	blue and pink leafy	-	newer white ceiling stipple	A50	ceiling	-	-	-	negative
Lodge (Original)	Main	Reception	reception desk area	newer stipple over concrete	wood panel	carpet and ceramic tile; over vinyl tile	8 fluorescent lights; HVAC vent; R12 ice cream cooler	white	wood	blue and pink leafy carpet; white ceramic tile; tan vinyl tile	ceramic 20 x 20 cm; vinyl 23 x 23 cm	tan vinyl floor tile	A60	floor	-	-	-	positive
Lodge (Original)	Main	Lobby	main lobby area	newer stipple over concrete	wood panel; mirrors over drywall	carpet over concrete over vinyl tile	floor leveling compound over some vinyl tile	white	white; brown; mirrors	blue and pink leafy carpet; tan vinyl tile	23 x 23 cm	gray floor leveling compound	A67	floor	-	-	-	negative
Lodge (Original)	Main	Lobby	main entrance	newer stipple over concrete	wood panel; mirrors over drywall	ceramic tile over vinyl tile	-	white	brown; mirrors	white	20 x 20 cm	-	-	-	-	-	-	-

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Lodge (Original)	Main	Main Stairwell	main stairs and sitting area	newer stipple over old stipple over concrete	drywall	carpet over vinyl tile over concrete	3 fluorescent lights	white	light yellow	blue and pink leafy carpet; tan vinyl tile	23 x 23 cm	white drywall putty	A42	outside women's washroom	-	-	-	negative
												newer white ceiling stipple	A49	ceiling	-	-	-	negative
Lodge (Original)	Main	Ladies Washroom	washroom	drywall	ceramic tile over drywall	ceramic tile over ceramic tile over concrete	3 fluorescent lights	light yellow	white with floral accent	white over pink mosaic	20 x 20 cm; 1.5 x 1.5 cm	-	-	-	pink mosaic ceramic tile	P11	floor	negative
Lodge (Original)	Main	Main stairs storage	storage	drywall	drywall	linoleum over plywood	1 fluorescent light	light yellow	light yellow	white squares	-	white squares linoleum	A99	floor	-	-	-	negative
Lodge (Original)	Main	Men's Washroom	washroom	drywall	ceramic tile over drywall	ceramic tile over leveling compound over ceramic tile	2 fluorescent lights	light yellow	white with floral accent	white over gray	20 x 20 cm; 1.5 x 1.5 cm	gray floor leveling compound	A68	floor	-	-	-	negative
												-	-	-	gray ceramic tile	P10	floor	negative
Lodge (Original)	Main	Lounge Closet	storage with shelves	drywall	drywall	carpet over concrete and ceramic tile	1 fluorescent light	white	white	dark pink with flecks; brown mosaic	1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Lounge	lounge area with bar	newer stipple over concrete; drywall	drywall	carpet over concrete	HVAC vent; electronics	white; light yellow	light yellow	blue and pink leafy	-	-	-	-	-	-	-	-
Lodge (Original)	Main	Lounge Bar	bar area	drywall	drywall; mirror	vinyl tile	cooler (refrigerant unknown)	light yellow	light yellow; wood	tan	23 x 23 cm	tan vinyl floor tile	A61	floor	-	-	-	positive
Lodge (Original)	Main	Bar Closet	storage with shelves	drywall	wood; cinderblock	vinyl tile over concrete	ceiling insulation is styrofoam; pipes have fibreglass or no insulation; electronics; general cleaners	light yellow	brown; light yellow	tan	23 x 23 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Lounge Storage	storage with shelves	drywall	drywall	carpet over concrete	-	light yellow	light yellow	blue and pink leafy	-	-	-	-	-	-	-	-

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Lodge (Original)	Main	Dining Room	dining room	newer stipple over concrete	drywall	carpet over concrete; ceramic tile	fireplace; HVAC vent; 2 mercury thermometers	white	light yellow	red; brown and pink	30 x 30 cm	white drywall putty	A43	northwest wall	-	-	-	positive
												tan vinyl floor tile	A58	floor near entrance	-	-	-	positive
												gray mortar	A63	fireplace mantle	-	-	-	negative
												gray mortar	A100	fireplace; inside bricks	-	-	-	negative
Lodge (Original)	Main	Bar Area	between dining room and kitchen	drywall	drywall	ceramic tile over concrete	-	light yellow	light yellow	brown and pink	30 x 30 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Kitchen	kitchen	concrete; drywall	cinderblock; drywall; ceramic tile	ceramic tile; ceramic tile over vinyl tile	15 fluorescent lights; R134A Snapple fridge; Garland stove?; R12 General freezer; fire suppression tanks: under pressure; vermiculite	white	white; white with yellow flecks	orange-brown; orange-brown with flecks	15 x 15 cm	-	-	-	orange-brown ceramic tile	P13	floor	negative
												-	-	-	orange-brown with flecks ceramic tile	P14	floor	negative
												-	-	-	white with yellow flecks ceramic tile	P15	wall	negative
												-	-	-	white	P16	wall and ceiling	negative
												-	-	-	yellow with white flecks ceramic tile	P27	wall	negative
Lodge (Original)	Main	Kitchen Washroom	washroom; uniform storage	concrete with skim coat	cinderblock; drywall	ceramic tile over concrete	-	light yellow	light yellow	orange-brown	15 x 15 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Kitchen Office and Hall	office and hallway with coolers	concrete	cinderblock; drywall	ceramic tile; concrete	2 fluorescent lights	light yellow	light yellow	orange-brown; orange-brown with flecks	15 x 15 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Cooler 1	fridge	metal panel	metal panel	ceramic tile over concrete	white styrofoam insulation; refrigerant unknown	white	white	orange-brown	15 x 15 cm	black caulking	A69	around temperature sensor	-	-	-	positive
Lodge (Original)	Main	Cooler 2	freezer	metal panel	metal panel	ceramic tile	white styrofoam insulation; refrigerant unknown	white	white	orange-brown	15 x 15 cm	black caulking	A70	around temperature sensor	-	-	-	positive
Lodge (Original)	Main	Kitchen Storage	dry storage	drywall	cinderblock; plywood	ceramic tile	2 fluorescent lights	light yellow	light yellow	orange-brown	15 x 15 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	Kitchen Stairs	stairway to games room	plywood	plywood	steel	-	light yellow	light yellow	black diamond plate	-	-	-	-	-	-	-	-

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Lodge (Original)	Main	Linen Room	janitor's room with sink	concrete	cinderblock	concrete	liquid ice melter; vermiculite; pipe elbow insulation; car battery	white	white	gray	-	-	-	-	-	-	-	-
Lodge (Original)	Main	Hall 3	hallway	t-bar	cinderblock; wood under windows	carpet over leveling compound over concrete	mercury thermometer	white	white	blue and pink leafy	2 x 2	white spackle ceiling tile	A55	ceiling	-	-	-	negative
Lodge (Original)	Main	245	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	R12 fridge; mercury thermometer; smoke detector (battery)	white	brown; red	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	245	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	246	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	246	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	247	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	247	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	248	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Main	248	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-

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Lodge (Original)	Main	249	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	white drywall putty	A44	door frame	-	-	-	positive
Lodge (Original)	Main	249	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light; vermiculite	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Main	250	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	old white ceiling stipple	A51	ceiling	-	-	-	negative
Lodge (Original)	Main	250	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	white textured ceililng tile	A57	ceiling	-	-	-	negative
Lodge (Original)	Lower	Linen Room	storage with shelves	concrete	concrete; cinderblock	concrete	R12 fridge; pipe elbow insulation	light yellow	light yellow	gray	-	gray pipe elbow insulation	A73	pipe elbow near ceiling	-	-	-	positive
Lodge (Original)	Lower	125	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	white	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	125	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	124	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; television	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	124	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	123	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	123	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	122	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	-	white	light yellow	pink	-	-	-	-	-	-	-	-

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Lodge (Original)	Lower	122	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	121	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	121	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	120	bedroom	stipple over concrete	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery); television	white	light yellow	pink	-	old white ceiling stipple	A53	ceiling	-	-	-	negative
Lodge (Original)	Lower	120	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	119	bedroom	t-bar with fibreglass insulation	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white spackle	light yellow	pink	2 x 2	-	-	-	-	-	-	-
Lodge (Original)	Lower	119	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	118	bedroom	t-bar with fibreglass insulation	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery); television; older Admiral fridge	white spackle	light yellow	pink	2 x 2	-	-	-	-	-	-	-
Lodge (Original)	Lower	118	washroom	flat tile	drywall; ceramic tile	ceramic tile over ceramic tile	fluorescent light	white	light yellow; white tile with floral accent	white; brown mosaic	4 x 2; 20 x 20 cm; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	117	bedroom	t-bar with fibreglass insulation	drywall; texture on doorside wall	carpet	mercury thermometer; smoke detector (battery)	white spackle	light yellow	pink	2 x 2	white wall texture	A39	doorside wall	-	-	-	negative

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Lodge (Original)	Lower	117	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	brown vermiculite	A87	cinderblock wall on balcony	-	-	-	positive
Lodge (Original)	Lower	Hall 3	hallway	t-bar	textured drywall over pink fibreglass insulation over concrete	carpet over concrete	no windows; water damage	white spackle	white	blue and pink leafy	2 x 2	-	-	-	-	-	-	-
Lodge (Original)	Lower	Hall 4	hallway	t-bar	textured drywall with fibreglass insulation; cinderblock	carpet over concrete	-	white spackle	white	blue and pink leafy	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	116	bedroom	drywall; stipple over concrete	drywall	carpet	-	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	116	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	115	bedroom	drywall; stipple over concrete	drywall	carpet	-	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	115	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	114	bedroom	drywall; stipple over concrete	drywall	carpet	-	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	114	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	113	bedroom	drywall; stipple over concrete	drywall	carpet	mercury thermostat	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	113	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-

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Lodge (Original)	Lower	112	bedroom	drywall; stipple over concrete	drywall	carpet	smoke detector (battery)	white	light yellow	pink	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	112	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	111	bedroom	drywall; stipple over concrete	drywall	carpet	mercury thermostat; smoke detector (battery); television	white	light yellow	pink	-	white drywall putty	A46	bedroom/ washroom wall	-	-	-	positive
												old white ceiling stipple	A52	ceiling	-	-	-	negative
Lodge (Original)	Lower	111	washroom	flat tile	drywall; ceramic tile	ceramic tile	fluorescent light	white spackle	light yellow; white tile with floral accent	brown mosaic	4 x 2; 1.5 x 1.5 cm	-	-	-	-	-	-	-
Lodge (Original)	Lower	Electrical Room	main power enters hotel	concrete	concrete; cinderblock	concrete	vermiculite; 3 mercury thermometers; insulation on floor; electronics	white	white	gray	-	white insulation	A108	laying on floor	-	-	-	negative
Lodge (Original)	Lower	Infirmary	storage; first aid supplies	concrete; drywall	cinderblock; drywall	concrete	tile counter, peach tile; backsplash; pipes with fibreglass insulation; 3 battery backups	light yellow	light yellow	gray	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	Infirmary Storage	storage with shelves	concrete	concrete; cinderblock; drywall	concrete	computers, electronics; 2 fluorescent lights; 6 pipe elbows	white	white	gray	-	green chalk board	A71	near back shelves	-	-	-	negative
												gray pipe elbow insulation	A72	pipe elbow near ceiling	-	-	-	positive
Lodge (Original)	Lower	Main Stairs	lobby-like area	newer stipple over concrete	drywall	carpet over leveling compound over concrete	mould under stairs	white	light yellow	blue and pink leafy	-	white drywall putty	A45	under display case	-	-	-	negative
Lodge (Original)	Lower	Rear Entrance	back entrance from elevator	t-bar over concrete	cinderblock; drywall	ceramic tile over concrete	-	white spackle	light yellow	white	2 x 2; 20 x 20 cm	-	-	-	-	-	-	-
Lodge (Original)	Top	Elevator Room	elevator to hot springs	drywall with stipple	drywall	concrete	1 fluorescent light	white	peach	gray	-	black window caulking	A84	exterior window	-	-	-	negative
Lodge (Original)	Lower	Elevator Room	elevator from hot springs	stipple over concrete	wood siding	concrete	1 fluorescent light; possible PCB grease	white	tan	gray	-	-	-	-	tan	P24	interior wall	negative

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Lodge (Original)	Lower	-	walkway to elevator	concrete	concrete outside; wood over concrete inside	concrete	6 flourescent lights; water damage on ceiling	white	white concrete; tan wood	gray	-	gray skim coat	A102	corridor floor	-	-	-	negative
												-	-	-	white over yellowish	P25	inside wall	negative
												-	-	-	gray over gray	P26	walkway floor	negative
Lodge (Original)	Lower	Games Room	games/ leisure room	stipple over concrete	drywall; wood panel	linoleum; carpet over vinyl tile	mercury thermostat; fireplace	white	white; wood stain	fake limestone linoleum; red carpet; tan tile	23 x 23 cm	gray mortar	A64	fireplace mantle	-	-	-	negative
												beige firebrick	A65	fireplace	-	-	-	negative
												green/white limestone linoleum	A103	north side floor	-	-	-	negative
												white window caulking	A104	exterior southeast window	-	-	-	positive
Lodge (Original)	Lower	Games Room Storage	storage; stairs to kitchen	stipple over concrete	cinderblock; wood panel over fiberglass insulation	vinyl tile over concrete	R22 air conditioner; water leaking onto floor; 1 fluorescent light	white	tan; wood	tan	23 x 23 cm	tan vinyl floor tile	A62	floor	-	-	-	positive
Lodge (Original)	Lower	Paint Storage	paint storage	wood frame; plywood	plywood	plywood	30 paint cans; 2 paint thinner; cleaners; 15 spray cans	white	white	gray	-	-	-	-	-	-	-	-
Lodge (Original)	Lower	Mechanical Room	hot water tanks; HVAC; boilers; parts and tools	concrete	cinderblock; concrete	concrete	fluorescent tubes; compressors (unknown and 134A); 5 fluorescent lights; cleaning supplies; stipple; drywall compound; contact cement; polish; paint/ primer; grout; engine oil; Raid; floor finish; electronics; TSP; HCl; 3 propane tanks 400g; solder paste; WD40; fertilizer 15kg; 1 drum heat transfer fluid	white	white	gray	-	brown peg board	A74	wall near HVAC unit	-	-	-	negative
												black gasket	A101	pipe joint along west wall	-	-	-	positive
												-	-	-	gray	P3	railing and stairs	negative
Lodge (New)	-	Exterior	northwest end of building	flat roof with tar	wood siding over concrete	asphalt	white lattice; no eaves	-	yellow over green	-	-	-	-	-	-	-	-	-

* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (New)	-	Exterior	front; northwest portion of building	flat roof with tar	cinderblock over blue foam insulation over drywall; concrete lower; wood over fibreglass over drywall under windows	cobble; asphalt; concrete stairs	yellow trim and doors; yellow wood siding below windows, around air intake; cinderblock screen in front of stairs; white lattice; no eaves	-	white	gray stairs	19 x 19 cm block	gray skim coat	A90	exterior stairs near staff quarters	-	-	-	negative
												black roof tar	A94	roof above 384	-	-	-	negative
												brown caulking	A95	roof above 384; around vent duct	-	-	-	negative
												-	-	-	yellow over green	P17	balcony railing outside 334	negative
												-	-	-	gray	P18	concrete stairs outside 334	negative
												-	-	-	white	P19	exterior wall outside 334	negative
Lodge (New)	-	Exterior	rear; northwest portion of building	flat roof with tar	cinderblock; concrete lower	-	balconies gray; yellow doors and trim; no eaves	-	white	-	19 x 19 cm block	-	-	-	-	-	-	-
Lodge (New)	-	Exterior	rear; pool area	-	cinderblock; concrete	-	red paving stone walkway; gray wood stairs and balcony; yellow railing; balcony in very poor condition	-	white	-	19 x 19 cm block	-	-	-	-	-	-	-
Lodge (New)	-	Exterior	rear; south of pool area	flat roof with tar	cinderblock; concrete lower	-	gray concrete balconies; yellow doors and trim; no eaves	-	white	-	19 x 19 cm block	-	-	-	-	-	-	-
Lodge (Original)	-	Exterior	front; north-central portion of building	flat roof with tar	cinderblock	cobble; asphalt	yellow trim and doors, below windows; no eaves	-	white	-	19 x 19 cm block	brown vermiculite	A86	cinderblock between Hall 3	-	-	-	positive
												-	-	-	yellow	P29	exterior Hall 3	negative
															white	P30	exterior Hall 3	negative

* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (Original)	-	Exterior	front; main entrance area	flat roof with tar; awning	wood siding over concrete; rock around main doors	cobble; asphalt	wood trim around doors, windows; green, red, white paint on awning; no eaves	-	yellow over green; white concrete	-	-	black roof tar	A78	above main entrance	-	-	-	negative
												gray mortar	A89	main entrance stonework	-	-	-	negative
												black tar paper	A96	roof above theatre	-	-	-	negative
Lodge (Original)	-	Exterior	front; east portion of building	flat roof with tar	wood siding over tar paper over blue foam insulation; cinderblock	cobble; asphalt	no eaves; cinderblock screen around stairs; gray stairs	-	white	-	19 x 19 cm block; 10 x 19 cm block around stairs	black tar paper	A77	office exterior	-	-	-	negative
												gray mortar	A88	exterior Hall 4; adjacent stairs	-	-	-	negative
Lodge (Original)	-	Exterior	northeast end of building	flat roof with tar	wood siding over concrete; concrete lower	-	vermiculite around door; yellow over green trim; gray concrete balconies; no eaves	-	yellow over green; white concrete	-	-	-	-	-	-	-	-	-
Lodge (Original)	-	Exterior	elevator shaft	-	rock; concrete	concrete	yellow wooden door; white trim; white concrete wall along stairs, walkway	-	white over green	gray walkway with red stairs	-	-	-	-	red	P28	stairs to elevator	negative
Lodge (Original)	-	Exterior	rear; east portion of building	flat roof with tar	concrete and rock lower; wood siding over concrete	dirt	no eaves; concrete around doors, windows	-	white concrete; yellow siding	-	-	-	-	-	yellow	P6	wood siding; exterior 116	negative
Lodge (Original)	-	Exterior	rear; main entrance area	concrete	rock	concrete	yellow doors with white trim; green trim around balcony; no eaves	white	-	gray	-	black roof tar	A79a	roof adjacent smoking room	-	-	-	negative
												black roof tar	A79b	roof adjacent smoking room	-	-	-	negative
												-	-	-	gray	P4	walkway to elevator	negative
												-	-	-	yellow	P5	entrance exterior door	negative
Lodge (Original)	-	Exterior	rear; east dining room area	peaked	concrete; window	-	-	-	white; white trim	-	-	white roof caulking	A75	around metal flashing	-	-	-	negative
												black asphalt sheeting	A80	roof above dining room	-	-	-	negative
												gray roof caulking	A97	around metal flashing	-	-	-	negative

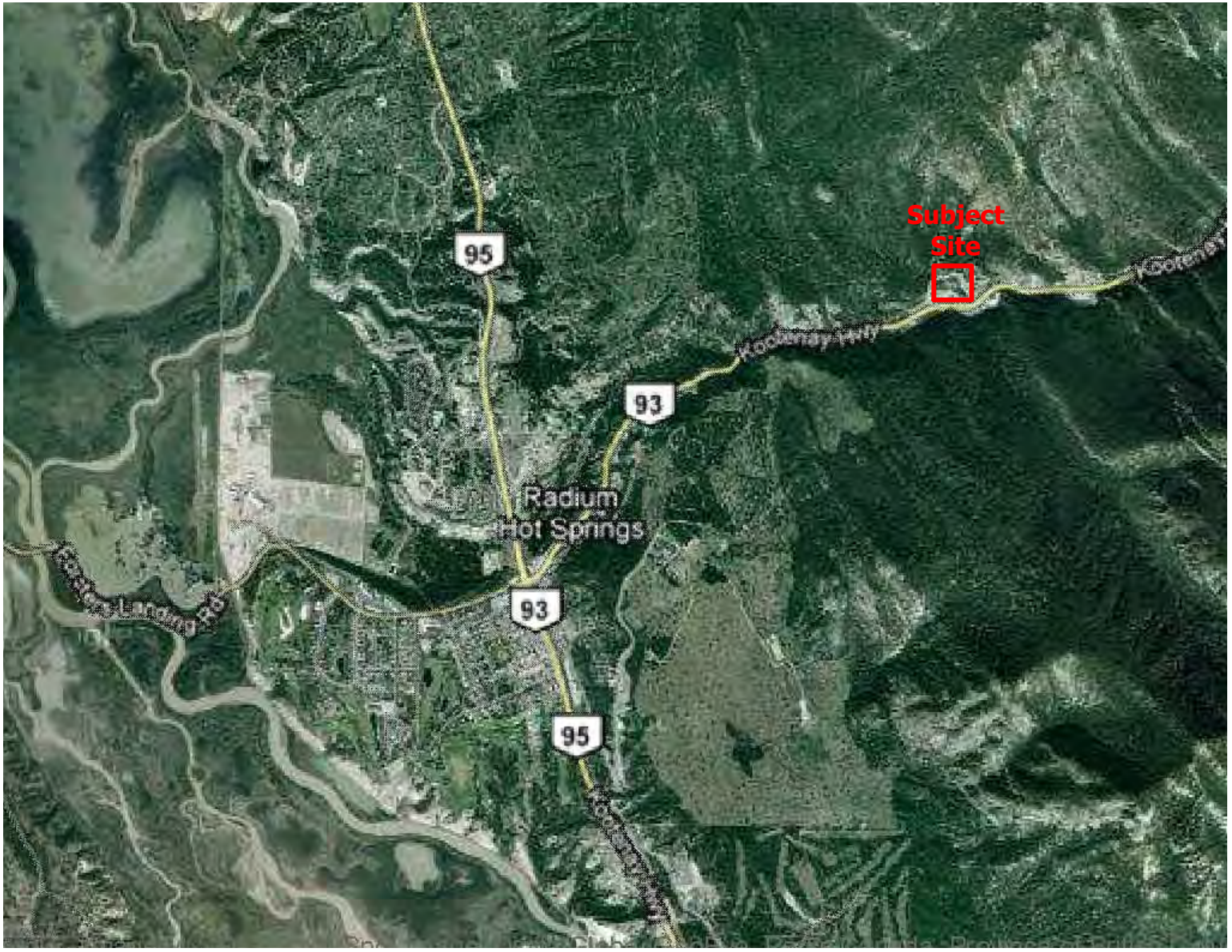
* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Lodge (Original)	-	Exterior	rear; west dining room area	-	wood trim, siding; concrete; rock; cinderblock	-	rock chimney	-	white	-	19 x 19 cm block	-	-	-	-	-	-	-
Lodge (Original)	-	Exterior	rear; west side of building	flat roof with tar	concrete; cinderblock	concrete balconies; grass	white wood around kitchen stairs; yellow trim, doors; plastic and concrete railings on balconies	-	white	gray balconies	19 x 19 cm block; 40 x 20 cm for dividing walls	white exterior caulking	A76	outside 375; between new and original buildings	-	-	-	negative
												black asphalt sheeting	A81	above kitchen stairs	-	-	-	negative
												black tar paper	A98	roof over kitchen stairs	-	-	-	negative
Lodge (New)	Bsmt	Pool Mechanical Room	mechanical room beneath pool	concrete	concrete	concrete	15 pipe elbows with insulation; HVAC unit, fibreglass insulation in and on duct; floor sump with concrete bottom; ~5 aerosol paint cans; mechanical parts, pipes (gaskets); chemicals; paint; pail of HCl; mercury thermostat; foam insulation on exterior wall	white	white	gray	-	gray pipe elbow insulation	A31	low pipe along wall	-	-	-	negative
												black gasket	A105	pipe on floor	-	-	-	positive
												black gasket	A106	pipe on shelf	-	-	-	negative

* no access ** limited visibility of area ***Sample not analyzed

Appendix 1b

Sampling Diagrams for the Lodge



Scale: NTS

VICINITY MAP

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: November 2011 Drawn by: Google Imagery

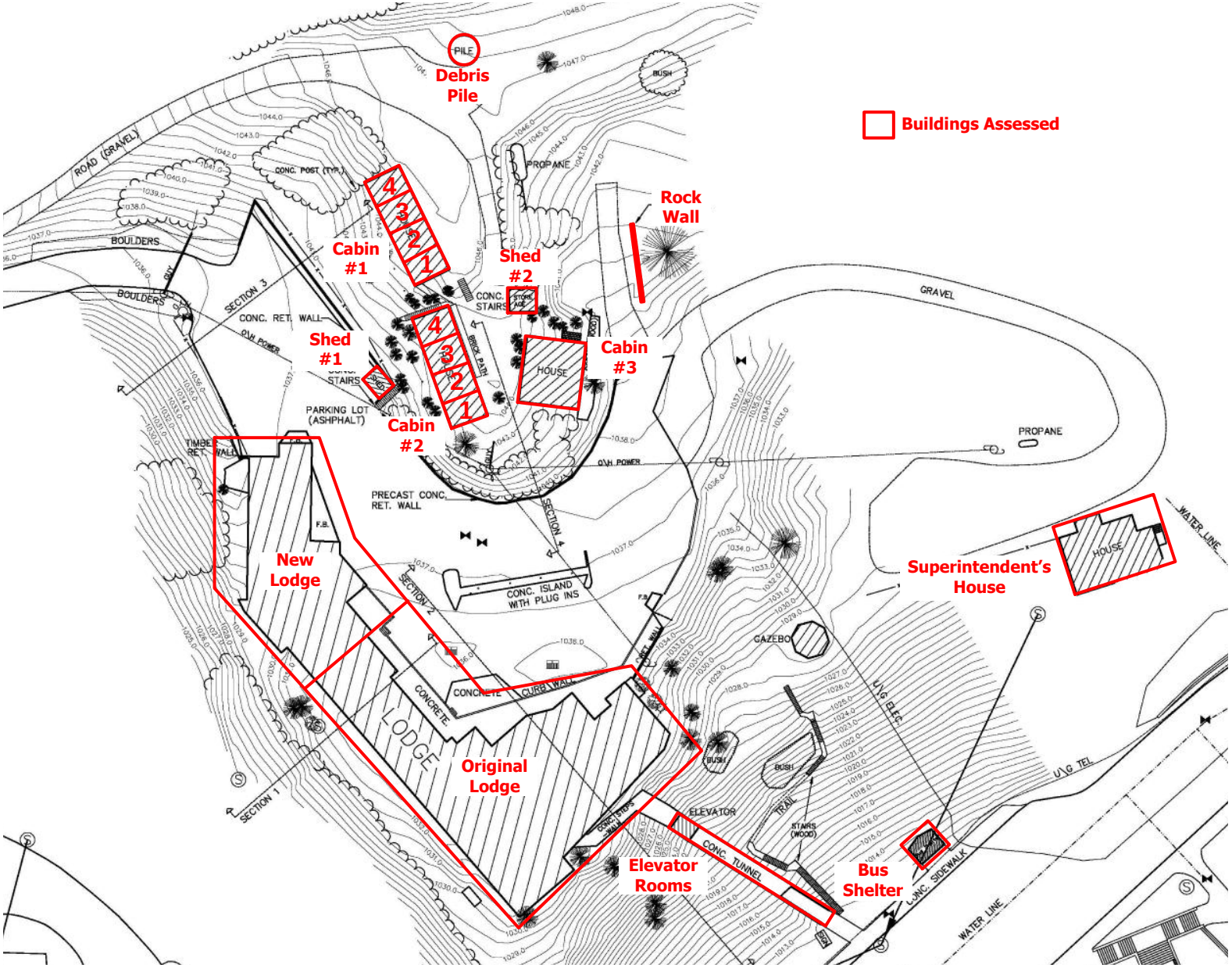
Edited: January 2012 Edited by: EH

Project Name: Hazardous Materials Assessment

Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-1



Scale: NTS

SITE MAP

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

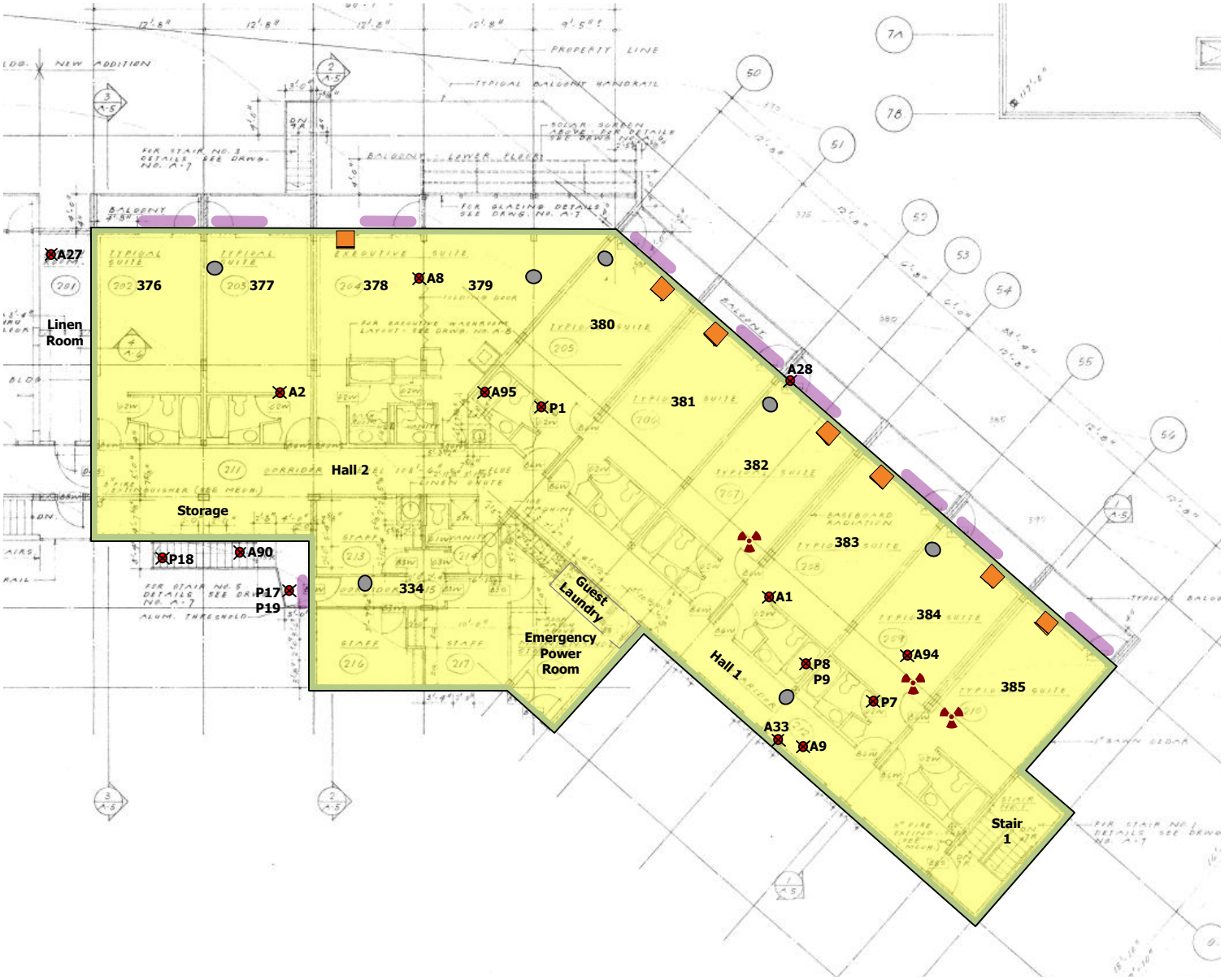
Date: June 2011 | Drawn by: PWGSC | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: January 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 1b-2

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (NEW)
2nd Floor

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Sep, 1964
Edited: Nov 29, 2011

Drawn by: Strong Lamb & Nelson Ltd.
Edited by: EH

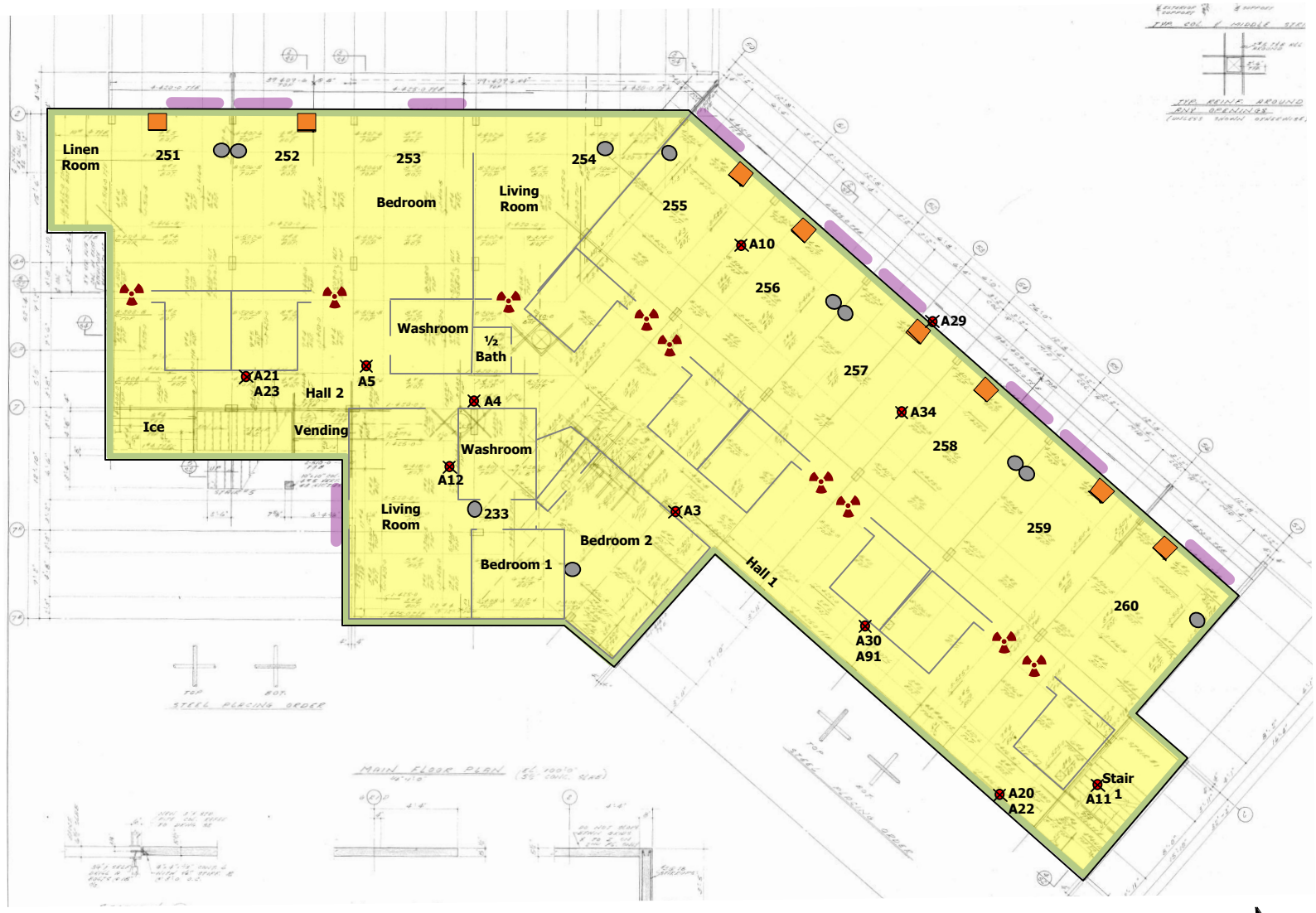
Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-3

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (NEW)

Main Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

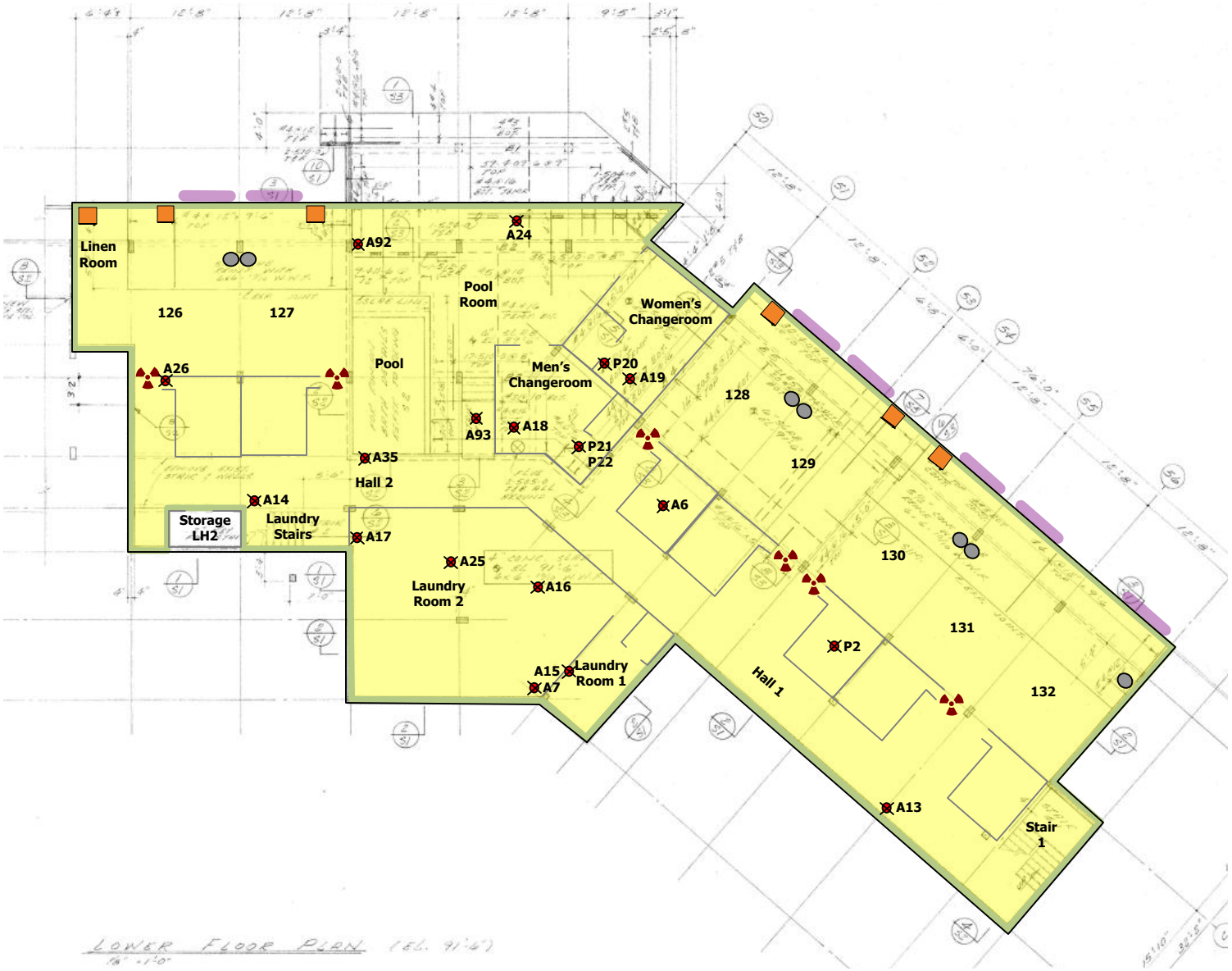
Date: Sep, 1964 | Drawn by: Strong Lamb & Nelson Ltd. | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: Nov 29, 2011 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 1b-4

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (NEW)
Lower Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Sep, 1964
Edited: Nov 29, 2011

Drawn by: Strong Lamb & Nelson Ltd.
Edited by: EH

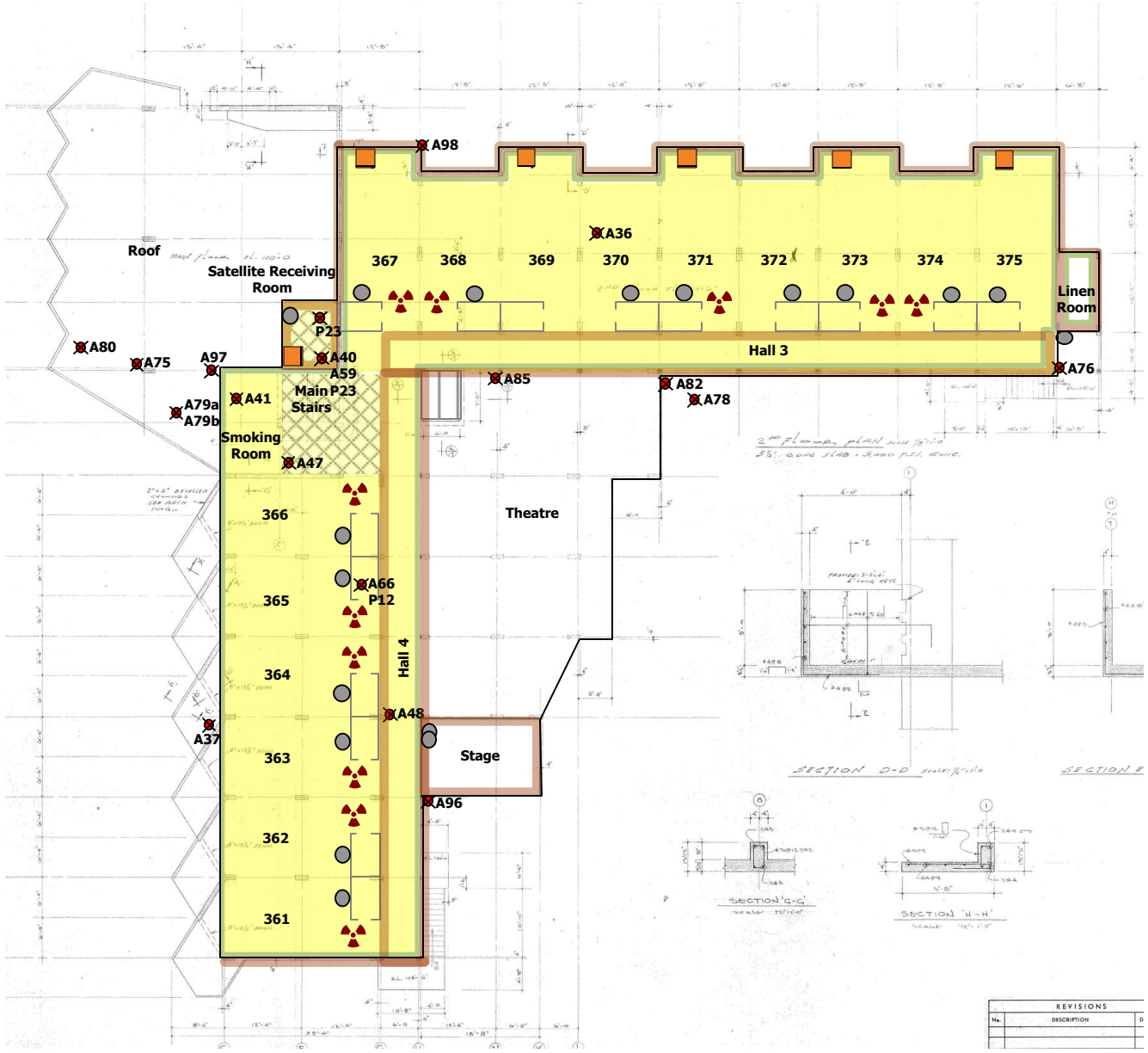
Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-5

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (ORIGINAL)
2nd Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Sep, 1964
Edited: Jan 31, 2012

Drawn by: Strong Lamb & Nelson Ltd.
Edited by: EH

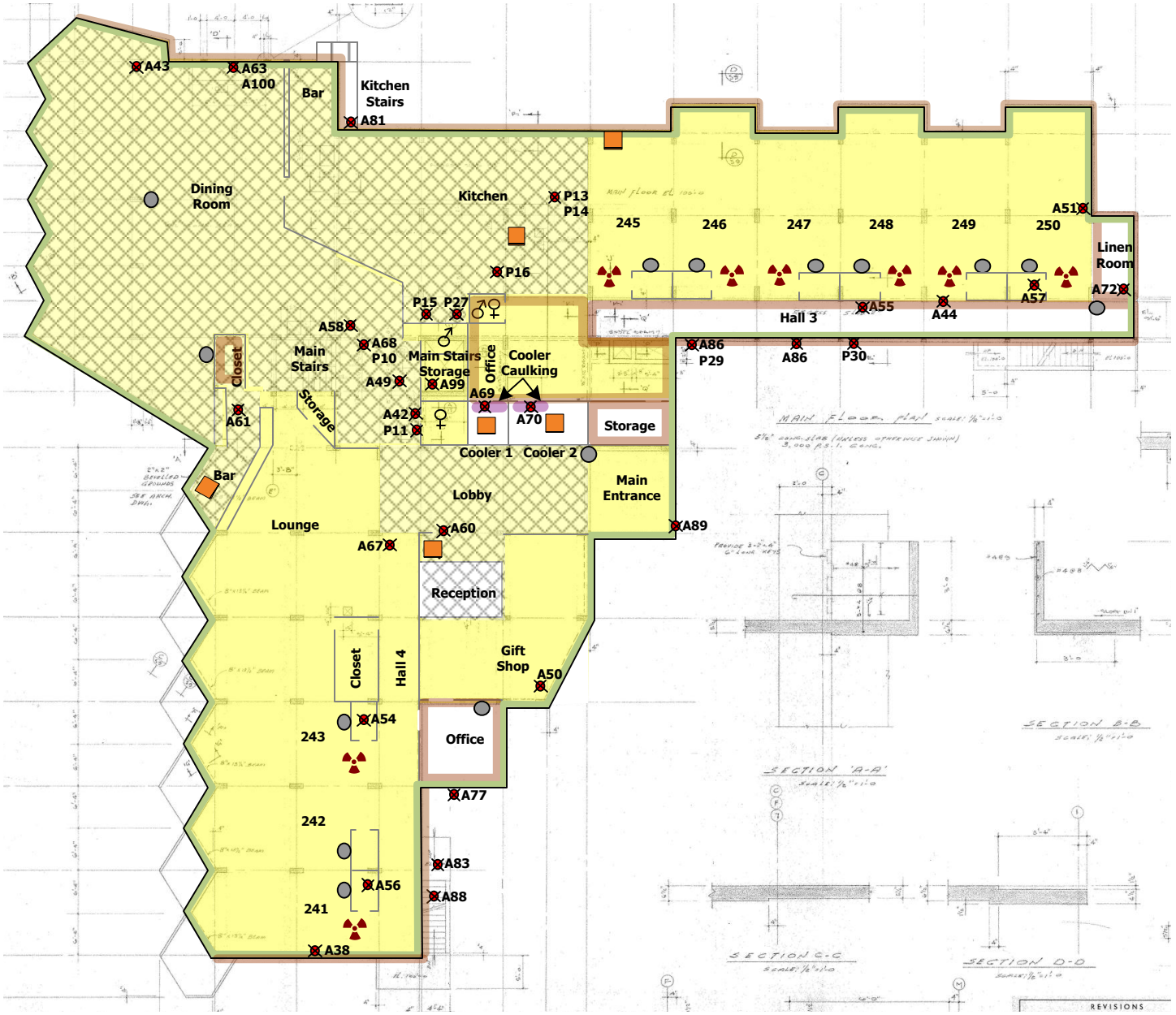
Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-6

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (ORIGINAL)

Main Floor

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Sep, 1964
Edited: Jan 30, 2012

Drawn by: Strong Lamb & Nelson Ltd.
Edited by: EH

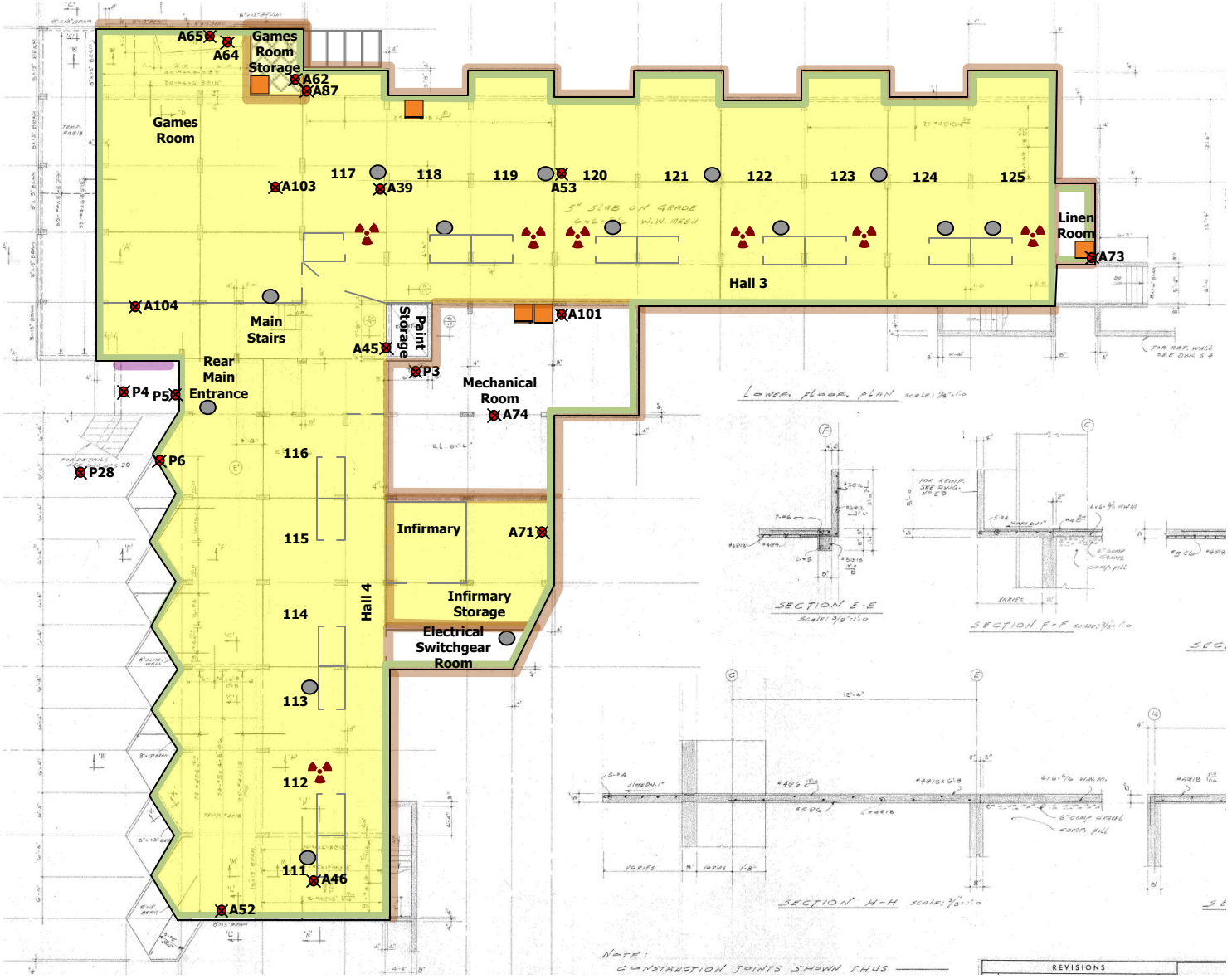
Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-7

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE (ORIGINAL)

Lower Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Sep, 1964

Edited: Jan 30, 2012

Drawn by: Strong Lamb & Nelson Ltd.

Edited by: EH

Project Name: Hazardous Materials Assessment

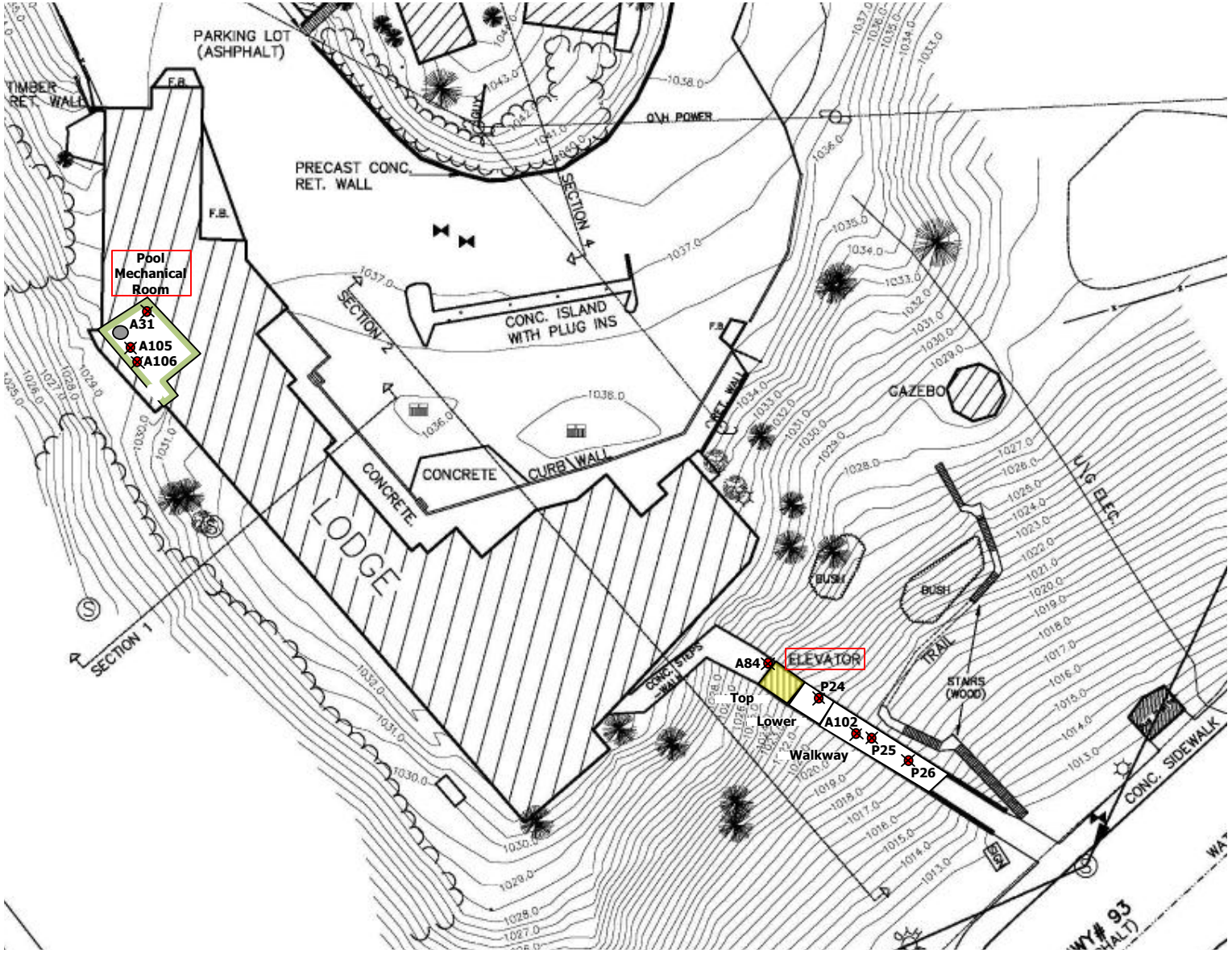
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-8

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: LODGE
Elevator (Original) & Basement (New)

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: June, 2011
Edited: Jan 27, 2012

Drawn by: PWGSC
Edited by: EH

Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 1b-9

Appendix 1c

Photographic Log for the Lodge

Sample A3 : Drywall putty containing asbestos in ceiling space of Main floor Hall 1

Sample A5 : Drywall putty containing asbestos in 2nd floor Room 253

Sample A8 : Ceiling stipple containing asbestos in 2nd floor Room 378

Sample A11 : Ceiling stipple containing asbestos in Main floor Stair 1

Sample A28 : Window caulking containing asbestos on 2nd floor Room 382 exterior balcony door

Sample A105 : Gasket containing asbestos in Basement Pool Mechanical room

Sample A40 : Drywall putty containing asbestos in 2nd floor Satellite Receiving room

Sample A44 : Drywall putty containing asbestos in Main floor Room 249

Sample A58a : Vinyl floor tile containing asbestos in Main floor Dining room

Sample A61a : Vinyl floor tile containing asbestos in Main floor Lounge Bar

Sample A69 : Black caulking containing asbestos in Main floor Cooler 1

Sample A73 : Pipe elbow insulation containing asbestos in Lower floor Linen room

Sample A85 : Vermiculite containing asbestos in 2nd floor Hall 3 wall

Sample A101 : Gasket containing asbestos in Lower floor Mechanical room

Sample A104 : Window caulking containing asbestos on Lower floor Games room

Thermostat containing mercury and smoke detector containing radioactive material in guest room

Air conditioner containing ODS R-22 in guest room

Miscellaneous chemicals in Lower floor Storage LH2

Mould under Lower floor Main Stairs

PHOTOGRAPHIC LOG

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Taken: ER

Date: October 2011

File No. 11192

Buildings: New & Original Lodge
Parameter: Mercury, ODS, RAM, Mould

Appendix
1c-5

Appendix 1d

Laboratory Results for the Lodge

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454450 **Description / Location:** White Joint Compound
Client No.: A1 L-New: 2nd Floor Room 383

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454451 **Description / Location:** White Joint Compound
Client No.: A2 L-New: 2nd Floor Room 377

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454452 **Description / Location:** Off-White Joint Compound
Client No.: A3 L-New: Main Hall 1; In Ceiling Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 4454453 **Description / Location:** Off-White Joint Compound
Client No.: A4 L-New: Main Hall 2; In Ceiling Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.5	Chrysotile	None Detected	None Detected	PC 98.5

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: R. Caran **Approved By:**

Date: 10/19/2011

Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454454 **Description / Location:** Off-White Joint Compound
Client No.: A5 L-New: Main; Room 253 Door Frame

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Lab No.: 4454455 **Description / Location:** White Joint Compound
Client No.: A6 L-New: Lower Room 128 Washroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454456 **Description / Location:** Off-White Joint Compound
Client No.: A7 L-New: Lower

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 4454457 **Description / Location:** White Ceiling Texture
Client No.: A8 L-N: 2nd Floor Room 378

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: R. Caran

Date: 10/19/2011

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454458 **Description / Location:** White Ceiling Textue
Client No.: A9 L-N: 2nd Floor Hall 1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454459 **Description / Location:** White Ceiling Textue
Client No.: A10 L-N Main Ceilng Room 256

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Lab No.: 4454460 **Description / Location:** White Ceiling Textue
Client No.: A11 L-N Main N Stairwell Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454461 **Description / Location:** White Ceiling Textue
Client No.: A12 L-N Main Room 233 Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: R. Caran

Date: 10/19/2011

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454462 **Description / Location:** White Ceiling Textue
Client No.: A13 L-N Hall 1 Main Ceiling Lower

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454463 **Description / Location:** White Ceiling Textue
Client No.: A14 L-N Lower Hall 2 Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454464 **Description / Location:** Brown Window Caulk
Client No.: A29 L-N Main Floor Room 257 Exterior Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454465 **Description / Location:** Grey Pipe Elbow Insulation
Client No.: A30 L-N Main FL B/T Hall 1 2589259

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	30
		40	Fibrous Glass	

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: R. Caran

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454466 **Description / Location:** White Pipe Elbow Insulation
Client No.: A31 L-N Pool Utility Room 4th Level

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	50
		30	Fibrous Glass	

Lab No.: 4454467 **Description / Location:** White Wall Texture
Client No.: A33 L-N 2nd Floor Hall 1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.7	Chrysotile	None Detected	None Detected	PC 98.3

Lab No.: 4454468 **Description / Location:** White Wall Texture
Client No.: A34 L-N Main Room 257

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454469 **Description / Location:** White Wall Texture
Client No.: A35 L-N Lower Hall 2 On Con-Blocks

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454470 **Description / Location:** White Wall Texture
Client No.: A36 L-O Room 370 Door Side Wall 2nd

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	95

Lab No.: 4454471 **Description / Location:** White Wall Texture
Client No.: A37 L-O Room 363 2nd Floor Exterior Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	95

Lab No.: 4454472 **Description / Location:** White Wall Texture
Client No.: A38 L-O Main Room 241 Exterior Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	95

Lab No.: 4454473 **Description / Location:** White Wall Texture
Client No.: A39 L-O Lower Room Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454474 **Description / Location:** Off-White Joint Compound
Client No.: A40 L-O 2nd Floor Room 117

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.5	Chrysotile	None Detected	None Detected	PC 98.5

Lab No.: 4454475 **Description / Location:** White Joint Compound
Client No.: A41 L-O 2nd Floor Smoking Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454476 **Description / Location:** White Joint Compound
Client No.: A42 L-O Main; Main Stairs

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454477 **Description / Location:** Off-White Joint Compound
Client No.: A43 L-O Dining Room NW Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454478 **Description / Location:** Off-White Joint Compound
Client No.: A44 L-O Main Room 249

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Lab No.: 4454479 **Description / Location:** White Joint Compound
Client No.: A45 L-O Lower Main StairwellUnderDisplayCase

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454480 **Description / Location:** Off-White Joint Compound
Client No.: A46 L-O Lower Room 111 Corner Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.5	Chrysotile	None Detected	None Detected	PC 98.5

Lab No.: 4454481 **Description / Location:** White Ceiling Texture
Client No.: A47 L-O 2nd Floor Main Stairs (Newer)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454482 **Description / Location:** White Ceiling Texture
Client No.: A48 L-O 2nd Floor Hallway 4 Outside Room 363

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454483 **Description / Location:** White Ceiling Texture
Client No.: A49 L-O Main; Main Stairs Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454484 **Description / Location:** White Ceiling Texture
Client No.: A50 L-O Main; Gift Shop Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454485 **Description / Location:** White Ceiling Texture
Client No.: A51 L-O Main; Room 250 Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454486 **Description / Location:** White Ceiling Texture
Client No.: A52 L-O Lower Room 111 Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454487 **Description / Location:** White Ceiling Texture
Client No.: A53 L-O Lower Room 120 Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454488 **Description / Location:** White Ceiling Tile
Client No.: A54 L-O Main Room 234 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	3	Cellulose	96
		1	Fibrous Glass	

Lab No.: 4454489 **Description / Location:** White Ceiling Tile
Client No.: A55 L-O Main Hall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	60	Cellulose	10
		30	Fibrous Glass	

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454490 **Description / Location:** White Ceiling Tile
Client No.: A56 L-O Main Room 241 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	3	Cellulose	96
		1	Fibrous Glass	

Lab No.: 4454491 **Description / Location:** White/Lt.Tan Ceiling Tile; 4x2
Client No.: A57 L-O; Main Bathrooms Room 250

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Mineral Wool	20

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Analysis Performed By: M. Mirza

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454492 **Description / Location:** Tan Floor Tile; 9x9
Client No.: A58 L-O; Main; Main Stairs/Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454492 **Description / Location:** Tan Mastic **Layer No.:** 2
Client No.: A58 L-O; Main; Main Stairs/Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454492 **Description / Location:** Black Mastic **Layer No.:** 3
Client No.: A58 L-O; Main; Main Stairs/Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454493 **Description / Location:** Tan Floor Tile; 9x9
Client No.: A59 L-O; 2nd; Sattelite Receiving Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454494 **Description / Location:** Tan Floor Tile; 9x9
Client No.: A60 L-O; Main Reception

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Lab No.: 4454494 **Description / Location:** Tan Mastic **Layer No.:** 2
Client No.: A60 L-O; Main Reception

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454494 **Description / Location:** Black Mastic **Layer No.:** 3
Client No.: A60 L-O; Main Reception

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454495 **Description / Location:** Tan Floor Tile; 9x9
Client No.: A61 L-O; Main Lounge Bar

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4454495 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: A61 L-O; Main Lounge Bar

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454496 **Description / Location:** Tan Floor Tile; 9x9
Client No.: A62 L-O; Lower Games Room Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Lab No.: 4454496 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: A62 L-O; Lower Games Room Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454497 **Description / Location:** Grey Fireplace Mortar
Client No.: A63 L-O; Main Mantle Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454498 **Description / Location:** Grey Fireplace Mortar
Client No.: A64 L-O; Lower Mantle Game's Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454499 **Description / Location:** White/Yellow Fireplace Brick
Client No.: A65 L-O; Lower Game's Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454500 **Description / Location:** Grey Leveling Compound
Client No.: A66 L-O; 2nd Room 365 Washroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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CERTIFICATE OF ANALYSIS

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Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454501 **Description / Location:** White Leveling Compound
Client No.: A67 L-O; Main Lobby

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454501 **Description / Location:** Yellow Mastic **Layer No.:** 2
Client No.: A67 L-O; Main Lobby

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454502 **Description / Location:** Grey Leveling Compound
Client No.: A68 L-O; Main Men's Washroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454503 **Description / Location:** Black Caulk
Client No.: A69 L-O; Kitchen Freezer 1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.8	Chrysotile	None Detected	None Detected	PC 98.2

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Analytical Method: EPA 600/R-93/116

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454504 **Description / Location:** Black Caulk
Client No.: A70 L-O; Kitchen Freezer 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 4454505 **Description / Location:** Green/Brown Fibrous
Client No.: A71 L-O; Lower Infermary Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 4454506 **Description / Location:** White/Tan Pipe Elbow Insulation
Client No.: A72 L-O; Lower Infermary Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	15	Fibrous Glass	75

Lab No.: 4454507 **Description / Location:** Off-White Pipe Elbow Insulation
Client No.: A73 L-O; Linen Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 5.7	Chrysotile	70	Fibrous Glass	PC 24.3

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454508 **Description / Location:** White/Tan Ceiling Tile/Pegboard
Client No.: A74 L-O; Lower Mechanical Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 4454509 **Description / Location:** White Roof Caulk
Client No.: A75 Roof-Around Metal Flashing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454510 **Description / Location:** White Exterior Wall Caulk
Client No.: A76 B/T New/Old Building Outside Room 375

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454511 **Description / Location:** Black Tar Paper
Client No.: A77 L-O Exterior Office

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Cellulose	20

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454512 **Description / Location:** Black Tar
Client No.: A78 L-O Exterior Roof Over Main Entrance

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454513 **Description / Location:** Black Tar
Client No.: A79a L-O Exterior Adjacent Smoking Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454514 **Description / Location:** Black Tar
Client No.: A79b L-O Exterior Adjacent Smoking Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454515 **Description / Location:** White/Black Roof Material
Client No.: A80 L-O Exterior Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Synthetic	85

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454516 **Description / Location:** Black Roof Material
Client No.: A81 L-O Exterior Kitchen Stairs

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Fibrous Glass	80

Lab No.: 4454517 **Description / Location:** White Window Caulk
Client No.: A82 L-O 2nd Exterior Hall 3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454518 **Description / Location:** Grey Window Caulk
Client No.: A83 L-O Exterior Main Hall 4 East Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454519 **Description / Location:** Black Window Caulk
Client No.: A84 L-O Lower Window Beside Door ToElevation

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analytical Method: EPA 600/R-93/116

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454520 **Description / Location:** Dk.Brown Vermiculite Insulation
Client No.: A85 L-O Lower Window Beside Door ToElevation

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.25	Actinolite	None Detected	None Detected	PC 99.75

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).

IATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of the vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004). Please call for more information and pricing.

Lab No.: 4454521 **Description / Location:** Dk.Brown Vermiculite Insulation
Client No.: A86 L-O Main Exterior Hall 3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC Trace	Actinolite	None Detected	None Detected	100

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).

IATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of the vermiculite for possible asbestos.

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Analytical Method: EPA 600/R-93/116

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Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454522 **Description / Location:** Dk.Brown Vermiculite Insulation
Client No.: A87 L-O Lower Room 117 Balcony

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.25	Actinolite	None Detected	None Detected	PC 99.75

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).

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Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004). Please call for more information and pricing.

Lab No.: 4454523 **Description / Location:** Grey Mortar
Client No.: A88 L-O Exterior Hall 4 Adjacent Stairs

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454524 **Description / Location:** Grey Mortar
Client No.: A89 L-O Exterior Main Entrance Stone Work

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454525 **Description / Location:** Gery Cementitious
Client No.: A90 L-N Exterior Stairs Staff

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454526 **Description / Location:** Gery Cementitious; Firestop
Client No.: A91 L-N Hall 7 Ceiling-Pipe Penetration

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454527 **Description / Location:** Off-White Wall Texture
Client No.: A92 Pool Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100

Lab No.: 4454528 **Description / Location:** White Ceiling Texture
Client No.: A93 Pool Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	3	Fibrous Glass	97

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454529 **Description / Location:** Black Tar
Client No.: A94 L-N Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454530 **Description / Location:** Dk.Brown Caulk
Client No.: A95 Roof Vent Pipe

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454531 **Description / Location:** Dk.Brown Tar Paper
Client No.: A96 Roof-Exterior Theater

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 4454532 **Description / Location:** Grey Caulk
Client No.: A97 Roof-Metal Flashing-Over Dining

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454533 **Description / Location:** Black Roof Material
Client No.: A98 Roof Exterior Over Kitchen Stairs

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Fibrous Glass	90

Lab No.: 4454534 **Description / Location:** Off-White Vinyl Sheet Flooring
Client No.: A99 L-O Main; Main Stairs Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	78
		2	Fibrous Glass	

Lab No.: 4454534 **Description / Location:** Yellow/White/Tan Mastic/FloorLeveler **Layer No.:** 2
Client No.: A99 L-O Main; Main Stairs Storage

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454535 **Description / Location:** Grey Brick Mortar
Client No.: A100 L-O Main Fireplace Inside Brick

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454536 **Description / Location:** Black/Brown Gasket Insulation
Client No.: A101 L-O Lower Mech. Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
60	Chrysotile	None Detected	None Detected	40

Lab No.: 4454537 **Description / Location:** Grey Cementitious
Client No.: A102 Bottom Elevator Corridor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454538 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: A103 Games Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	65
		5	Fibrous Glass	

Lab No.: 4454539 **Description / Location:** White Window Putty
Client No.: A104 L-O Lower Games Room Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454540 **Description / Location:** Black Gasket Insualtion
Client No.: A105 L-W; Pool Mech Room-Misc. Pipe (Floor)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
70	Chrysotile	None Detected	None Detected	30

Lab No.: 4454541 **Description / Location:** Black Gasket Insulation
Client No.: A106 L-W; Pool Mech Room-Misc. Pipe 2nd Shelf

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Synthetic	95

Lab No.: 4454542 **Description / Location:** Tan Floor Tile
Client No.: Dup A4

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.75	Chrysotile	None Detected	None Detected	PC 99.25

Lab No.: 4454543 **Description / Location:** White/Tan Fibrous
Client No.: Dup A5

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 6.3	Chrysotile	75	Mineral Wool	PC 18.7

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

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Local: 856-231-9449
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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454544 **Description / Location:** Grey Caulk
Client No.: Dup A6

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454545 **Description / Location:** Grey Cementitious
Client No.: Dup A7

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454546 **Description / Location:** Black Tar Paper
Client No.: Dup A8

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4454547 **Description / Location:** Grey Cementitious
Client No.: Dup A9

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

9000 Commerce Parkway, Ste B
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Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454548 **Description / Location:** White/Grey Floor Tile
Client No.: A15 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC Trace	Chrysotile	None Detected	None Detected	100

Lab No.: 4454548 **Description / Location:** Black/Tan Mastic/Floor Filler **Layer No.:** 2
Client No.: A15 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454549 **Description / Location:** White/Lt.Grey Floor Tile
Client No.: A16 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454549 **Description / Location:** Black/Tan Mastic/Floor Filler **Layer No.:** 2
Client No.: A16 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454550 **Description / Location:** White/Lt.Grey Floor Tile
Client No.: A17 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454550 **Description / Location:** Black/Tan Mastic/Floor Filler **Layer No.:** 2
Client No.: A17 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454551 **Description / Location:** Tan/White Sheetrock
Client No.: A18 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	2	Fibrous Glass	93
		5	Cellulose	

Lab No.: 4454552 **Description / Location:** Tan/White Sheetrock
Client No.: A19 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	2	Fibrous Glass	93
		5	Cellulose	

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

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CERTIFICATE OF ANALYSIS

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PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454553 **Description / Location:** White/Tan Ceiling Tile
Client No.: A20 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	40
		5	Mineral Wool	

Lab No.: 4454554 **Description / Location:** White/Tan Ceiling Tile
Client No.: A21 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	40
		5	Mineral Wool	

Lab No.: 4454555 **Description / Location:** White/Tan Ceiling Tile
Client No.: A22 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	60	Cellulose	30
		10	Mineral Wool	

Lab No.: 4454556 **Description / Location:** White/Tan Ceiling Tile
Client No.: A23 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	30
		20	Mineral Wool	

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454557 **Description / Location:** Grey Cementitious
Client No.: A24 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454558 **Description / Location:** Tan Plaster
Client No.: A25 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454559 **Description / Location:** Grey Cementitious
Client No.: A26 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4454560 **Description / Location:** Tan Plaster
Client No.: A27 Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report No: 254895
Project: Radium Test Springs Lodge
Project No.: 11192 - Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454561
Client No.: A28
Description / Location: Grey Putty
Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.4	Chrysotile	None Detected	None Detected	PC 97.6

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: M. Mirza

Date: 10/20/2011

iATL INTERNATIONAL
Asbestos Testing Laboratories

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Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [■] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[■] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other_____
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

+dup A4-A9

Client #(s): A1 (start) - A106 (end) (no A32) IATL#(s): _____ (start) - _____ (end) Total: 112

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

RECEIVED
OCT 19 2011
IATL - By

Chain of Custody:

Relinquished (Name / Organization):	Emily / Ballast Env.	Date: OCT 19 2011	Time:
Received (Name / IATL):	10/17/11 10/2	Date:	Time:
Sample Login (Name / IATL):		Date:	Time:
Sample Prep (Name / IATL):	10/17/11	Date:	Time:
Analysis(Name(s) / IATL):	MM 10/20/11	Date:	Time:
QA/QC Review (Name / IATL):	10/24/11	Date:	Time:
Archived / Released:	QA/QC InterLAB Use:	Date:	Time:

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IATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions: LS 10/19/11

Matrix:

[ ] Air [ ] Soil [●] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[●] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ● Email

[ ] 10 Day [ ] 5 Day [●] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

+dup A4-A9

Client #(s): A1 (start) - A106 (end) (no A32) IATL#(s): _____ (start) - _____ (end) Total: 112

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

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OCT 25 2011
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Chain of Custody:

Relinquished (Name / Organization): Ernst. / Ballast Env. Date: Oct 25 2011 Time:
Received (Name / IATL): 10/12 Date: Time:
Sample Login (Name / IATL): Date: Time:
Sample Prep (Name / IATL): 10/17/11 Date: Time:
Analysis(Name(s) / IATL): LS 10/19/11 Date: Time:
QA/QC Review (Name / IATL): 10/24/11 Date: Time:
Archived / Released: QA/QC InterLAB Use: Date: Time:

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ASBESTOS TESTING LABORATORIES

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Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [●] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

	See Page 2 for Bulk Asbestos Specific Log	
[ ] PCM : NIOSH 7400	[●] PLM : Bulk Asbestos EPA 600	[ ] TEM : AHERA
[ ] PCM : OSHA	[ ] PLM : Point Counting 198.1	[ ] TEM : NIOSH 7402
[ ] PCM : TWA	[ ] PLM : NOB via 198.1 (PLM only)	[ ] TEM : Dust / Wipe
	[ ] If <1% by PLM, to TEM via 198.4 [2]	[ ] TEM : Dust / Microvac
[ ] AAS : Lead in Air	[ ] PLM : See page 2 for instructions	[ ] TEM : NOB 198.4
[ ] AAS : Lead in Water	See Page 4 for Mold Specific Log	[ ] TEM : Bulk Analysis
[ ] AAS : Lead in Paint	[ ] IAQ: I Bioaersol Fungal Spore Trap [3]	[ ] TEM : Potable Water
[ ] AAS : Lead Dust/Wipe [1]	[ ] IAQ: II Bioaersol Fungal Spore Trap [4]	[ ] TEM : Non-Potable Water
[ ] AAS : Lead in Soil	[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]	[ ] TEM : Other
[ ] AAS : TCLP	[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]	[ ] Total Dust : NIOSH 0500
[ ] AAS : Metals (Cd, Zn, Cr)	[ ] IAQ: Other Culturable ID [2]	[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ ☐ Verbals ☐ FAX ● Email
date / time

[ ] 10 Day [ ] 5 Day [●] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

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Sample Numbers:

+dup A4-A9

Client #(s): A1 (start) - A106 (end) (no A32) IATL#(s): _____ (start) - _____ (end) Total: 112

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

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OCT 25 2011
IATL - By

Chain of Custody:

Relinquished (Name / Organization): Ernst. / Ballast Env.	Date: 10/21/11	Time: 10/2
Received (Name / IATL):	Date:	Time:
Sample Login (Name / IATL):	Date:	Time:
Sample Prep (Name / IATL):	Date:	Time:
Analysis(Name(s) / IATL): mm 10/24/11	Date:	Time:
QA/QC Review (Name / IATL): dlc 10/24/11	Date:	Time:
Archived / Released: QA/QC InterLAB Use:	Date:	Time:

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www.iatl.com

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [■] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[■] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ (date / time) ❑ Verbals ❑ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

+dup A4-A9

Client #(s): A1 (start) - A106 (end) (no A32) IATL#(s): _____ (start) - _____ (end) Total: 112

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

RECEIVED
OCT 25 2011
IATL - By

Chain of Custody:

Relinquished (Name / Organization): Erin H. / Ballast Env. Date: [illegible] Time:
Received (Name / IATL): [illegible] 10/2 Date: Time:
Sample Login (Name / IATL): Date: Time:
Sample Prep (Name / IATL): [illegible] Date: Time:
Analysis(Name(s) / IATL): Date: Time:
QA/QC Review (Name / IATL): [illegible] 10/24/11 Date: Time:
Archived / Released: QA/QC InterLAB Use: Date: Time:

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Springs Lodge Date: Oct 11, 2011

Client: PCGSC Job No.: 11192L

Date Results Required: No. Samples: Page 1 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A1	white	drywall putty	L-new: 2nd FL Rm 383	good 4454450	all walls some ceilings	112-0526
A2	"	drywall putty	L-new: 2nd FL Rm: 377	good. 4454451	"	0527
A3	"	drywall putty	L-new: Main; Hall 1; in ceiling space	good - 4454452	"	0544
A4	"	drywall putty	L-new: Main; Hall 2-ceiling space	good 4454453	"	0547
A5	"	drywall putty	L-new: Main; Rm 253 door frame	good 4454454	"	0548
A6	"	drywall putty	L-new: Lower; Rm 128 washroom	good 4454455	"	0559 ~~0549~~
A7	"	drywall putty	L-new: Lower;	good 4454456	"	0600
A8	"	ceiling stipple	L-N: 2nd FL Rm 378	good 4454457	all ceilings	0528
A9	"	"	L-N: 2nd FL Hall 1	good. 4454458	"	0529
A10	"	"	L-N: Main Ceiling Rm 256	good 4454459	"	0549
A11	"	"	L-N: main - N stairwell ceiling	good 4454460	"	0554
A12	"	"	L-N: Main Rm 233 ceiling	" 4454461	"	0555
A13	"	"	L-N: Main 1 Main ceiling lower	good 4454462	"	0661
A14	"	"	L-N: Lower, Hall 2 ceiling	good 4454463	"	0662

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 3 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A29	gray	window caulking	L-N; Main FL Rm 257 exterior door	fair 4454464	all windows	0556
A30	gray	pipe elbow insulation	L-N; ~~2nd~~ Main FL Hall 1 b/f 258 & 259	fair exposed 4454465	all T's to suite bathrooms.	0552
A31	gray	pipe elbow insulation	L-N; pool utility room 4th level	fair exposed 4454466	in room ≈14 elbows.	0725
~~A32~~	~~black~~	~~roof tar~~	~~L-N; See 494~~	~~fair~~	~~roof all~~	
A33	white	wall texture	L-N; 2nd FL Hall 1	good 4454467	ALL	0530
A34	"	"	L-N; ~~Main FL~~ Main Rm 257.	" 4454468	"	0557.
A35	"	"	L-N; Lower Hall 2 on con. blocks	" 4454469	"	0576
A36	"	"	L-O; Rm 370 ~~Upper FL~~ 2nd down side wall	" 4454470	"	0580
A37	"	"	L-O; Rm 363 ~~Upper~~ 2nd FL. inside exterior wall	" 4454471	"	0581
A38	"	"	L-O; Main; Rm 241 exterior wall	" 4454472	"	0640
A39	"	"	L-O; Lower Rm wall	" 4454473	"	0686
A40	white	drywall putty	L-O; 2nd FL Sattlite Room 117	good 4454474	all drywall	0586
A41	"	"	L-O; 2nd FL Smoking room	" 4454475	"	0588
A42	"	"	L-O; Main; Main stairs	" 4454476	"	0638

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 4 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A43	white	drywall putty	L-0; Dinning room, NW wall.	good 4454477	all drywall	0639
A44	"	"	L-0; Main. Rm. 249	" 4454478	"	0669
A45	"	"	L-0; Lower Main stairwell under display case	" 4454479	"	0687
A46	"	"	L-0; Lower, room 111 corner wall	" 4454480	"	0694
A47	white	ceiling stipple (never)	L-0; 2nd FL. Main stairs (never)	fair 4454481	all never. ceiling stipple	0629
A48	"	" (old)	L-0; 2nd Fl. hallway #4 outside rm 363	fair 4454482	"	0628
A49	"	" (never)	L-0; Main Main stairs ceiling	" 4454483	"	0641
A50	"	" (never)	L-0; Main gift shop ceiling	" 4454484	"	0642
A51	"	" (old)	L-0; Main Rm 250 ceiling.	" 4454485	"	0668
A52	"	" (old)	L-0; Lower Rm 111 ceiling	" 4454486	"	0698
A53	"	" (old)	L-0; Lower Rm 120 ceiling	" 4454487	"	0698
A54	white	ceiling tile - textured	L-0; Main: Rm 234 bathroom	good 4454488	3 bathrooms	0647
A55	"	ceiling tile - spackle	L-0; Main Hall 3 ceiling tile	good 4454489	all	0665
A56	white	ceiling tile - textured	L-0; Main Rm 241 bathroom	good 4454490	3 bathrooms	0646

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 5 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A57	white	Ceiling tile - texture ~~Spackle~~	L-O; Main - Bathrooms RM 250 ~~4x4~~ 4x2	good 4454491	all bathroom	0665
A58	tan	9x9 floor tile	L-O; Main; Main Stairs/dining room	fair - covered 4454492	all	0649
A59	"	"	L-O; 2nd; Satellite receiving Room	poor 4454493	"	0634
A60	"	"	L-O; Main; Reception	poor 4454494	"	0650
A61	"	"	L-O; Main; Lounge Bar	poor 4454495	"	0651
A62	"	"	L-O; Lower; games room storage	poor 4454496	"	0701
A63	gray	mortar - fireplace	L-O; Main; Mantle Dinning Room	good 4454497	2 fire places	0653
64 ~~A65~~	"	"	L-O; lower, Mantle games room	good 4454498	"	0702
65 ~~A66~~		fire brick - fireplace	L-O; lower games room	good 4454499	"	0702
A66	gray	floor levelling compound	L-O; ~~Main~~; 2nd ~~Hall 3~~ RM 365 washroom	good 4454500	all	0635
A67	"	"	L-O; Main; Lobby	fair 4454501	"	0658
A68	"	"	L-O; Main; Mens washroom	fair 4454502	"	0657
A69	black	caulking	L-O; Kitchen; freezer 1	good 4454503	≈ 1m	0656
A70	"	"	L-O; Kitchen, freezer 2	good 4454504	≈ 1m	0655

mm 10/20/11

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 6 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A71	green	chalk board	L-0; lower, Infermary storage	good 4454505	1: 1m x 1/2m	0707
A72	gray	pipe elbow insulation	L-0; lower, infermary storage	fair-exposed 4454506	1 elbow in this room	0667
A73	"	"	L-0; linen room	good-exposed 4454507	5 in room-all over building	0693
A74	brown	peg board	L-0; lower; mechanical room	good 4454508	3 boards total= 4x8'	0709
A75	white	roof caulking	Roof - around metal flashing	poor 4454509	all metal flashing	0631
A76	white	exterior wall caulking	bet new/old building outside rm 375	poor 4454510	all joint	0659
A77	black	tar paper	L-0; exterior office	good 4454511	all	0660
A78	black	roof tar	L-0; exterior roof over main entrance	fair 4454512	all	0582
A79 a b	"	"	L-0; exterior adjacent smoking room	fair 4454513 4454514	all	0589
A80	black	asphalt sheeting	L-0; exterior dining room	good 4454515	above dining room	0592
A81	black	"	L-0; exterior kitchen stairs	good 4454516	above stairs	✓
A82	gray	window caulking	L-0; 2nd exterior ~~Theatre Room 3rd Hall3~~	poor 4454517	all windows	0587 4
A83	white	"	L-0; exterior, main Hall 4; east window	poor 4454518	"	0661
A84	black	"	L-0; ~~rear~~ lower. window beside door to elevator.	fair 4454519	"	0703

- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

cs 10/91

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 7 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A85	brown	vermiculite	L-O; 2nd Theature / Hall 3 wall	good - 4454520	all cinderblock	0585
A86	"	"	L-O, Main exterior Hall 3	good 4454521	all cinderblock	0734
A87.	"	"	L-O, lower Room 117 balcony	good 4454522	all cinderblock	0736
A88	gray	mortar	L-O; exterior Hall 4 - adjacent stairs	fair 4454523	all block ~~stones~~ joints.	0662
A89	gray	"	L-O; exterior main entrance stone work.	fair 4454524	all stones	0663
A90	gray	skim coat	L-N; exterior stairs. - Steff.	poor 4454525	new - stairs exterior.	0543
A91	gray	cement firestop	L-N; Hall 7 ceiling → pipe penetration	good 4454526	all	0558
A92	white	wall & ~~ceiling~~ texture	pool room walls ~~+ ceiling~~	good 4454527 covered wall behind wood.	pool room ~~ceiling~~	0564
A93	gray	ceiling texture	pool room ceiling	good - 4454528 covered ceiling pannels	pool room ceiling	0563
A94	black	roof tar	L-N roof	Fair 44545.9	all	0610
A95	brown	caulking	Roof ~~around all metal penetration~~ vent pipe	Fair 44545.0	all penetrations	0612
A96	black	tar paper	roof - exterior theature	good 4454531	under metal siding	0621
A97	gray	caulking	roof - metal flashing - over dining	poor 44545.2	≈ 6m² all over roof	0632
A98	black	tar paper	roof exterior over kitchen stairs	good 4454533	under wood siding	0637

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 111921

Date Results Required: No. Samples: Page 9 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A99	white squares	Sheet lino	L-0 - Main main stairs storage	poor 4454534	room	0648
A100	gray	brick mortar	L-0, Main, Fireplace inside brick	good 4454535	2 fireplaces	0652
A101	black	gasket	L-0, Lower mech. room	fair 4454536	3 same many in room	0710
A102	gray	cement skim coat	Bottom elevator corridor	poor 4454537	12 ft x 2 1/2 m.	0678
A103	greenish white	limestone sheet lino.	games room	poor 4454538	9x4 m. 8x1 1/2 m	0704.
A104	white	window caulking	L-0, lower games room window	poor 4454539	all older windows	0706
A105	black	gasket	L-0, Pool mech. room - misc pipe (floor)	poor 4454540	1	0732
A106	black	gasket	L-0 " mix pipe 2nd shelf.	fair 4454541	1	0733

MM 10/20/11

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11-12, 2011

Client: PWGSC Job No.: 11192L.

Date Results Required: No. Samples: Page 8 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A4 Dup ~~A3~~				4454542		
A5 Dup ~~A2~~				4454543		
A6 Dup ~~A~~				4454544		
Dup A7				4454545		
Dup A8				4454546		
Dup A9				4454547		
Additional Samples Received Labeled						
A15	4454548					
16	4454549					
17	4454550					
18	4454551					
19	4454552					
20	4454553					
21	4454554					
22	4454555					
23	4454556					
24	4454557					
25	4454558					
26	4454559					
27	4454560					
28	4454561					

MM 10/20/11

BALLAST
- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 7 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A85	brown	vermiculite	L-O; 2nd Theature / Hall 3 wall	good - 4454520	all cinderblock	0585
A86	"	"	L-O, Main exterior Hall 3	good 4454521	all cinderblock	0734
A87.	"	"	L-O, lower Room 117 balcony	good 4454522	all cinder block	736
A88	gray	mortar	L-O; exterior Hall 4 - adjacent stairs	fair 4454523	all block ~~stones~~ joints.	0662
A89	gray	"	L-O; exterior main entrance stone work	fair 4454524	all stones	0663
A90	gray	skim coat	L-N; exterior stairs - steeff.	poor 4454525	new - stairs exterior.	0543
A91	gray	cement firestop	L-N; Hall 7 ceiling → pipe penetration	good 4454526	all	0558
A92	white	wall & ~~ceiling~~ texture	pool room walls ~~+ ceiling~~	good 4454527 covered	pool room ~~ceiling~~ wall behind wood.	0564
A93	gray	ceiling texture	pool room ceiling	good - covered 4454528 ceiling panneis	pool room ceiling	0563
A94	black	roof tar	L-N roof	fair 44545.9	all	0610
A95	brown	caulking	Roof ~~around all metal penetrations~~ vent pipe	fair 44545.0	all penetrations	0612
A96	black	tar paper	roof - exterior theature	good 4454531	under metal siding	0621
A97	gray	caulking	roof - metal flashing - over dining	poor 44545.2	≈ 6m² all over roof	0632
A98	black	tar paper	roof exterior over kitchen stairs	good 4454533	under wood siding	0637

- Providing a Balance -

(A)

BULK MATERIAL SAMPLING LOG

CS 10/19/11

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PLGSC Job No.: 11192L

Date Results Required: No. Samples: Page 6 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A 71	green	chalk board	L-O; lower, Infermary storage	good 4454505	1: 1m x 1/2m	0707
A 72	gray	pipe elbow insulation	L-O; lower, infermary storage	fair - exposed 4454506	1 elbow in this room	0667
A 73	"	"	L-O; linen room	good - exposed 4454507	5 in room - all-over building	0693
A 74	brown	peg board	L-O; lower; mechanical room	good 4454508	3 boards total = 4x8'	0709
A 75	white	roof caulking	Roof - around metal flashing	poor 4454509	all metal flashing	0631
A 76	white	exterior wall caulking	bt new/old building outside rm 375	poor 4454510	all joint	0659
A 77	black	tar paper	L-O; exterior office	good. 4454511	all	0660
A 78	black	roof tar	L-O; exterior roof over main entrance	fair 4454512	all	0582
A 79 a b	"	"	L-O; exterior adjacent smoking room	fair 4454513 4454514	all	0589
A 80	black	asphalt sheeting	L-O; exterior dining room	good 4454515	above dining room	0592
A 81	black	"	L-O; exterior kitchen stairs	good 4454516	above stairs	✓
A 82	gray	window caulking	L-O; 2nd exterior ~~Theatre Room~~ ~~3rd Hall 3~~	poor 4454517	all windows	0583 4
A 83	white	"	L-O; exterior, main Hall 4; east window	poor 4454518	"	0661
A 84	black	"	L-O; ~~rear~~ lower. window beside door to elevator.	fair 4454519	"	0703

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 11/2/2011
Report No: 255979
Project: Radium Lodge-Lodge
Project No.: 11192-Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4466895 **Description / Location:** Grey Plaster
Client No.: A107 (N) Laundry Room Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4466896 **Description / Location:** Off-White Insulation
Client No.: A108 (O) Electrical Room; On Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Mineral Wool	2

Lab No.: 4466897 **Description / Location:** Off-White Wall Texture
Client No.: A109 (N) Hall 1 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	2	Cellulose	98

Lab No.: 4466898 **Description / Location:** Off-White Wall Texture
Client No.: A110 (N) Hall 1 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	1	Cellulose	99

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: J. Haremza **Approved By:**

Date: 11/2/2011

Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client:	Ballast Enviro. Conslt'g Ltd.	**Report Date:**	11/2/2011
	PO Box87073 RPO DouglasSq.	**Report No:**	255979
	Calgary AB T2Z 3V7	**Project:**	Radium Lodge-Lodge
		Project No.:	11192-Lodge

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4466899 **Description / Location:** Off-White Wall Texture
Client No.: A111 (N) Hall 1 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	1	Cellulose	99

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: J. Haremza

Date: 11/2/2011

iATL INTERNATIONAL
Asbestos Testing Laboratories

9000 Commerce Parkway
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Toll Free: 877 428-4285
info@iatl.com
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Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [x] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[x] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions
See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time [ ] Verbals [ ] FAX [x] Email

[ ] 10 Day [ ] 5 Day [x] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A107 (start) - A111 (end) IATL#(s): _____ (start) - _____ (end) Total: 5

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): Erin H. / Ballast Env. Date: 27 OCT / 2011 Time: 10am
Received (Name / IATL): Date: Time:
Sample Login (Name / IATL): Date: Time:
Sample Prep (Name / IATL): Date: Time:
Analysis(Name(s) / IATL): Date: Time:
QA/QC Review (Name / IATL): Date: Time:
Archived / Released: QA/QC InterLAB Use: Date: Time:

RECEIVED
OCT 28 2011
IATL - By

- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge - Lodge Date: Oct 26/11

Client: PCGISC Job No.: 11192

Date Results Required: No. Samples: 5 Page 1 of 1

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A107	white	ceiling texture	(N) Laundry Room ceiling 4466895	good	laundry room ceiling	112-0785
A108	white	insulation	(O) electrical room 4466896	good (insulating sheet) on floor	0.3m x 0.3m	112-0786
A109	white	wall texture	(n) Hall 1 2nd FL 4466897	good	all	112-0787
A110	"	wall texture	(N) Hall 1 2nd FL 4466898	"	"	112- "
A 112	"	"	(N) Hall 1 2nd FL 4466899	"	"	112- "

Step-out Samples of A

9000 Commerce Parkway, Suite B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report Number: 254900
Project: HazardousMat'ls.Assessment
Project No.: 11192 - Lodge

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4454397	P1	White/Yellow Paint L-N; 2nd FL, Rm 380	0.022***
4454398	P2	White Paint L-N; Main Rm 130 Bathroom Ceiling	0.0063***
4454399	P3	Grey Interior Paint L-N; Lower Mech. Rm	0.13
4454400	P4	Grey Exterior Paint L-O; Lower Walkway To Elevator	<0.0077
4454401	P5	Yellow Exterior Paint L-O; Lower Main Stairwell, Exterior Door	0.31
4454402	P6	Lt. Yellow Exterior Paint L-O; Lower Main Stairwell, Exterior Door	0.033
4454403	P7	White Ceramic Tile Paint; 8x8 L-N; 2nd FL, Rm 380 Bathroom	0.062***
4454404	P8	White Ceramic Tile Paint; 8x8 L-N; 2nd FL, Rm 380 Bathroom	0.0064***
4454405	P9	White Shower Ceramic Tile Paint L-N; 2nd FL, Rm 380 Bathroom	0.02***
4454406	P10	Grey Ceramic Tile Paint L-O; Main, Men's Washroom	<0.0051***

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/15/2011
Date Analyzed: 10/20/2011
Analyst: C. Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway, Suite B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report Number: 254900
Project: HazardousMat'ls.Assessment
Project No.: 11192 - Lodge

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4454407	P11	Pink Mosaic Ceramic Tile Paint L-O; Main, Ladies Washroom	<0.0059***
4454408	P12	Brown Mosaic Ceramic Tile Paint L-O: 2nd FL, Rm 365 Washroom Floor	<0.0057***
4454409	P13	Orange/Brown Ceramic Tile Paint L-O: 2nd FL, Main, Kitchen Floor	<0.0031***
4454410	P14	Orange/Brown W/Flecks Ceramic Tile Paint L-O; Main, Kitchen Floor	<0.0061***
4454411	P15	White/Yellow W/Flecks Ceramic Tile Paint L-O; Main, Kitchen Wall	<0.0056***
4454412	P16	White Paint L-O; Main, Kitchen Wall&Ceiling	0.017
4454413	P17	Yellow/Green Exterior Paint L-N; Wood Trim	0.013
4454414	P18	Grey Exterior Steps Paint L-N; Concrete	<0.0070
4454415	P19	White Exterior Paint L-N; Exteror Wall At Shaft Accom.	0.017***
4454416	P20	White Interior Paint L-N; Pool Rm	<0.0086

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

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EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/15/2011

Date Analyzed: 10/20/2011

Analyst: C. Shaffer

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Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report Number: 254900
Project: HazardousMat'ls.Assessment
Project No.: 11192 - Lodge

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4454417	P21	Yellow Ceramic Tile Paint; 3x3 L-N; Pool Change Rm Showers	<0.0038***
4454418	P22	Yellow Ceramic Tile Paint; 2x2 L-N; Pool Change Rm Showers	<0.0034***
4454419	P23	Tan Wall Paint Satellite Rm	0.0067
4454420	P24	Tan Exterior/Interior Wall Paint Bottom Elevator Corridor	<0.0045
4454421	P25	White/White-Yellowish Ext. Wall Paint Bottom Elevator Corridor	<0.0092
4454422	P26	Grey/Grey Exterior Floor Paint Bottom Elevator Corridor	<0.0069***
4454423	P27	Yellow W/White Flecks Ceramic Tile Paint L-O; Main, Kitchen Wall	0.022***
4454424	P28	Red Exterior Paint Stairs To Elevator	<0.0080
4454425	P29	Yellow Exterior Paint Exterior Hall 3	<0.0075
4454426	P30	White Exterior Paint Exterior Front Of Old Wing	0.0073***

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

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EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

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Date Received: 10/15/2011

Date Analyzed: 10/20/2011

Analyst: C. Shaffer

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Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report Number: 254900
Project: HazardousMat'ls.Assessment
Project No.: 11192 - Lodge

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4454427	Dup P4	Lead Paint	5.8
4454428	Dup P5	Lead Paint	<0.0049
4454429	Dup P6	Lead Paint	0.0044***

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analystical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/15/2011

Date Analyzed: 10/20/2011

Analyst: C. Shaffer

E-MAILED
10.20.11

Chain of Custody

IATL INTERNATIONAL
Asbestos Testing Laboratories

9000 Commerce Parkway
Suite B
Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Lodge

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [ ] Bulk [ ] Other
[ ] Water [■] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[■] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[ ] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ● Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

+ dup P4-P6

Client #(s): P1 (start) - P30 (end) IATL#(s): _____ (start) - _____ (end) Total: 33

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): Emma / Ballast	Date: 13 OCT 2011	Time:
Received (Name / IATL):	Date:	Time:
Sample Login (Name / IATL):	Date: OCT 15 2011	Time:
Sample Prep (Name / IATL):	Date:	Time:
Analysis(Name(s) / IATL):	Date:	Time:
QA/QC Review (Name / IATL): 10/24/11	Date:	Time:
Archived / Released: QA/QC InterLAB Use:	Date:	Time:

RECEIVED
IATL - By

BALLAST
- Providing a Balance -

(L)

BULK MATERIAL SAMPLING LOG

Worksite: Radium lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 1 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	white/ yellow	paint	L-N, 2nd FL Rm 380	good 4454397	all	112-0533
P2	white	~~exterior~~ paint	L-N, ~~Lower~~ Main Rm ~~258~~ 130 bathroom ceilings	poor 4454398	all	0579
P3	gray	~~exterior~~ interior	L-O; Lower mech. room	fair 4454399	all.	0712
P4	gray	exterior	L-O, lower; walkway to elevator	poor 4454400	all ext. concrete	0713
P5	~~light~~ yellow	"	L-O; lower Main stairwell exterior door	4454401		0714
P6	light yellow	"		4454402		0715
P7	white 8x8	ceramic tile	L-N; 2nd FL Rm 380 bathroom	good 4454403	all exc. one	112-0534
P8	white	"	L-N, 2nd FL Rm 383 bathroom	" 4454404	all	0535
P9	white flower	"	"	" 4454405	all	0535
P10	gray	"	L-O; Main Mens washroom	good covered 4454406		0681
P11	pink mosaic	"	L-O; Main Ladies washroom	good covered 4454407		0682
P12	brown mosaic	"	~~L-O~~, 2nd Rm 365 washroom floor	poor 4454408	all	0635
P13	orange brown	"	L-O; Main Kitchen floor	fair 4454409	kitchen area (1/2)	0683
P14	o/b w/ flecs	"	L-O; Main Kitchen floor	fair 4454410	"	0683

(L)

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: PWGSC Job No.: 11192L

Date Results Required: No. Samples: Page 2 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P 15	white w/ yellow flecs	ceramic tile	L-O; Main; Kitchen wall	good 4454411	~~taken~~ 1m x 8' high	0684
P 16	white	paint	L-O; Main; Kitchen wall + ceiling	fair 4454412	Kitchen only	0685 ~~0684~~
P 17	yellow/ green	exterior paint	wood trim L-N	poor 4454413	all wood trim	0537
P 18	gray	exterior steps	steps & L-N concrete	poor 4454414	all stairs	0536
P19	white	exterior paint	L-N exterior wall at staff accom.	poor 4454415	all	0538
P20	white	paint interior	L-N - Pool room	good 4454416	pool & change rooms	0578
P21	yellow	ceramic tile 3x3	L-N - Pool change room showers	good 4454417	1m x 0.5m	0577
P22	"	" 2x2	L-N "	good 4454418	3 x 3m ≈	0577
P23	tan	wall paint	settlite room	good 4454419	wallpaper room (original colour?)	0636
P24	tan	wall exter/ inter.	bottom elevator corridor.	good 4454420	8 x 2½ room walls	0672
P25	white/ white-yellowish	wall exterior	"	poor 4454421	all	0674
P26	gray/ grey	Floor exterior	"	poor 4454422	all floor	0674
P27	yellow w/ white flecs	ceramic tile	L-O; main Kitchen wall	good 4454423	1x2m	0684
P28	red	exterior paint	stairs to elevator	poor 4454424	stairs to elevator	0716

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 12, 2011

Client: PLOGSC Job No.: 11192L.

Date Results Required: No. Samples: Page__of__

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P29	yellow	paint exterior.	exterior Hall 3	poor 4454425	all wood trim/ door	0712
P30	white	paint exterior	exterior front of old wing	poor 4454426	all exterior concrete + underblocking some trim	

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 11, 2011

Client: AOGSC Job No.: 11192L

Date Results Required: No. Samples: Page__of__

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
Dup P4				4454427		
Dup P5				4454428		
Dup P6				4454429		

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

BATCH / SAMPLE MANAGEMENT REPORT

Customer No.: BAL082

Customer: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Customer Rep: RS

Batch Number: **254900**

Project: **Haz Mat Assesment**

Project Number: **11192 - Lodge**

TAT: **3 Day**

Date/Time Rec'd: **10/15/2011**

# of Samples: **33** **Analysis:** **Lead Paint** **Time/Date Due:** **10/20/2011**

Initials Signaling Acknowledgement ☐ RTP: _____ ☐ To PLM NOB _____ ☐ To TEM NOB _____

Special Instructions:

Admin Notes: Portal

Shipping Error:

_____ Samples were not received in a sealed container. Bulk samples not double bagged.
_____ Air Cassettes received open in bag… sample integrity compromised, possible contamination.
_____ Samples received wet.
_____ Samples received covered with dust… possible cross contamination.
_____ Sample containers damaged, contents spilled… possible cross contamination.
_____ Paperwork received in the same bag as samples possible contamination.
_____ No / Incomplete Chain of Custody Received.
_____ No / Incomplete Sample Log Received.
_____ Sample container IDs do not match the client's sample log.
_____ No Turnaround Time indicated.
_____ PCM Re-prep for TEM NIOSH 7402. Cassettes previously opened and portion of filter removed.
_____ Blank(s) not submitted as required by the requested analytical method.
_____ Minimum shipping requirements not attained. See attached Carrier Air Bill.
_____ Other: _____

Batch Error:

_____ Wrong Client ID Listed:
_____ Wrong Client Location Listed:
_____ Wrong Project ID Listed:
_____ Wrong TurnAround Time Listed:
_____ Wrong Due Date Listed:
_____ Wrong Date/Time Received Listed:
_____ Wrong Analysis Method Listed:
_____ Wrong Number of Samples Listed:

Login Error:

_____ Sample Log Stamped Incorrectly:
_____ Sample Containers Mislabelled:
_____ Duplicate / Extra Samples Not Stamped:
_____ Analyst Bench Sheet Error:

Copy: FE, JN, RS, SC

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway, Suite B, Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818
INFO@IATL.COM

DAILY QUALITY CONTROL DATA

LEAD SAMPLE ANALYSIS

(DATE: 10 / 20 / 11)

Standard	Total Lead (mg)	Percent Recovery **
Reagent Blank	0.000	< LOQ
Blank Spike	0.500	104
Lab control Std # 401	0.424	108
Matrix Spike - LBP *	1.00	104
Matrix Spike - Wipe *	0.94	110
Matrix Spike - Soil *	0.537	105
Matrix spike - Air *	0.050	100
2.5 ppm Standard	0.25	103
10.0 ppm Standard	1.0	104
40.0 ppm Standard	4.0	97

AIHA LAP-LLC No. 100188 **NYS-DOH** ELAP No. 11021

Analysis Method: ASTM D3335-85A
NIOSH 7082
EPA SW846 3050B 7000B

Comments: IATL assumes that all sampling complies with accepted methods.
All client supplied sampling data is assumed to be correct when calculating results.
Detection limit based upon 0.2 mg/L reporting limit and sample size.
* NIST Traceable.
** 80-120% acceptable limits.

Analyzed By: R. Chad Shaffer

Date: 10/20/11

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

AAS.DailyQC.001

Appendix 2a

Detailed Room Descriptions for Cabin #3

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #3	-	-	exterior	asphalt shingles	wood siding with insulation paper	wood deck and stairs	steel eaves	white and green over green	white over red; yellow over white trim	gray	-	green shingle	A1	exterior roof	-	-	-	positive (tar)
												black tar paper	A2	north side; under wood siding	-	-	-	negative
												gray cardboard insulation	A3	north side; under wood siding	-	-	-	negative
												yellow glazing	A4	north side; front window	-	-	-	negative
												yellow glazing	A5	south side; rear window	-	-	-	negative
												-	-	-	white over red	P1	rear exterior wall	negative
												-	-	-	yellow over white	P2	front exterior trim	negative
												-	-	-	gray	P5	north stairs	negative
Cabin #3	-	Crawlspace	crawlspace	wool insulation	wood	dirt floor	pipes; fiberglass insulation	bare	bare	-	-	-	-	-	-	-	-	-
Cabin #3	-	Entry 1	entry	tile	wood panel over wool insulation	linoleum	no closet	white	brown stain	beige squares	1 x 1	white ceiling tile	A13	entry ceiling	-	-	-	negative
Cabin #3	-	Kitchen/ Dining	kitchen/ dining room	tile; drywall	drywall	linoleum	vermiculite under sink; animal feces	white	pink	beige squares	1 x 2	gray drywall putty	A6	kitchen ceiling	-	-	-	negative
												gray drywall putty	A7	dining room wall	-	-	-	negative
												gray drywall putty	A8	kitchen ceiling	-	-	-	negative
												white ceiling tile	A14	kitchen/ dining ceiling	-	-	-	negative
												-	-	-	pink	P3	kitchen wall	negative
												-	-	-	white	P4	kitchen ceiling	negative
Cabin #3	-	Bedroom 1	south bedroom	drywall	drywall	carpet over linoleum	2 closets	white	pink	pink; beige squares	-	-	-	-	-	-	-	-
Cabin #3	-	Washroom 1	washroom	drywall	wood panel	linoleum	animal feces	white	brown stain	beige squares	-	beige squares linoleum	A9	washroom floor	-	-	-	negative
Cabin #3	-	Entry 2	entry	tile	wood panel	linoleum	water damage on ceiling	white	brown stain	beige squares	1 x 1	beige squares linoleum	A11	entry floor	-	-	-	negative
												white ceiling tile	A15	entry ceiling	-	-	-	negative

* no access ** limited visibility of area ***Sample not analyzed

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #3	-	Laundry Room	laundry room	tile	drywall	linoleum	ceiling coming down; faucets gone; animal feces	white	pink	beige rectangles	1 x 1	beige rectangles linoleum	A10	laundry room floor	-	-	-	positive
												brown vermiculite	A18	laundry room ceiling	-	-	-	positive
Cabin #3	-	Washroom 2	washroom	plywood	wood panel; vinyl tile	linoleum	animal feces	white	pink; black and green	beige squares	-	black and green vinyl tile	A12	washroom wall	-	-	-	negative
Cabin #3	-	Bedroom 2	bedroom	tile	drywall; wood panel	carpet over wood over subfloor	outside wall is wood, rest are drywall	white	pink; brown stain	red/brown shag	1 x 2	-	-	-	-	-	-	-
Cabin #3	-	Bedroom 3	bedroom	tile	drywall; wood panel	carpet over wood over newer subfloor	outside wall is drywall, rest are wood	white	pink; brown stain	red/brown shag	1 x 2	white ceiling tile	A16	bedroom ceiling	-	-	-	negative
Cabin #3	-	Living Room	living room	tile	drywall	carpet over newer subfloor	-	white	pink	red/brown shag	1 x 2	white ceiling tile	A17	living room ceiling	-	-	-	negative
Cabin #3	-	Attic	attic	no access								-	-	-	-	-	-	-

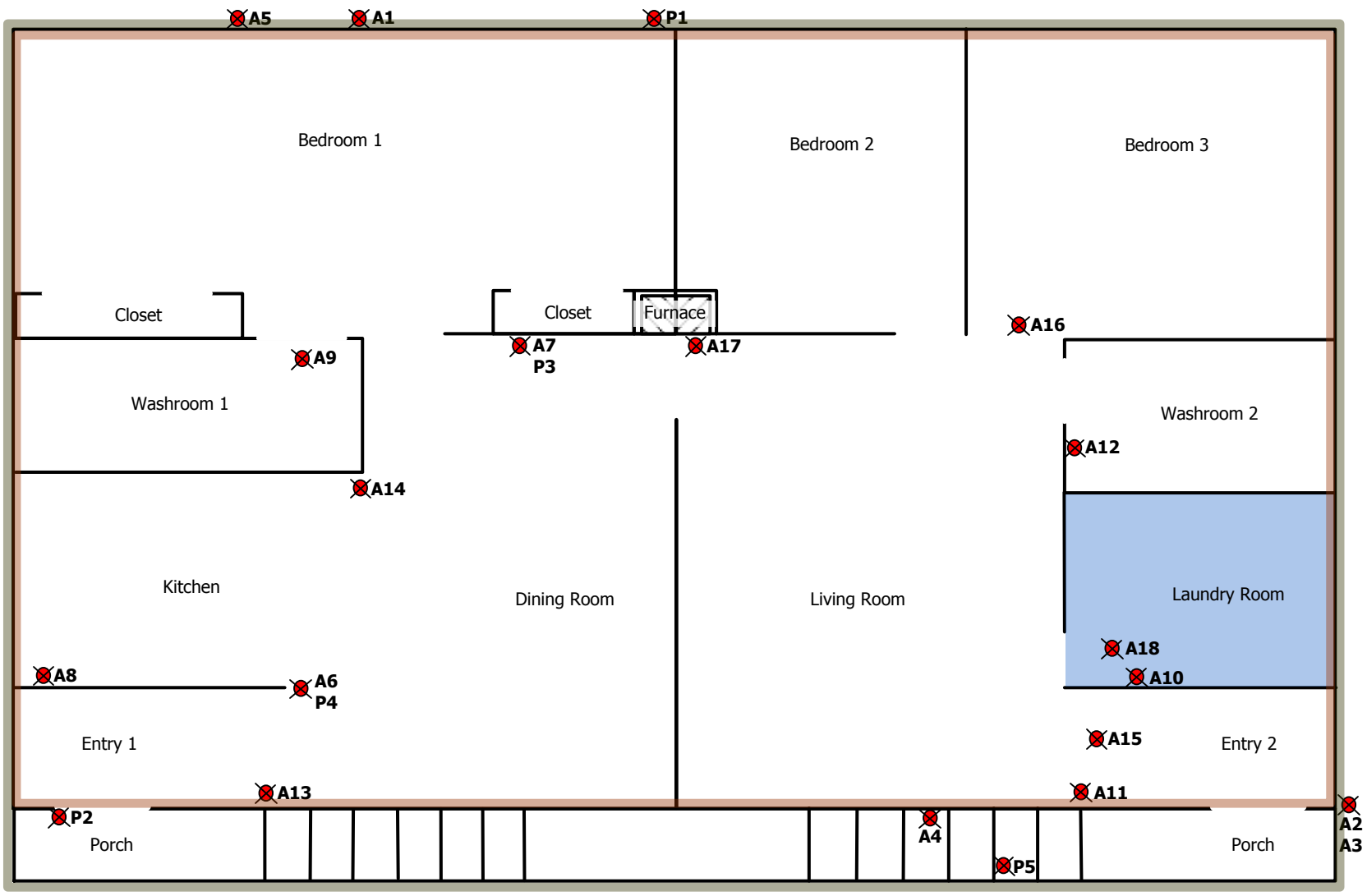
* no access ** limited visibility of area ***Sample not analyzed

Appendix 2b

Sampling Diagrams for Cabin #3

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/Tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- Roof Shingles/Tar containing Asbestos
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: CABIN #3

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 24, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: Jan 30, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 2b

Appendix 2c

Photographic Log for Cabin #3

Sample A1 : Green shingles with tar containing asbestos on roof

Sample A10 : Linoleum containing asbestos on laundry room floor

Sample A18 : Vermiculite containing asbestos in laundry room ceiling space

Water damage in Entry 2

Rodent feces in Kitchen

PHOTOGRAPHIC LOG

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Taken: EH

Date: October 2011

File No. 11192

Building: Cabin #3

Parameter: Water Damage & Pests

Appendix
2c-2

Appendix 2d

Laboratory Results for Cabin #3

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448850 **Description / Location:** Black Shingle
Client No.: A1 Rear Of Duplex (Ext)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4448850 **Description / Location:** Black Tar **Layer No.:** 2
Client No.: A1 Rear Of Duplex (Ext)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.5	Chrysotile	None Detected	None Detected	PC 96.5

Lab No.: 4448850 **Description / Location:** Black Tar Paper **Layer No.:** 3
Client No.: A1 Rear Of Duplex (Ext)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Cellulose	20

Lab No.: 4448851 **Description / Location:** Brown/Black Tar Paper
Client No.: A2 West Side Of Duplex (Ext)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello **Approved By:**

Date: 10/12/2011

Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448852 **Description / Location:** Brown Paper/Insulation
Client No.: A3 West Side Of Duplex (Ext.) Entire House

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4448853 **Description / Location:** Off-White Glazing
Client No.: A4 West Front Window (Ext. Side)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448854 **Description / Location:** Off-White Glazing
Client No.: A5 Rear, 3rd Window From West

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448855 **Description / Location:** White Joint Compound
Client No.: A6 Kitchen Ceiling; Entire House

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448856 **Description / Location:** White Joint Compound
Client No.: A7 Dining Room Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448857 **Description / Location:** White Joint Compound
Client No.: A8 Kitchen Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448858 **Description / Location:** White/Tan Vinyl Sheet Flooring
Client No.: A9 Bathroom 1 Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	80
		5	Fibrous Glass	

Lab No.: 4448859 **Description / Location:** White/Tan Vinyl Sheet Flooring
Client No.: A10 Laundry Room Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
25	Chrysotile	5	Cellulose	70

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448860 **Description / Location:** Off-White/Tan Vinyl Sheet Flooring
Client No.: A11 Entry 2 Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	80
		5	Fibrous Glass	

Lab No.: 4448861 **Description / Location:** Black Vinyl Sheet Flooring
Client No.: A12 Bathroom 2 Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	40	Cellulose	60

Lab No.: 4448861 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: A12 Bathroom 2 Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448862 **Description / Location:** White/Tan Ceiling Tile; 1x1
Client No.: A13 Entry 1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

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Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448863 **Description / Location:** White/Tan Ceiling Tile; 1x2
Client No.: A14 Kitchen/Dining

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 4448864 **Description / Location:** White/Tan Ceiling Tile; 1x1
Client No.: A15 Entry 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 4448865 **Description / Location:** White/Tan Ceiling Tile; 1x2
Client No.: A16 Bedroom 3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 4448866 **Description / Location:** White/Tan Ceiling Tile; 1x2
Client No.: A17 Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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CERTIFICATE OF ANALYSIS

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Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254336
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448867
Client No.: A18

Description / Location: Brown Vermiculite Insulation
Laundry Room Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).

IATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of the vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004). Please call for more information and pricing.

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/17/2011
Report No: 254851
Project: Radium-Duplex
Project No.: 11192-Duplex

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 114448867F
Client No.: A18
Description / Location: Brown Vermiculite Insulation; Floats
Laundry Room Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100

Analysis by EPA-600/R-04/004.

Lab No.: 114448867S
Client No.: A18
Description / Location: Brown Vermiculite Insulation; Sinks
Laundry Room Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.13	Actinolite	Trace	Cellulose	PC 99.87

Analysis by EPA-600/R-04/004.

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/17/2011

iATL INTERNATIONAL
Asbestos Testing Laboratories

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Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Duplex

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [■] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[■] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A1 (start) - A18 (end) IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): [illegible] 10/11/11 Date: _____ Time: _____
Sample Prep (Name / IATL): _____ Date: _____ Time: _____
Analysis(Name(s) / IATL): LS 10/12/11 Date: _____ Time: _____
QA/QC Review (Name / IATL): dhc 10-12-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

RECEIVED OCT 7 2011

IATL - By _____

BALLAST
- Providing a Balance -

ASB

BULK MATERIAL SAMPLING LOG

CS 10/12/11

Worksite: Radium - Duplex Date: 3 Oct 2011

Client: PWGSC Job No.: 11192-D

Date Results Required: No. Samples: Page 1 of 2

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A1	green	shingles	rear of duplex (ext.)	encapsulated (covered w/ newer shingles) 4448850	entire roof	111-0536
A2	black	tar paper	west side of duplex (ext.)	encapsulated (under wood siding) 4448851	entire house	0538
A3	gray	cardboard insulation	west side of duplex (ext.)	" 4448852	entire house	0539
A4	yellow	window glazing	west front window (ext. side)	fair 4448853	10 windows	0543
A5	yellow	window glazing	rear, 3rd window from west	fair 4448854	"	0542
A6	gray	drywall putty	kitchen ceiling	poor 4448855	entire house	0545
A7	gray	drywall putty	dining rm wall	poor 4448856	"	0546
A8	gray	drywall putty	kitchen ceiling	poor 4448857	"	0548
A9	beige squares	lino	bathroom 1 floor	poor 4448858	bathroom 1,2 kitchen/dining entry 1,2	0550
A10	beige rectangles	lino	laundry room floor	fair 4448859	laundry room	0552
A11	beige squares	lino	entry 2 floor	poor 4448860	see A9	0554
A12	~~yellow~~ ~~tile~~ ~~beige~~ green	vinyl tile	bathroom 2 wall	fair 4448861	bathroom 2 backsplash	0556
A13	white	ceiling tile 1x1	entry 1	fair 4448862	entry 1,2 laundry room	0557
A14	white	ceiling tile 1x2	kitchen / dining	fair 4448863	kitchen / dining living rm bdrm 2,3	0560

BALLAST
- Providing a Balance -

ASB

BULK MATERIAL SAMPLING LOG

LS 10/12/11

Worksite: Radium - duplex Date: 30 oct/2011

Client: PWGSC Job No.: 11192-D

Date Results Required: No. Samples: Page 2 of 2

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A15	white	ceiling tile 1x1	entry 2	poor 4448864	see A13	0561
A16	white	ceiling tile 1x2	bdrm 3	good 4448865	see A14	0562
A17	white	ceiling tile 1x2	living room	poor 4448866	see A14	0565
A18	brown	vermiculite	laundry room ceiling	bad 4448867	entire house	0566 / 0567

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report Number: 254281
Project: Hazardous Materials Asses.
Project No.: 11192-Duplex

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4448756	P1	White Over Red Paint Rear Ext. Wall	0.11
4448757	P2	Yellow Over White Paint Ext. Trim	0.022
4448758	P3	Pink Paint Kitchen Wall	<0.0087***
4448759	P4	White Paint Kitchen Ceiling	<0.0040
4448760	P5	Grey Paint Ext. Stairs&Deck	0.32

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/7/2011
Date Analyzed: 10/12/2011
Analyst: C. Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

E-MAILED
10.12.11

iATL INTERNATIONAL
Asbestos Testing Laboratories

9000 Commerce Parkway
Suite B
Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Duplex

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [ ] Bulk [ ] Other
[ ] Water [■] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[■] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[ ] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ ❑ Verbals ❑ FAX ■ Email
date / time

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): P1 (start) - P5 (end) IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): M 10/10/11 Date: _____ Time: _____
Sample Prep (Name / IATL): [illegible] Date: _____ Time: _____
Analysis(Name(s) / IATL): _____ Date: _____ Time: _____
QA/QC Review (Name / IATL): dbc 10-13-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

RECEIVED
OCT 7 2011
IATL - By _____

BALLAST
- Providing a Balance -

PAINT

BULK MATERIAL SAMPLING LOG

Worksite: ~~[illegible]~~ Radium – Duplex Date: Oct 3/11

Client: PWGSC Job No.: 11192-D

Date Results Required: No. Samples: 5 Page 1 of 1

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	white over red		rear ext. wall	poor 4448756	all ext. ~~except trim~~ siding + trim	111-0526
P2	yellow over white		ext. trim	poor 4448757	all ext. door + window trim	0531
P3	pink		kitchen wall	poor 4448758	~~kitchen/dining room~~ all duplex + int. doors	0508
P4	white		kitchen ceiling	4448759 good	kitchen bdrm 1 bathroom 1 - ceiling +	0532
P5	gray		ext. stairs + deck	4448760 poor	20m²	0533

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

BATCH / SAMPLE MANAGEMENT REPORT

Customer No.: BAL082

Customer: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Customer Rep: RS

Batch Number: 254281

Project:

Project Number: 11192

TAT: 3 Day

Date/Time Rec'd: 10/7/2011

# of Samples: 5 **Analysis:** **Lead Paint** **Time/Date Due:** 10/12/2011

Initials Signaling Acknowledgement ☐ RTP: _____ ☐ To PLM NOB _____ ☐ To TEM NOB _____

Special Instructions:

Admin Notes: Portal

Shipping Error:

_____ Samples were not received in a sealed container. Bulk samples not double bagged.
_____ Air Cassettes received open in bag… sample integrity compromised, possible contamination.
_____ Samples received wet.
_____ Samples received covered with dust… possible cross contamination.
_____ Sample containers damaged, contents spilled… possible cross contamination.
_____ Paperwork received in the same bag as samples possible contamination.
_____ No / Incomplete Chain of Custody Received.
_____ No / Incomplete Sample Log Received.
_____ Sample container IDs do not match the client's sample log.
_____ No Turnaround Time indicated.
_____ PCM Re-prep for TEM NIOSH 7402. Cassettes previously opened and portion of filter removed.
_____ Blank(s) not submitted as required by the requested analytical method.
_____ Minimum shipping requirements not attained. See attached Carrier Air Bill.
_____ Other: _____

Batch Error:

_____ Wrong Client ID Listed:
_____ Wrong Client Location Listed:
_____ Wrong Project ID Listed:
_____ Wrong TurnAround Time Listed:
_____ Wrong Due Date Listed:
_____ Wrong Date/Time Received Listed:
_____ Wrong Analysis Method Listed:
_____ Wrong Number of Samples Listed:

Login Error:

_____ Sample Log Stamped Incorrectly:
_____ Sample Containers Mislabelled:
_____ Duplicate / Extra Samples Not Stamped:
_____ Analyst Bench Sheet Error:

_____

_____

Copy: FE, JN, RS, SC

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway, Suite B, Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818
INFO@IATL.COM

DAILY QUALITY CONTROL DATA

LEAD SAMPLE ANALYSIS

(DATE: 10 / 12 / 11)

Standard	Total Lead (mg)	Percent Recovery **
Reagent Blank	0.000	< LOQ
Blank Spike	0.500	104
Lab control Std # 401	0.464	110
Matrix Spike - LBP *	1.02	104
Matrix Spike - Wipe *	1.58	103
Matrix Spike - Soil *	0.443	104
Matrix spike - Air *	0.050	102
2.5 ppm Standard	0.25	102
10.0 ppm Standard	1.0	103
40.0 ppm Standard	4.0	97

AIHA LAP-LLC No. 100188 **NYS-DOH** ELAP No. 11021

Analysis Method: ASTM D3335-85A
NIOSH 7082
EPA SW846 3050B 7000B

Comments: IATL assumes that all sampling complies with accepted methods.
All client supplied sampling data is assumed to be correct when calculating results.
Detection limit based upon 0.2 mg/L reporting limit and sample size.
* NIST Traceable.
** 80-120% acceptable limits.

Analyzed By: Chad Shaffer
R. Chad Shaffer

Date: 10/12/11

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

AAS.DailyQC.001

Appendix 3a

Detailed Room Descriptions for Cabin #1 & Cabin #2

Building	Unit	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #2	1	-	exterior	asphalt shingles over wood shingles	wood siding; parchment over wood (lower)	wood porch	-	gray	white; yellow trim	gray	-	gray parchment	A2	#1 crawlspace side wall	-	-	-	negative
												-	-	-	white	P1	porch railing	positive
												-	-	-	yellow trim	P2	front window	negative
												-	-	-	gray over white	P3	wood porch	negative
Cabin #2	1	Kitchen/ living room	kitchen/ living room	tile	wood; fiberglass insulation	carpet; linoleum	animal feces	white	white; white over yellow	pink; white squares	1 x 2	white ceiling tile	A8	living room ceiling	-	-	-	negative
												-	-	-	white	P6	kitchen divider wall	negative
												-	-	-	yellow	P7	kitchen divider wall	negative
Cabin #2	1	Bedroom	bedroom	wood	wood	carpet	animal feces	brown stain	white	red	-	-	-	-	-	-	-	-
Cabin #2	1	Washroom	washroom	wood	wood over fibreboard	linoleum over wood; carpet	animal feces	brown stain	brown stain	white squares; red	-	white squares linoleum	A7	washroom floor	-	-	-	negative
Cabin #2	2	-	exterior	asphalt shingles over wood shingles	wood siding	-	brick chimney	gray	white; yellow trim	-	-	-	-	-	-	-	-	-
Cabin #2	2	Kitchen/ living room	kitchen/ living room	tile; drywall	drywall; wood panel over wood, fibreboard; fibreglass insulation	linoleum; carpet over hardwood	household cleaners; mould	white	white over yellow; white wallpaper	white squares; green	1 x 2	white squares linoleum	A9	front entry floor	-	-	-	negative
												gray drywall putty	A11	kitchen wall	-	-	-	positive
												gray drywall putty	A10	kitchen wall	-	-	-	positive
												-	-	-	white	P8	kitchen ceiling	negative
												-	-	-	yellow	P9	kitchen wall	negative
Cabin #2	3	-	exterior	asphalt shingles over wood shingles	wood siding	-	brick chimney; red fire extinguisher box	gray	white; yellow trim	-	-	yellow window glazing	A1	exterior washroom window	-	-	-	negative
												-	-	-	red over white	P4	fire extinguisher box	positive
Cabin #2	3	Bedroom	bedroom	tile over wood	wood panel; texture	carpet over hardwood	electronics; fridge; propane tank	white	white	gray with black	1 x 2	white texture	A12	bedroom wall	-	-	-	negative
												white texture	A13	bedroom wall	-	-	-	negative
												white ceiling tile	A14	bedroom ceiling	-	-	-	negative
Cabin #2	3	Washroom	washroom	drywall	drywall; ceramic tile	linoleum	animal feces	white	white	white squares	-	gray drywall putty	A15	washroom wall	-	-	-	positive

* no access ** limited visibility of area ***Sample not analyzed

Building	Unit	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #2	4	-	exterior	asphalt shingles over wood shingles	wood siding	wood porch	-	gray	white; yellow trim	gray	-	gray parchment	A3	crawlspace rear wall	-	-	-	negative
												black tar paper	A19	exterior wall	-	-	-	negative
												-	-	-	green	P5	crawlspace side wall	negative
												-	-	-	brown	P10	wood porch	positive
Cabin #2	4	Living Room	living room; hallway	tile	wood panel; texture	carpet over vinyl tile	-	white	white	green-brown checkered; brown	1 x 2	white texture	A16	living room wall	-	-	-	negative
												brown vinyl tile	A17	living room floor	-	-	-	negative
												brown vinyl tile	A18	hallway floor	-	-	-	negative
Cabin #2	4	Bedroom	bedroom	wood	wood panel	carpet over hardwood	-	white	white	green-brown checkered; brown	-	-	-	-	-	-	-	-
Cabin #2	4	Washroom	washroom	wood	wood panel over white wood panel	linoleum	3 tires	white	brown stain	white squares	-	-	-	-	-	-	-	-
Cabin #2	4	Kitchen	kitchen	tile	wood panel; wood	linoleum	-	white	white; white wallpaper	white squares	-	-	-	-	-	-	-	-
Cabin #2	-	Crawlspace	crawlspace	wood; beams	wood	dirt floor	wires, pipes, breaker panel, hot water tank, gas-fired furnace	bare	white over green (exterior)	-	-	white/black rubber wire insulation	A4	crawlspace	-	-	-	negative
												black wire insulation	A5	crawlspace	-	-	-	negative
												gray chimney mortar	A6	crawlspace	-	-	-	negative
Cabin #2	-	Attic	attic	wood, beams in good condition; wood chip insulation; squirrels								-	-	-	-	-	-	-
Cabin #1	1	-	exterior	asphalt shingles over wood shingles	wood siding over tar paper	fibreboard over wood porch	soffit	gray	white over brown; yellow trim over brown	gray; white over gray	-	gray parchment	A22	crawlspace side wall	-	-	-	negative
												-	-	-	white	P11	wood siding	negative
												-	-	-	gray	P13	wood porch	positive
												-	-	-	white over brown over gray	P14	top of crawlspace side wall	positive
												-	-	-	white over green	P15	crawlspace side wall	negative
Cabin #1	1	Living Room/ Kitchen	living room/ kitchen	plywood	wood panel over wood (burnt); fibreglass insulation	carpet over vinyl tile	2 unlabeled leaking light ballasts; 4 fire extinguishers; animal feces	white	brown	brown with yellow; brown	-	brown vinyl tile	A26b	kitchen area floor	-	-	-	negative
												-	-	-	-	-	-	-

* no access ** limited visibility of area ***Sample not analyzed

Building	Unit	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #1	1	Washroom	washroom	tile panel over wood	wood panel over wood; fibreglass insulation	linoleum over subfloor over vinyl tile over hardwood	animal feces	white	floral wallpaper; gray	beige with brown; brown	1 x 1	black subfloor/red mastic	A25	washroom floor	-	-	-	negative
												brown vinyl tile	A26a	washroom floor	-	-	-	negative
												1 x 1 white ceiling tile panel	A27	washroom ceiling	-	-	-	negative
Cabin #1	1	Bedroom	bedroom	drywall	drywall; wood panel	carpet over hardwood	-	unpainted	bare; brown	brown with yellow; brown stain	-	-	-	-	-	-	-	-
Cabin #1	2	-	exterior	asphalt shingles over wood shingles	wood siding over tar paper	-	brick chimney in poor condition; soffit	gray	white over brown; yellow trim over brown	-	-	yellow window glazing	A21	exterior washroom window	-	-	-	negative
												-	-	-	yellow	P12	window trim	negative
Cabin #1	2	Living Room	living room	tile	wood; wood panel; fibreglass insulation	hardwood	photocopier; appliances; tire; PVC tubing with glue; animal feces	white	brown stain; light brown	brown stain	1 x 2	-	-	-	-	-	-	-
Cabin #1	2	Kitchen	kitchen	tile	wood; wood panel	vinyl tile over hardwood	4 light ballasts, leaking; R12 cooler; animal feces	white	light brown; floral wallpaper	light and dark brown streaks	1 x 2	light and dark brown streaks vinyl tile	A30	kitchen floor	-	-	-	positive
Cabin #1	2	Closet	closet	wood	wood	carpet over hardwood	-	brown stain	brown stain	brown with yellow	-	-	-	-	-	-	-	-
Cabin #1	2	Washroom	washroom	tile	wood panel over yellow wood panel	linoleum	animal feces	white	medium brown	beige with brown	1 x 1	beige with brown linoleum	A29	washroom floor	-	-	-	negative
Cabin #1	3	-	exterior	asphalt shingles over wood shingles	wood siding over tar paper	-	red fire extinguisher box; soffit; brick chimney in poor condition; wooden eaves	gray	white over brown; yellow trim over brown	-	-	black tar paper	A20	near front door	-	-	-	negative
Cabin #1	3	Living Room	living room	fibreboard; wood; tile	wood panel; fibreboard over wood; insulation paper	hardwood	old fridge; photocopier; tire; water damage; R12 compressor	off-white; white	peach; brown	brown stain	1 x 2	brown fibreboard	A28	interior wall	-	-	-	negative
												brown insulation paper	A32	interior wall	-	-	-	negative
Cabin #1	3	Closet	closet	wood	wood	wood	-	brown stain	brown stain	brown stain	-	-	-	-	-	-	-	-
Cabin #1	3	Washroom	washroom	tile	wood panel	vinyl tile	animal feces	white	medium brown	light brown with white streaks	1 x 2	light brown with white streaks vinyl tile	A31	washroom floor	-	-	-	positive

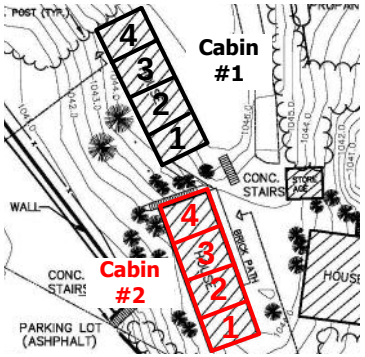
* no access ** limited visibility of area ***Sample not analyzed

Building	Unit	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Cabin #1	4	-	exterior	asphalt shingles over wood shingles	wood siding over tar paper	wood porch	wooden eaves	gray	white over brown; yellow trim over brown	gray	-	-	-	-	-	-	-	-
Cabin #1	4	Living Room/ Kitchen/ Hall	living room	tile	wood panel; fibreglass insulation over wood	vinyl tile	old fridge; photocopier; freezer; chlorine	white	medium brown, light brown	light brown with streaks	1 x 2	light brown with white streaks vinyl tile	A33	front entry floor	-	-	-	positive
Cabin #1	4	Washroom	washroom	wood panel; fibreboard	wood panel	vinyl tile	-	medium brown	medium brown	light brown with streaks	-	-	-	-	-	-	-	-
Cabin #1	4	Bedroom	bedroom	tile	wood panel over fibreglass insulation; cardboard	hardwood	fibreglass insulation tubes; tire; air compressor	white	medium brown	brown stain	1 x 2	-	-	-	-	-	-	-
Cabin #1	-	Crawlspace	crawlspace	wood; beams	parchment over wood; chicken wire, tar paper	dirt floor	newer hot water tank, wires, pipes	bare; stained wood	white over green (exterior); orange on door trim	-	-	gray mortar	A23	chimney	-	-	-	negative
												white/black wire insulation	A24	crawlspace	-	-	-	negative
Cabin #1	-	Storage Room	storage room	wood; beams	plywood	plywood	herbicides; pesticides; engine oil; car wash	bare; stained wood	gray	-	-	-	-	-	-	-	-	-
Cabin #1	-	Attic	attic	wood, beams in good condition; recycled blown in paper; animal feces; rat								-	-	-	-	-	-	-

* no access ** limited visibility of area ***Sample not analyzed

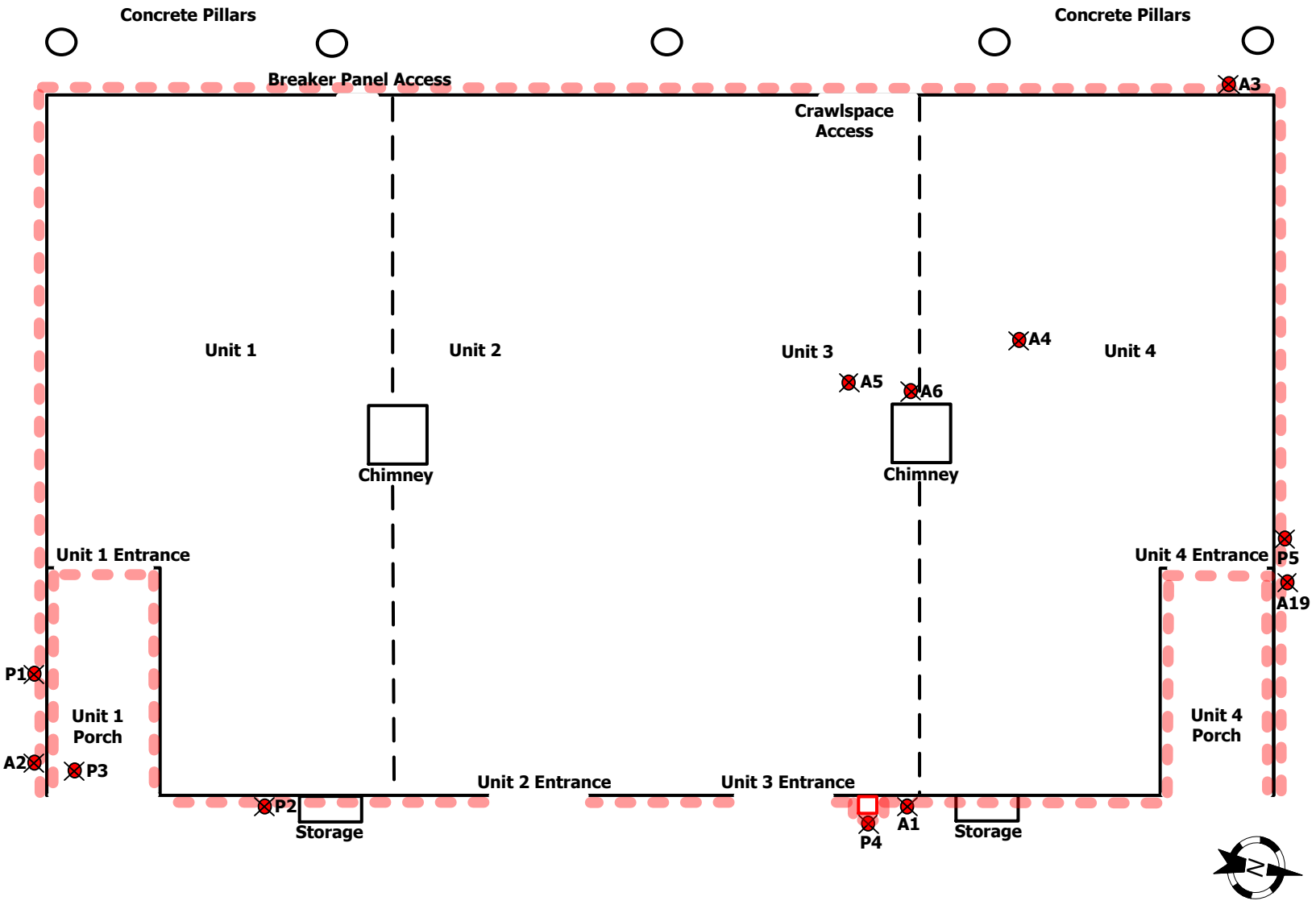
Appendix 3b

Sampling Diagrams for Cabin #1 & Cabin #2



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

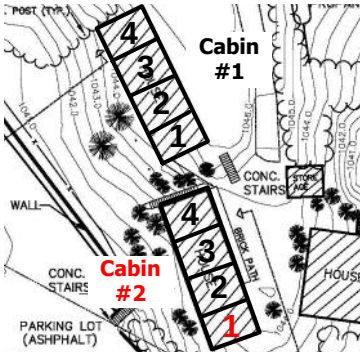
SITE SAMPLING DIAGRAM: CABIN #2
Crawlspace

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

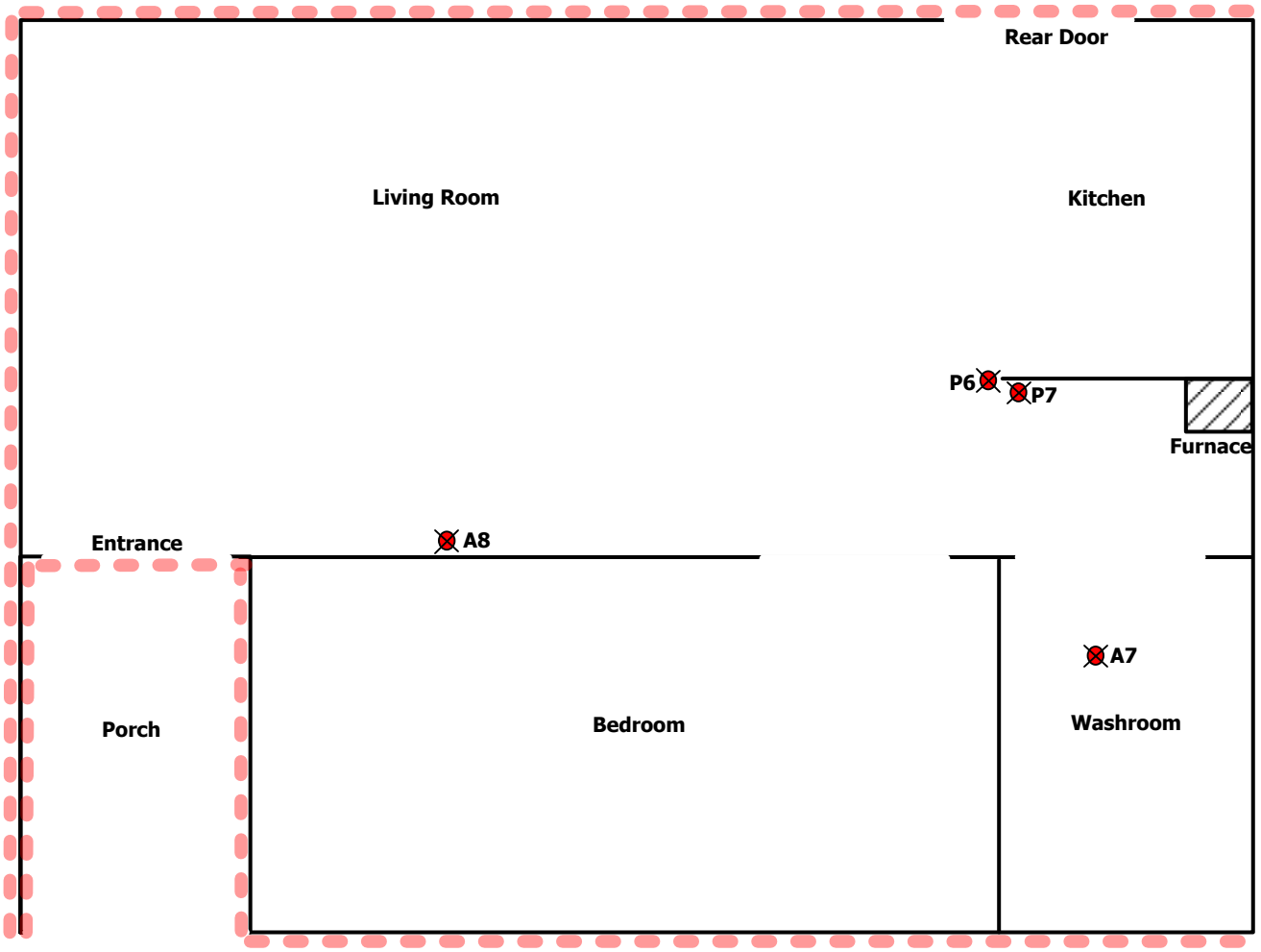
Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-1



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

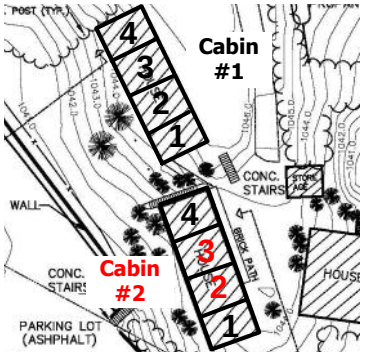
SITE SAMPLING DIAGRAM: CABIN #2
Unit 1

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

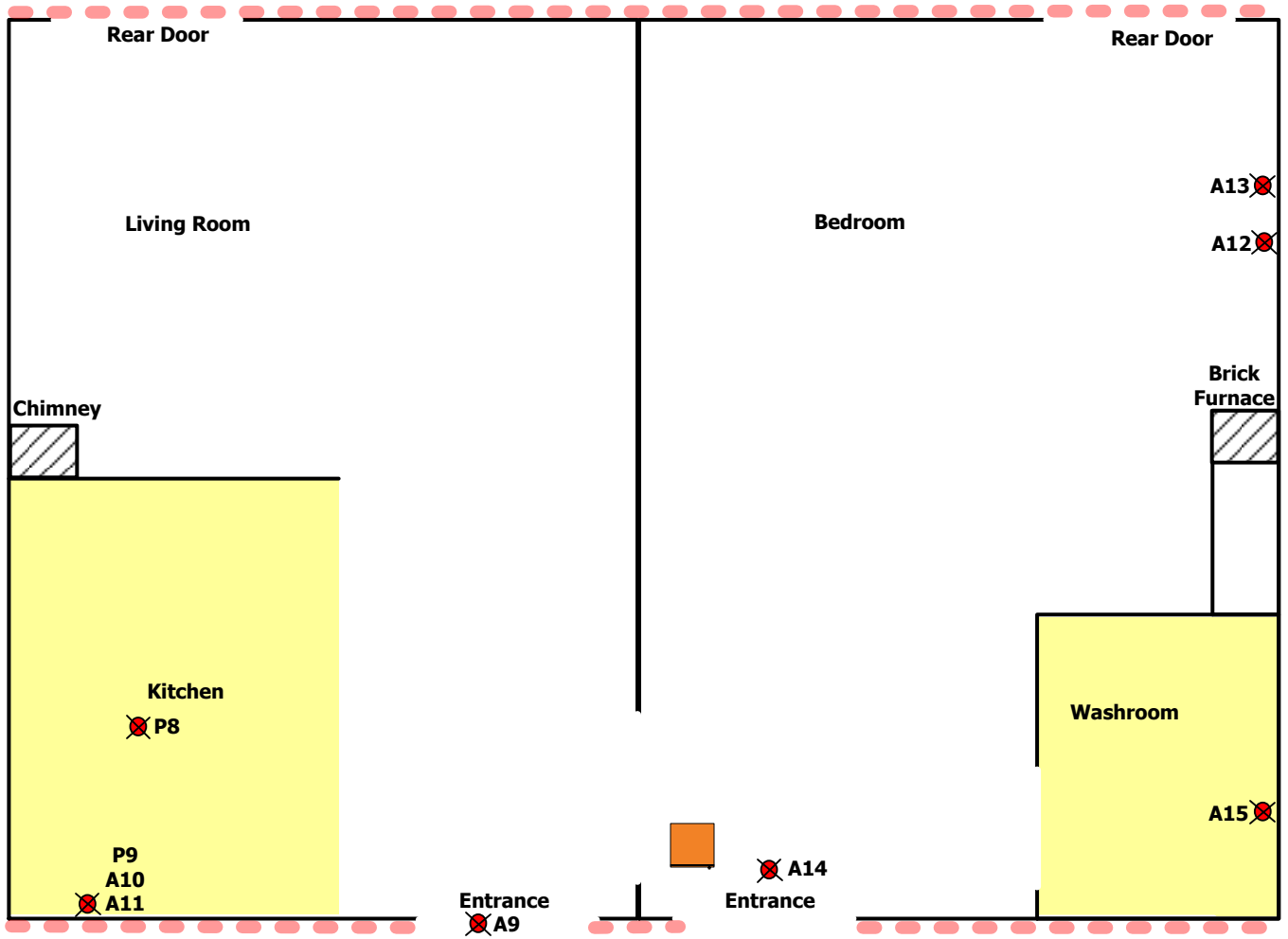
Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-2



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

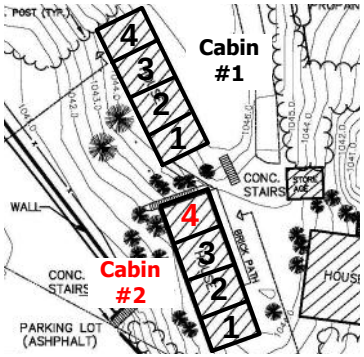
SITE SAMPLING DIAGRAM: CABIN #2
Unit 2 & Unit 3

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

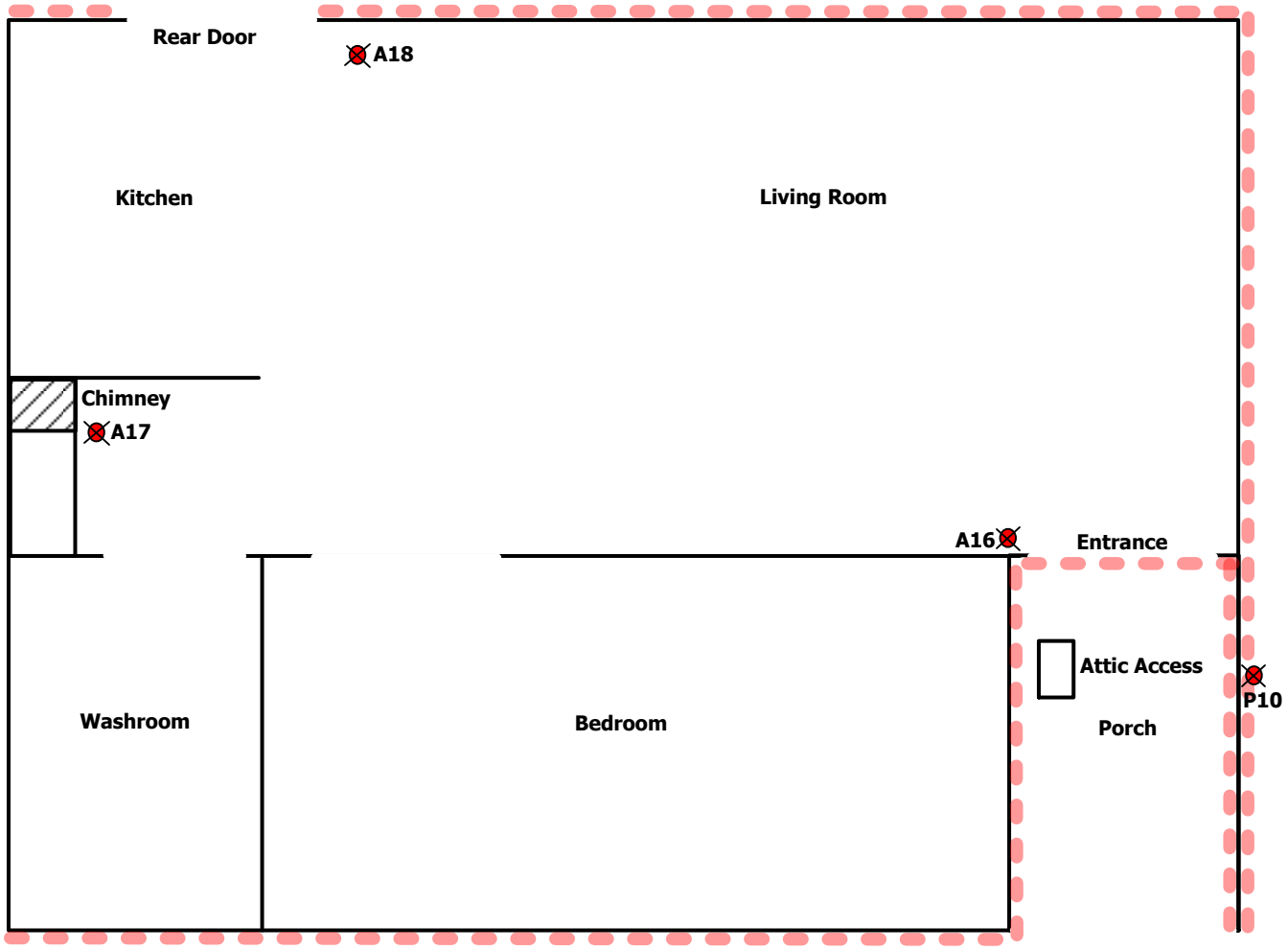
Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-3



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

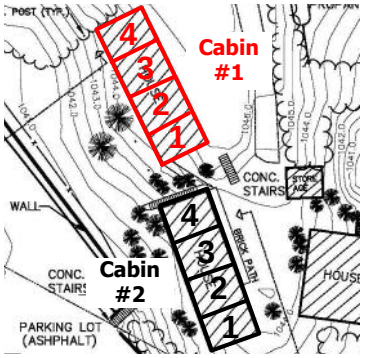
SITE SAMPLING DIAGRAM: CABIN #2
Unit 4

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

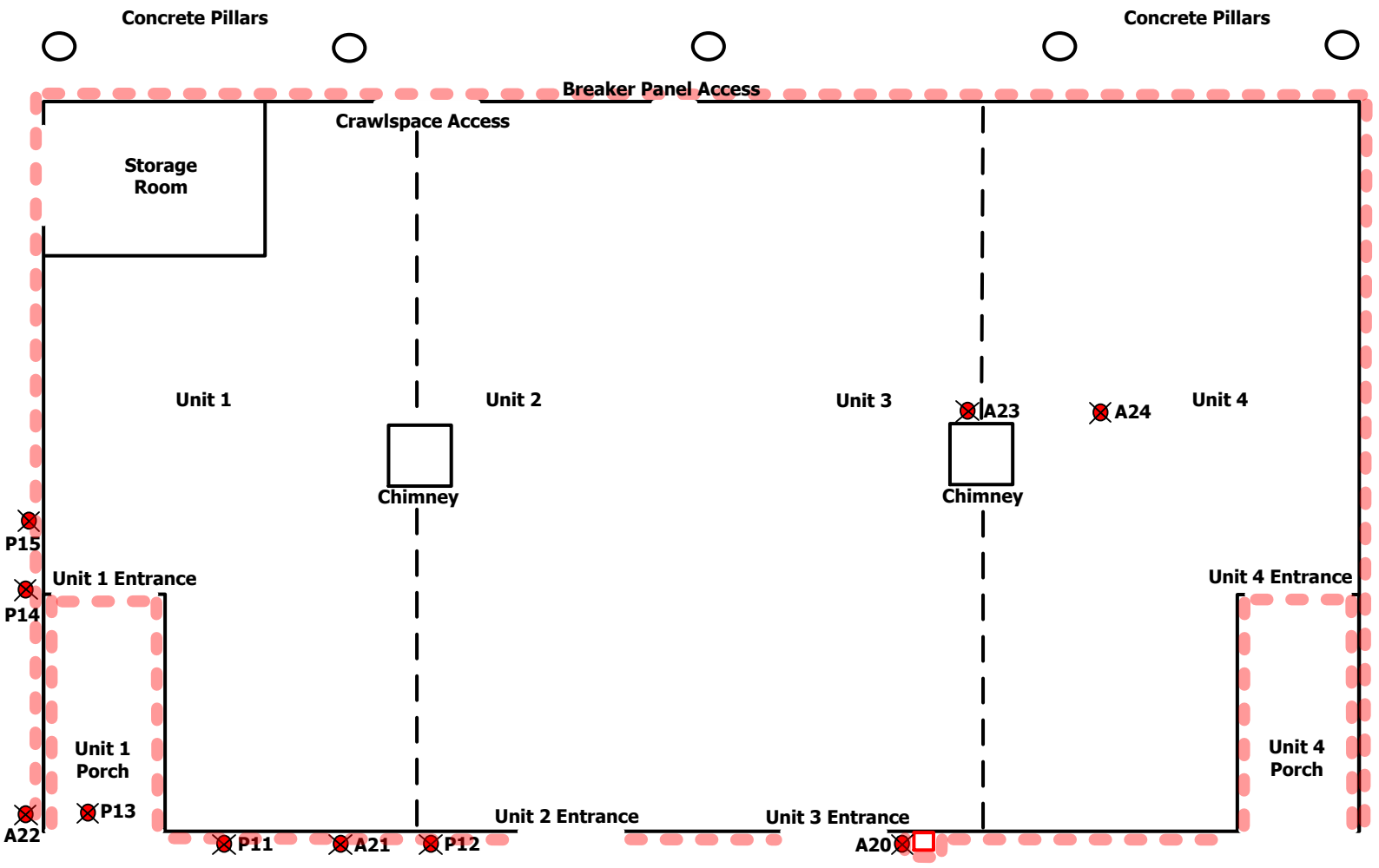
Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-4



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: CABIN #1
Crawlspace

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

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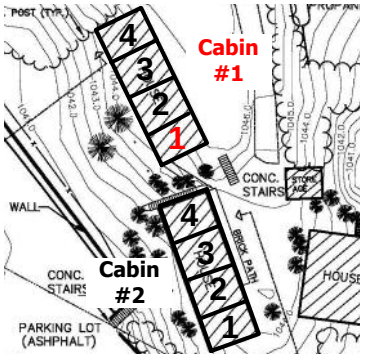
Appendix 3b-5



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P = paint sample

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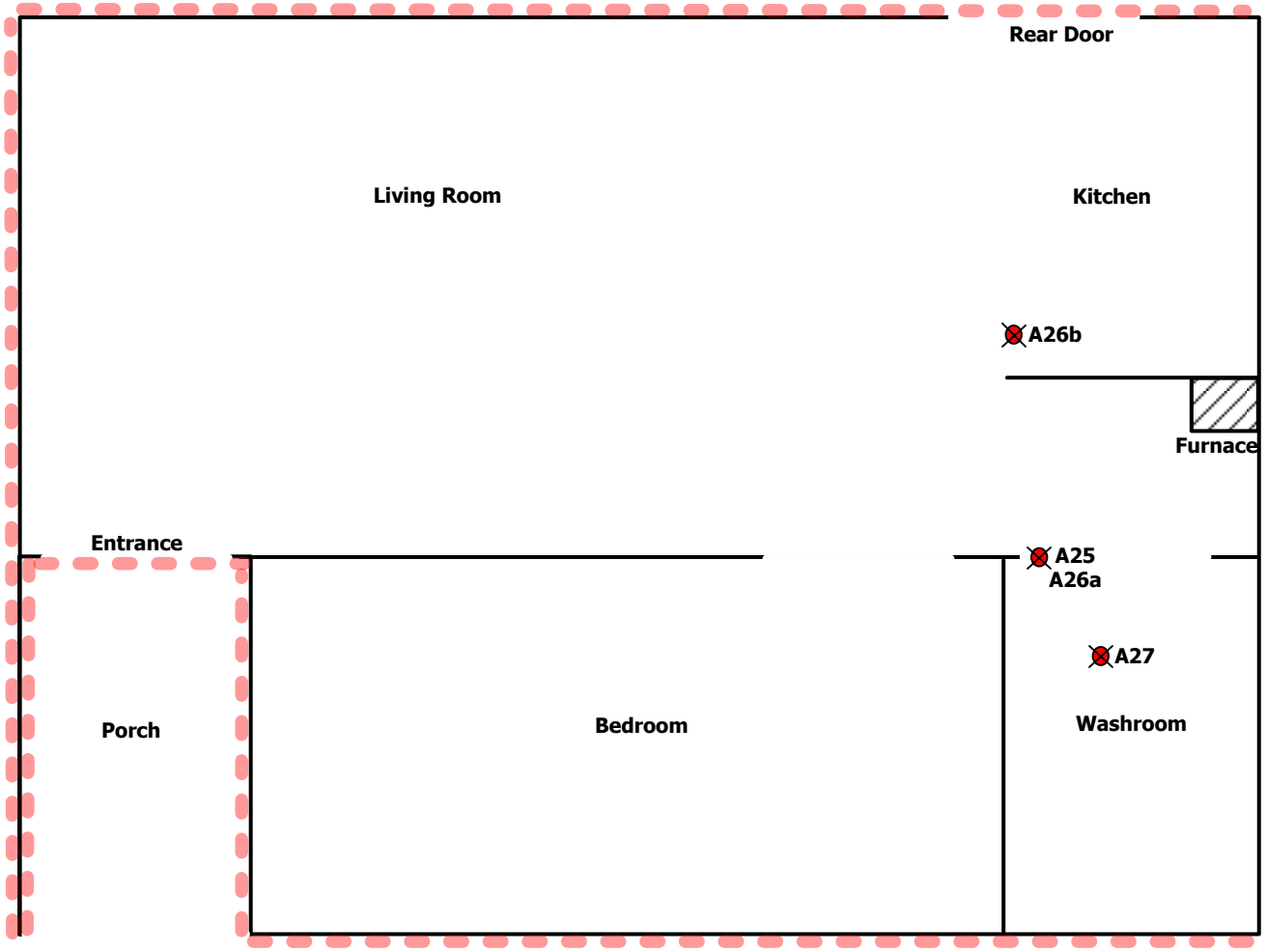
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

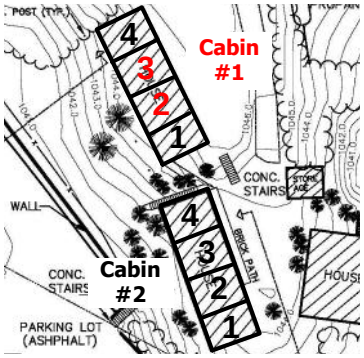
SITE SAMPLING DIAGRAM: CABIN #1
Unit 1

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-6



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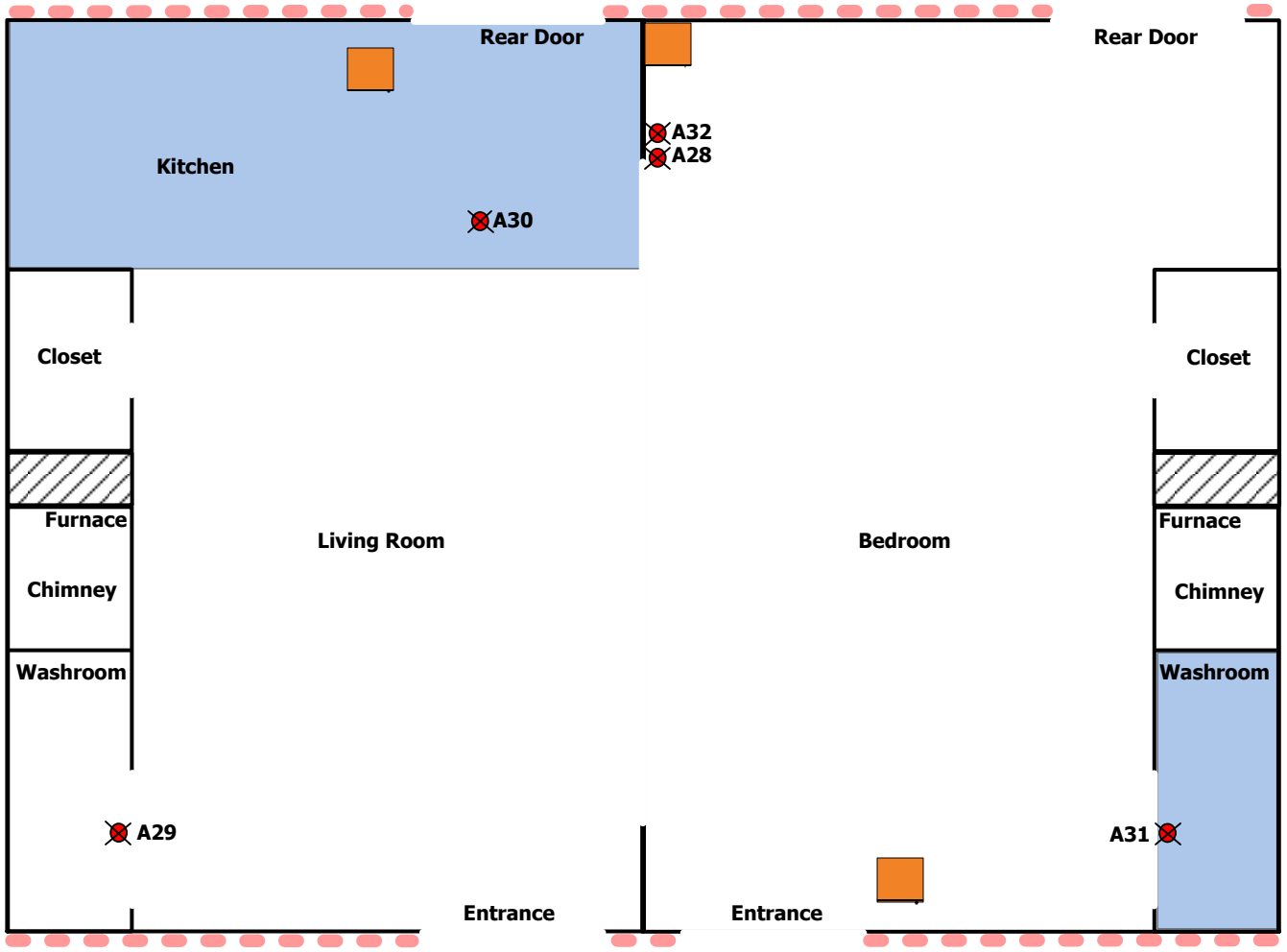
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

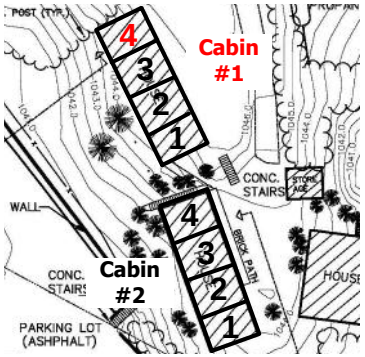
SITE SAMPLING DIAGRAM: CABIN #1
Unit 2 & Unit 3

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Date: Oct 25, 2011 | Drawn by: EH | Project Name: Hazardous Materials Assessment | Project No.: 11192

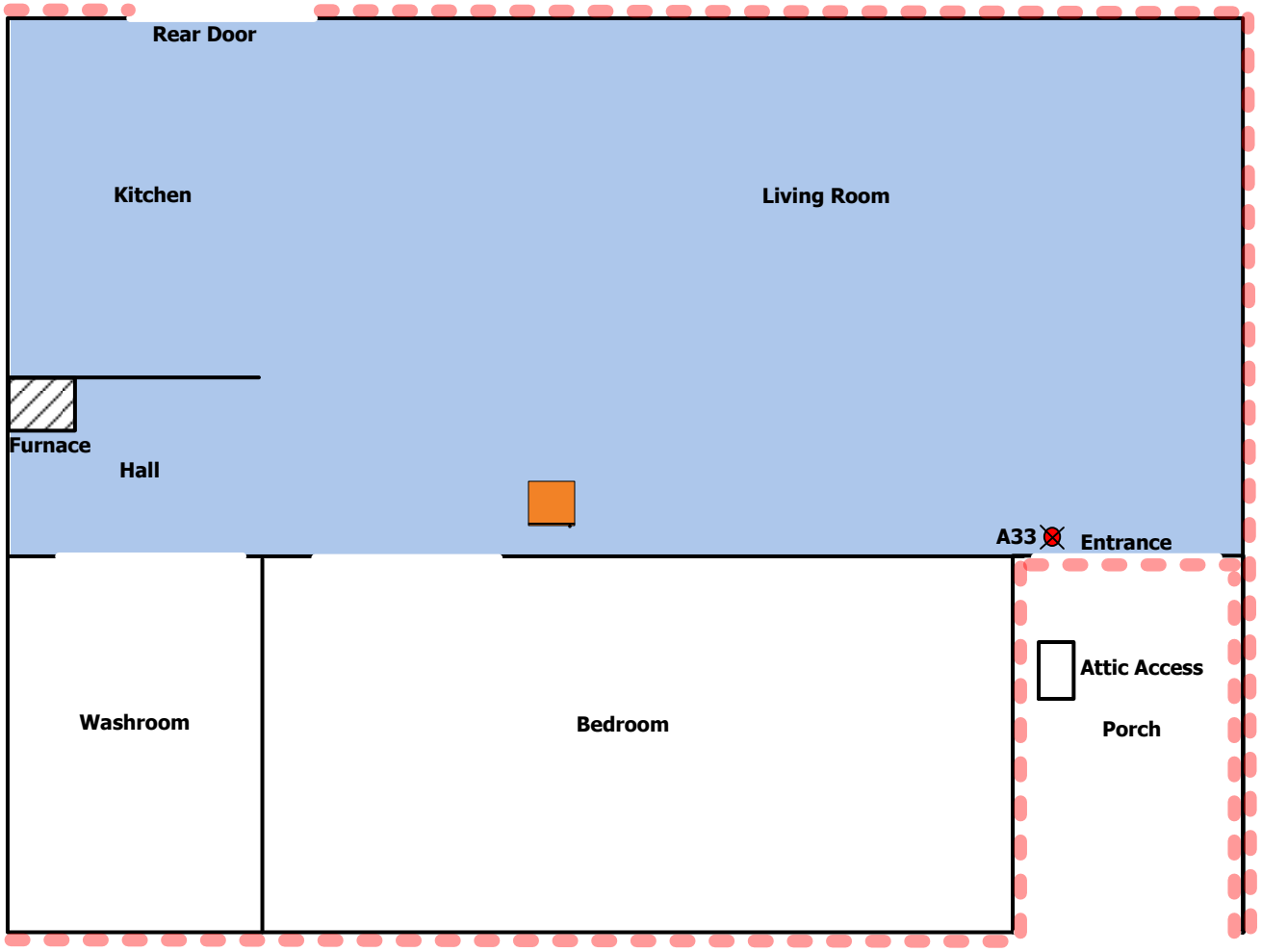
Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-7



Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: CABIN #1
Unit 4

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

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Edited: Jan 17, 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 3b-8

Appendix 3c

Photographic Log for Cabin #1 & Cabin #2

Cabin #2 Unit 2

Sample A10 : Drywall putty containing asbestos in kitchen

Cabin #2 Unit 2

Sample A11 : Drywall putty containing asbestos in kitchen

Cabin #2 Unit 3

Sample A15 : Drywall putty containing asbestos in washroom

Cabin #1 Unit 2

Sample A30 : Light and dark brown streaks vinyl floor tile containing asbestos in kitchen

Cabin #1 Unit 3

Sample A31 : Light brown with white streaks vinyl floor tile containing asbestos in washroom

Cabin #2 Unit 1

Sample P1 : White paint containing lead on porch railing

Cabin #2 Unit 1

Sample P4 : Red over white paint containing lead on fire extinguisher box

Cabin #2 Unit 4

Sample P10 : Brown under white paint containing lead on porch

PHOTOGRAPHIC LOG

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Taken: EH

Date: October 2011

File No. 11192

Buildings: Cabin #1 & Cabin #2

Parameter: Asbestos & Lead

Appendix
3c-2

Cabin #1 Unit 1

Sample P13 : Gray paint containing lead on porch

Cabin #1 Unit 1

Sample P14 : White over brown and gray paint containing lead on wall

Cabin #1 Unit 1

Rodent feces

Appendix 3d

Laboratory Results for Cabin #1 & Cabin #2

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
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Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254337
Project: Radium Hot Spring Lodge
Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448873 **Description / Location:** Tan Window Glazing
Client No.: A1 South Cabin #4 Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448874 **Description / Location:** Grey Cementitious
Client No.: A2 South Cabin #1 Side Wall Crawl Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448875 **Description / Location:** Grey Cementitious
Client No.: A3 South Cabin #4 Rear Wall-Crawl Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448876 **Description / Location:** Tan/Black Insulation
Client No.: A4 South Cabin Crawl Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	60	Cellulose	40

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: B. Hargrove **Approved By:**

Date: 10/12/2011

Frank E. Ehrenfeld, III
Laboratory Director

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Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448877 **Description / Location:** Black/Brown Insulation
Client No.: A5 Crawl Space South Cabin

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Cellulose	20

Lab No.: 4448878 **Description / Location:** Grey Chimney Mortar
Client No.: A6 Crawl Space South Cabin

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448879 **Description / Location:** Off-White Vinyl Sheet Flooring
Client No.: A7 South Cabin #1 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	80
		Trace	Fibrous Glass	

Lab No.: 4448880 **Description / Location:** Tan/White Ceiling Tile
Client No.: A8 South Cabin #1 Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Cellulose	2

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448881 **Description / Location:** Off-White Vinyl Sheet Flooring
Client No.: A9 South Cabin #2 Entrance

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	78
		2	Fibrous Glass	

Lab No.: 4448882 **Description / Location:** Tan Joint Compound
Client No.: A10 South Cabin #2 Kitchen Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.4	Chrysotile	None Detected	None Detected	PC 97.6

Lab No.: 4448883 **Description / Location:** Tan Joint Compound
Client No.: A11 South Cabin #2 Kitchen Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.2	Chrysotile	None Detected	None Detected	PC 97.8

Lab No.: 4448884 **Description / Location:** White Texture
Client No.: A12 South Cabin #3 Bedroom Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

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Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448885 **Description / Location:** White Texture
Client No.: A13 South Cabin #3 Bedroom Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448886 **Description / Location:** Tan/White Ceiling Tile
Client No.: A14 South Cabin #3 Bedroom Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4448887 **Description / Location:** Tan Joint Compound
Client No.: A15 South Cabin #3 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.9	Chrysotile	None Detected	None Detected	PC 98.1

Lab No.: 4448888 **Description / Location:** White Wall Texture
Client No.: A16 South Cabin Living Room N.Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448889 **Description / Location:** Tan/Black Vinyl Sheet Flooring
Client No.: A17 South Cabin Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	65

Lab No.: 4448890 **Description / Location:** Tan/Black Vinyl Sheet Flooring
Client No.: A18 South Cabin Hall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	65

Lab No.: 4448890 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: A18 South Cabin Hall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448891 **Description / Location:** Black Tar Paper
Client No.: A19 South Cabin #4

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

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Analytical Method: EPA 600/R-93/116

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Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448892 **Description / Location:** Brown Paper
Client No.: A20 North Cabin #3 Near Front Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4448893 **Description / Location:** Tan Glazing
Client No.: A21 North Cabin #2 Ext. Bathroom Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448894 **Description / Location:** Grey Cementitious
Client No.: A22 Crawl Space Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448895 **Description / Location:** Grey Brick Mortar
Client No.: A23 Chimney In Crawl Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448896 **Description / Location:** Tan/Black Wire Insulation
Client No.: A24 Wire In Crawl Space

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	60	Cellulose	40

Lab No.: 4448897 **Description / Location:** Tan/Black Vinyl Sheet Flooring
Client No.: A25 North Cabin #1 Bathroom Entry

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	65

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448898 **Description / Location:** Lt.Brown Rubber Floor Tile
Client No.: A26a Kitchen Area

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448898 **Description / Location:** Tan Mastic **Layer No.:** 2
Client No.: A26a Kitchen Area

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448898 **Description / Location:** Blue Paper **Layer No.:** 3
Client No.: A26a Kitchen Area

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4448899 **Description / Location:** Lt.Brown/Black Vinyl Sheet Flooring
Client No.: A26b Kitchen Area

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	65

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448900 **Description / Location:** Tan/White Ceiling Tile; 1x1
Client No.: A27 North Cabin #1 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	95	Cellulose	5

Lab No.: 4448901 **Description / Location:** Tan Fiberboard
Client No.: A28 North Cabin #3 East Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Cellulose	2

Lab No.: 4448902 **Description / Location:** Lt.Brown Vinyl Sheet Flooring
Client No.: A29 North Cabin #2 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448902 **Description / Location:** Tan Mastic **Layer No.:** 2
Client No.: A29 North Cabin #2 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: B. Hargrove

Date: 10/12/2011

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Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254337
Project: Radium Hot Spring Lodge
Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448903 **Description / Location:** Tan Floor Tile
Client No.: A30 North Cabin #2 Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.8	Chrysotile	None Detected	None Detected	PC 96.2

Lab No.: 4448903 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: A30 North Cabin #2 Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448904 **Description / Location:** Lt.Brown Floor Tile
Client No.: A31 North Cabin #3 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 4.2	Chrysotile	None Detected	None Detected	PC 95.8

Lab No.: 4448905 **Description / Location:** Tan Insulation
Client No.: A32 North Cabin #3 East Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Cellulose	2

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: B. Hargrove

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254337
Project: Radium Hot Spring Lodge
Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448906 **Description / Location:** Lt.Brown Floor Tile
Client No.: A33 North Cabin #4 Entry

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 4.8	Chrysotile	None Detected	None Detected	PC 95.2

Lab No.: 4448906 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: A33 North Cabin #4 Entry

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448907 **Description / Location:** Off-White Vinyl Sheet Flooring
Client No.: DupA1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	79
		1	Fibrous Glass	

Lab No.: 4448908 **Description / Location:** Tan Joint Compound
Client No.: DupA2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.2	Chrysotile	None Detected	None Detected	PC 97.8

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: B. Hargrove

Date: 10/12/2011

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254337
Project: Radium Hot Spring Lodge
Project No.: 11192-Cabins

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448909 **Description / Location:** Tan Insulation
Client No.: DupA3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Cellulose	2

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: B. Hargrove

Date: 10/12/2011

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Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Cabins

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [●] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[●] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX [●] Email

[ ] 10 Day [ ] 5 Day [●] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A1 (start) - A33 + Dup A1-A3 (end) IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): 10/11/11 Date: _____ Time: _____
Sample Prep (Name / IATL): _____ Date: _____ Time: _____
Analysis(Name(s) / IATL): 10-12-11 Date: _____ Time: _____
QA/QC Review (Name / IATL): 10-13-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

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BULK MATERIAL SAMPLING LOG

ASB

Worksite: Radium Hot Springs Lodge Date: Oct 1/2011

Client: PWGSC Job No.: 11192-C

Date Results Required: No. Samples: Page 1 of 3

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A1	yellow	window glazing	South cabin #4 window	fair 4448873	4m	111-0590
A2	gray	parchment	South cabin #1 ~~#4~~ ~~south~~ side wall - crawlspace	fair 4448874	all near + side walls of crawlspace	0591
A3	"	"	South cabin #4 rear wall - crawlspace	fair 4448875	20m² x 2m²	0592
A4	white black rubber	wire insulation single wire	South cabin crawlspace	good 4448876	~40m	0593
A5	black	wire insulation double wire	crawlspace South cabin	good 4448877	unk. 3+m	0594
A6	gray	chimney mortar	crawlspace South cabin	good 4448878	2 chimneys	0595
A7	white ~~beige~~ squares	lino	South cabin #1 bathroom	good 4448879	6m²	0606
A8	white	ceiling tile	South cabin #1 living room	good 4448880	entire living/kitchen	0607
A9	white squares	lino	South cabin #2 entrance	good 4448881	8m²	0614
A10	gray	drywall putty	South cabin #2 kitchen wall	fair 4448882	entire kitchen 9m²	0617
A11	gray	drywall putty	South cabin #2 kitchen wall	fair 4448883	entire kitchen 9m²	0615
A12	white	wall texture	South cabin #3 bathroom wall	fair 4448884	6m²	0618
A13	"	"	"	fair 4448885	6m²	0619
A14	white	ceiling tile	South cabin #3 bedroom ceiling	poor 4448886	20m²	0620

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

ASB

Worksite: Radium Hot Springs Lodge Date: 4 Oct / 2011

Client: PWGSC Job No.: 11192-C

Date Results Required: No. Samples: Page 2 of 3

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A15	gray	drywall putty	South cabin #3 bathroom	poor 4448887	16m²	0638
A16	white	wall texture	South cabin living room N-wall	fair 4448888	4m²	0643
A17	brown	vinyl floor tile	South cabin living room	good 4448889	16m²	0644
A18	brown	"	South cabin hall	good 4448890	3m²	0645
A19	black	tar paper	South cabin #4	good 4448891	entire ext. under wood siding	0646
A20	black	tar paper	North cabin #3 near front door	good 4448892	entire ext. under wood siding	0669
~~A21~~	~~yellow~~	~~window glazing~~	~~North cabin #3 front door~~			
A21	yellow	window glazing	North cabin #2 ext. bathroom window	good 4448893	3 small windows	0671
A22	white	parchment	crawlspace exterior	poor 4448894	entire crawlspace exterior	0673
A23	gray	brick mortar	chimney in crawlspace	good 4448895	2 chimneys	0675
A24	white + black	wire insulation	wire in crawlspace	poor 4448896	unk. throughout	0676
A25	black + red	sheet flooring - blackish w/ red mastic	North cabin #1 bathroom entry	good 4448897	throughout unit except bedroom	0682
A26a	brown	vinyl floor tile	"	good 4448898	4.5m²	0681
A26b			→ kitchen area			
A27	white	1x1 tile panel	North cabin #1 bathroom	good 4448899	4.5m²	0683

4448900

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BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Springs Lodge Date: 4 OCT/2011

Client: PWGSC Job No.: 11192-C

Date Results Required: No. Samples: Page 3 of 3

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A28	brown	fibre board	North cabin #3 east wall	poor 4448901	all interior walls	0704
A29	beige/ brown	lino	North cabin #2 bathroom	good 4448902	3m²	0705
A30	light + dark brown streaks	vinyl floor tile	North cabin #2 kitchen	good 4448903	kitchen area	0707 ~~0706~~
A31	light brown w/ streaks white	vinyl floor tile	North cabin #3 bathroom	good 4448904	entire bathroom	0708
A32	brown	insulation paper	North cabin #3 east wall	poor 4448905	entire unit	0709
A33	light brown w/ white streaks	vinyl floor tile	North cabin #4 entry	good 4448906	entire unit except bathroom	0734
Dup A1				4448907		
Dup A2				4448908		
Dup A3				4448909		

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CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report Number: 254283
Project: Hazardous Materials Asses.
Project No.: 11192-Cabins

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4448733	P1	White Paint; South Cabin #1 Balcony Railing (Ext.)	5.3
4448734	P2	Yellow Paint; South Cabin #1 Window Trim, North Side (Ext.)	0.024
4448735	P3	Grey/White Paint; South Cabin #1 Porch (Ext.)	0.13
4448736	P4	Red/White Paint; South Cabin #3 Red Painted Fire Extinguisher Box (Ext.)	3.2
4448737	P5	Green Paint; South Cabin #4 Outside Wall Of Crawl Space	0.028
4448738	P6	White Paint; South Cabin #1 Living/Kitchen	0.0044
4448739	P7	Yellow Paint; South Cabin #1 Living/Kitchen, Small Wall	0.041
4448740	P8	White Paint; South Cabin #2 Kitchen Ceiling	<0.0086
4448741	P9	Yellow Paint; South Cabin #2 Kitchen Wall	<0.0095
4448742	P10	Brown Paint; South Cabin #4 Porch	4.6

Accreditations: NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/7/2011
Date Analyzed: 10/12/2011
Analyst: C. Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report Number: 254283
Project: Hazardous Materials Asses.
Project No.: 11192-Cabins

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4448743	P11	White Paint; North Cabin #1 Siding, North Wall	0.17
4448744	P12	Yellow Paint; North Cabin #2 Window, North Side	0.20
4448745	P13	Grey Paint; North Cabin #1 Porch, Deck	8.7
4448746	P14	White/Brown/Grey Paint; North Cabin #1 East Wall Of Top Of Crawl Space	1.7
4448747	P15	White/Green Paint; North Cabin #1 East Wall Of Top Of Crawl Space	0.015***
4448748	DupP1	Lead In Paint	1.1
4448749	DupP2	Lead In Paint	0.026

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analystical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/7/2011

Date Analyzed: 10/12/2011

Analyst: C. Shaffer

E-MAILED
10.12.11

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Asbestos Testing Laboratories

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - Cabins

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [ ] Bulk [ ] Other
[ ] Water [■] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[■] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[ ] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ❑ Verbals ❑ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): P1 (start) - P15 (end) + Dup P1 & P2 IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): M 10/10/11 Date: _____ Time: _____
Sample Prep (Name / IATL): 10/12/11 Date: _____ Time: _____
Analysis(Name(s) / IATL): _____ Date: _____ Time: _____
QA/QC Review (Name / IATL): dbc 10-13-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

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BALLAST
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Paint

BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Spring Lodge Date: Oct 4, 2011

Client: PWGSC Job No.: 11192-C

Date Results Required: No. Samples: Page 1 of 2

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	white	South cabin #1	balcony railing (ext.)	poor 4448733	all siding + railings	111-0584
P2	yellow	"	window trim (north side) (ext)	fair 4448734	all windows + doors	0585
P3	gray/white	"	porch (ext.)	poor 4448735	porches of #1,4 6m²	0586
P4	red/white	South cabin #3	red painted fire ext. box (ext.)	fair 4448736	1m²	0587
P5	green paint	South cabin #4	outside wall of crawlspace	poor 4448737	all ext. crawlspace walls	0588
P6	white	South cabin #1	living/kitchen	fair 4448738	all interior walls except bathroom	0601 ~~0600~~
P7	yellow	South cabin #1	living/kitchen small wall	fair 4448739	18m²	0600
P8	white	South cabin #3	kitchen ceiling	poor 4448740	all int. walls, kitchen ceiling	0613
P9	yellow	South cabin #2	kitchen wall	fair 4448741	all int. kitchen walls	0616
P10	brown	South cabin #4	porch	poor 4448742	#4 porch	0642
P11	white	North cabin #1	siding (n. wall)	poor 4448743	entire wood siding	0661
P12	yellow	North cabin #2	window (n. side)	fair - poor 4448744	all trim (windows + doors)	0662
P13	gray	North cabin ~~#4~~ #1	porch (deck)	poor 4448745	both decks/porches	0663
P14	white/brown/gray	North cabin #1	East wall of top of crawlspace	fair 4448746	entire wood siding	0664

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Springs Lodge Date: 4 OCT / 2011

Client: PWGSC Job No.: 11192-C

Date Results Required: No. Samples: Page 2 of 2

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P15	white/ green	North column #1	East wall of crawlspace	poor 4448747	entire crawlspace extension	0666
Dup P1				4448748		
Dup P2				4448749		

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

BATCH / SAMPLE MANAGEMENT REPORT

Customer No.: BAL082

Customer: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Customer Rep: RS

Batch Number: 254283

Project:

Project Number: 11192

TAT: 3 Day

Date/Time Rec'd: 10/7/2011

# of Samples: 17 **Analysis:** **Lead Paint** **Time/Date Due:** 10/12/2011

Initials Signaling Acknowledgement ☐ RTP: _____ ☐ To PLM NOB _____ ☐ To TEM NOB _____

Special Instructions:

Admin Notes: Portal

Shipping Error:

_____ Samples were not received in a sealed container. Bulk samples not double bagged.
_____ Air Cassettes received open in bag… sample integrity compromised, possible contamination.
_____ Samples received wet.
_____ Samples received covered with dust… possible cross contamination.
_____ Sample containers damaged, contents spilled… possible cross contamination.
_____ Paperwork received in the same bag as samples possible contamination.
_____ No / Incomplete Chain of Custody Received.
_____ No / Incomplete Sample Log Received.
_____ Sample container IDs do not match the client's sample log.
_____ No Turnaround Time indicated.
_____ PCM Re-prep for TEM NIOSH 7402. Cassettes previously opened and portion of filter removed.
_____ Blank(s) not submitted as required by the requested analytical method.
_____ Minimum shipping requirements not attained. See attached Carrier Air Bill.
_____ Other: _____

Batch Error:

_____ Wrong Client ID Listed:
_____ Wrong Client Location Listed:
_____ Wrong Project ID Listed:
_____ Wrong TurnAround Time Listed:
_____ Wrong Due Date Listed:
_____ Wrong Date/Time Received Listed:
_____ Wrong Analysis Method Listed:
_____ Wrong Number of Samples Listed:

Login Error:

_____ Sample Log Stamped Incorrectly:
_____ Sample Containers Mislabelled:
_____ Duplicate / Extra Samples Not Stamped:
_____ Analyst Bench Sheet Error:

Copy: FE, JN, RS, SC

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway, Suite B, Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818
INFO@IATL.COM

DAILY QUALITY CONTROL DATA

LEAD SAMPLE ANALYSIS

(DATE: 10 / 12 / 11)

Standard	Total Lead (mg)	Percent Recovery **
Reagent Blank	0.000	< LOQ
Blank Spike	0.500	104
Lab control Std # 401	0.464	110
Matrix Spike - LBP *	1.02	104
Matrix Spike - Wipe *	1.58	103
Matrix Spike - Soil *	0.443	104
Matrix spike - Air *	0.050	102
2.5 ppm Standard	0.25	102
10.0 ppm Standard	1.0	103
40.0 ppm Standard	4.0	97

AIHA LAP-LLC No. 100188 **NYS-DOH** ELAP No. 11021

Analysis Method: ASTM D3335-85A
NIOSH 7082
EPA SW846 3050B 7000B

Comments: IATL assumes that all sampling complies with accepted methods.
All client supplied sampling data is assumed to be correct when calculating results.
Detection limit based upon 0.2 mg/L reporting limit and sample size.
* NIST Traceable.
** 80-120% acceptable limits.

Analyzed By: Chad Shaffer
R. Chad Shaffer

Date: 10/12/11

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

AAS.DailyQC.001

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 31-OCT-11
Report Date: 04-NOV-11 14:38 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1079108

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1079108-1 T1 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	42.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-2 T2 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-3 T3 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.2		0.50	mg/L		03-NOV-11	R2280826
L1079108-4 T4 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	57.3		0.50	mg/L		03-NOV-11	R2280826
L1079108-5 T5 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	3.30		0.50	mg/L		03-NOV-11	R2280826
L1079108-6 T6 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	2.58		0.50	mg/L		03-NOV-11	R2280826

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-CL	Waste	TCLP Leachable Metals	EPA SW846 METHODS 1311 AND 6010B

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-ICP-CL	**Waste**							
Batch R2280826								
WG1381861-2 DUP		**L1079108-1**						
Lead (Pb)-Leachable		42.7	41.2		mg/L	3.6	25	03-NOV-11
WG1381861-1 MB								
Lead (Pb)-Leachable			<0.50		mg/L		0.5	03-NOV-11

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # L1079106

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting Ltd.	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1: erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
		Email 2: elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403-452-3110 Fax: 403-452-3133	Email 3:	**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: 11192	
Company:		PO / AFE: 11192EH	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
		ALS Contact:	**Sampler:**

Sample Identification (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	TCLP-Lead
T1	26-Oct-11		Other	X
T2	26-Oct-11		Other	X
T3	26-Oct-11		Other	X
T4	26-Oct-11		Other	X
T5	26-Oct-11		Other	X
T6	26-Oct-11		Other	X

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observatic Yes / No ? If Yes add
Erin Humeny	31-Oct-11			31 Oct-11	15:21	21 °C				

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 28-OCT-11
Report Date: 04-NOV-11 15:12 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1078192

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-1 T1							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	124.0		42.4-139	%		04-NOV-11	R2281519
L1078192-2 T2							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	100.0		42.4-139	%		04-NOV-11	R2281519
L1078192-3 T3							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	87.0		42.4-139	%		04-NOV-11	R2281519
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	103.0		42.4-139	%		04-NOV-11	R2281519
L1078192-5 T5							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	1.00		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	0.37		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	1.37		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519
L1078192-6 T6							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30	DLIS	0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLIS	Detection Limit Adjusted: Insufficient Sample
DLM	Detection Limit Adjusted For Sample Matrix Effects
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PCB-PAINT-ED	Misc.	PCBs in Paint	EPA 3550/8082-GC-ECD

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-PAINT-ED	**Misc.**							
Batch R2281519								
WG1380593-2 LCS								
Aroclor 1260			110.0		%		65.5-118.8	03-NOV-11
WG1380593-1 MB								
Aroclor 1016			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1221			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1232			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1242			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1248			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1254			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1260			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1262			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1268			<0.30		mg/kg		0.3	03-NOV-11
Surrogate: Decachlorobiphenyl			116.0		%		42.4-139	03-NOV-11

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

L1078192

COC #

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1:	erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Calgary AB T2Z 3V7	Email 2:	elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403.452.3110 Fax: 403.4523.3133	Email 3:		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	11192	
Company:		PO / AFE:	11192 EH	
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
		ALS Contact:	Sampler:	

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCB in paint	Number of Containers
T1	26-Oct-11	-	Product	X	1
T2	26-Oct-11	-	Product	X	1
T3	26-Oct-11	-	Product	X	1
T4	26-Oct-11	-	Product	X	1
T5	26-Oct-11	-	Product	X	1
T6	26-Oct-11	-	Product	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Erin Humeny	28-Oct-11		SK	28 Oct	12:05	24 °C				

GENF 18.01 Front

Appendix 4a

Copy of the Historical Hazardous Building Materials Assessment for the Superintendent's House

Golder Associates Ltd.

1000, 940 - 6th Avenue S.W.
Calgary, Alberta, Canada T2P 3T1
Telephone 403-299-5600
Fax 403-299-5606

Golder Associates

REPORT FOR

HAZARDOUS BUILDING MATERIALS ASSESSMENTS
VARIOUS BUILDINGS
KOOTENAY AND LAKE LOUISE NATIONAL PARKS

Note: Some sections were removed from this Report that doesn't apply to the Superintendent's House

prepared for:

Parks Canada
~~Lake Louise, Yoho and Kootenay National Parks~~
PO Box 220
Radium Hot Springs, BC
V0A 1M0

DISTRIBUTION:

3 Copies	**Parks Canada** **Radium Hot Springs, BC**
2 Copies	**Golder Associates Ltd.** **Calgary, AB**

November 9, 2007 **07-1325-0394**

50 BEST EMPLOYERS IN CANADA 2007

CANADA'S 50 BEST MANAGED COMPANIES

EXECUTIVE SUMMARY

Golder Associates Ltd. (Golder) conducted hazardous building materials assessments in select buildings in Kootenay and Lake Louise National Parks. The surveys were completed from September 25 to 28, 2007, by James Kiryakos and Ryan Campbell, Occupational Hygiene Technologists, under the direction of Robert Smith, Senior Occupational Hygienist.

The purpose of the assessments was to identify hazardous building materials that may be disturbed or damaged during regular maintenance, repair, renovation or demolition activities.

The assessments were completed to determine the presence of hazardous building materials including asbestos-containing materials (ACM); lead-based paint; polychlorinated biphenyls (PCB) in fluorescent light ballasts; mercury in thermostats, pressure sensing devices and lightbulbs; radioactive materials in smoke detectors; ozone-depleting substances (ODS) in items or systems such as air conditioning units and refrigerators; miscellaneous chemicals in the buildings, visual indicators of the potential for Hantavirus and visible suspect fungal contamination that may be disturbed or damaged during regular maintenance, repair, renovation or demolition activities.

The buildings included in this project, as defined by Parks Canada, are as follows:

- Parks Canada Maintenance Compound in Lake Louise, Alberta; and
- Parks Canada McKay Maintenance Compound in Kootenay National Park:
  - ~~Garage;~~
  - ~~Stores Building;~~
  - ~~Carpentry/Paint Shop;~~
  - ~~Electrical/Plumbing Shops/Lunchroom; and~~
  - Superintendent's House.

Based on site observations and laboratory analysis, Golder makes the following conclusions:

1. The locations of the identified ACM are summarized in Table 5.1: Locations of Asbestos-Containing Materials.

Table 5.1: Locations of Asbestos-Containing Materials

Building	Location	Asbestos-Containing Material
Lake Louise Maintenance Compound	Intentionally remove from this report	
Garage, McKay Maintenance Compound		
Stores Building, McKay Maintenance Compound		
Carpentry/Paint Shop, McKay Maintenance Compound		
Superintendent's House, McKay Maintenance Compound	Throughout	3" Pipe Elbow Mudding
	Throughout	Straight Run Aircell Pipe Insulation
	Main Floor Living Room	Sheet Flooring, White Mosaic
	Second Floor Common Room	Sheet Flooring, White Mosaic
	Second Floor Bedroom	Sheet Flooring, White Mosaic
	Main Floor Washroom	Sheet Flooring, Red Orange Mosaic
	Master Bedroom	9" x 9" Floor Tile, Blue with White Streaks
	Master Bedroom	9" x 9" Floor Tile, White with Orange and Brown Spots

The majority of the ACM identified were observed to be in good condition at the time of the assessment. However, there were some ACM that were observed to be in moderate condition at the time of the assessment. Table 4.2: Asbestos-Containing Materials in Moderate Condition, outlines the location, condition and type of material.

Asbestos-containing vermiculite lose-fill insulation was confirmed to be present in the cinderblock wall along the perimeter walls of the Garage. It is expected that the vermiculite insulation is present throughout all four exterior cinderblock walls of the Garage.

2. The light grey-blue paint was found to be lead-based door and door frame and on the ceramic wall tiles.
3. ~~One suspect PCB-containing ballast was identified in the second Floor Women's Washroom in the Main Garage. Based on the age of the facility it is expected that other PCB-containing ballasts may be present in the buildings surveyed.~~
4. Mercury-containing thermostats were not identified in the buildings surveyed. Fluorescent light bulbs that may contain mercury vapour were identified throughout the buildings surveyed.
5. ~~A smoke detector was observed in the North and South Stairwell of the Lake Louise Maintenance Compound and the Second Floor Kitchen in the Main Garage at the McKay Maintenance Compound.~~
6. ODS were observed throughout the building surveyed, Table 4.4: Suspect ODS Equipment and Location, identifies the location of suspect ODS, type of equipment and qualities.
7. Various types of chemicals were observed in the buildings at the time of the survey. The chemicals observed were consistent with those expected for normal operation of the buildings.
8. There were no visual sign of rodent infestation observed at the time of the survey.
9. ~~Water staining was observed on the ceiling tiles in the east and west office cubicle areas on the Second Floor of the Lake Louise Maintenance Compound. Water damage was observed on the east wall in the mechanical room on the Second Floor of the Lake Louise Maintenance Compound.~~ Suspect fungal contamination was not observed at the time of the survey in the other buildings surveyed.

Based on the results of the sampling and inspection, the following recommendations are made:

1. Prior to renovation or demolition work, ACM that may be impacted must either be protected from impact or removed. The work should be completed by certified workers. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

   ACM in poor condition should be removed or repaired as soon as possible. ACM in moderate condition should be scheduled for repair or removal as scheduling permits but still

in a timely manner. ACM in good condition can be managed in place through the use of an Asbestos Management Program, until their condition or redundancy warrants their removal.

2. Disturbance of lead-based paint from construction and demolition may result in exposure to lead, either by inhaling or ingesting lead dust. Contamination can include contact with skin and clothing during the disturbance activities and workers must be aware of proper work procedures. If the items identified with lead-based paint are to be demolished or disposed, safe work procedures must be developed. If lead-based paint is to be abated, safe work procedures must be developed and a Toxicity Characteristic Leaching Procedure (TCLP) test must be performed on the lead-based paint waste prior to disposal.
3. Any fluorescent light ballasts which are to be disposed of should be sorted on-site by qualified personnel based on date of manufacture. PCB-containing ballasts must be identified, barrelled appropriately, and stockpiled on-site. Following removal of all fixtures, the barrelled PCB-containing light ballasts must be appropriately labelled, manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Environment Canada.
4. Mercury in bulbs pose no risk to workers or occupants provided the bulbs remain intact and undisturbed. It is recommended that at the time of renovation or demolition, all mercury-containing bulbs found in fluorescent fixtures should be kept separate from all other waste to prevent damage to the bulbs. These materials may be recycled and reused by qualified personnel or may be disposed of in accordance with regulations.
5. If smoke detectors suspected of containing radioactive material are to be disposed of, it must be handled in accordance with the Atomic Energy Control Act, Atomic Energy Control Regulations.
6. If equipment suspected of containing ODS is to be disposed of, it must be handled in accordance with Environment Canada's Ozone-Depleting Substances, 1998.

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LIST OF APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) conducted hazardous building materials assessments in select buildings in Kootenay and Lake Louise National Parks. The surveys were completed from September 25 to 28, 2007, by James Kiryakos and Ryan Campbell, Occupational Hygiene Technologists, under the direction of Robert Smith, Senior Occupational Hygienist.

The purpose of the assessments was to identify hazardous building materials that may be disturbed or damaged during regular maintenance, repair, renovation or demolition activities.

1.1 Scope of Work

The assessments were completed to determine the presence of hazardous building materials including asbestos-containing materials (ACM); lead-based paint; polychlorinated biphenyls (PCB) in fluorescent light ballasts; mercury in thermostats, pressure sensing devices and lightbulbs; radioactive materials in smoke detectors; ozone-depleting substances (ODS) in items or systems such as air conditioning units and refrigerators; miscellaneous chemicals in the buildings, visual indicators of the potential for Hantavirus and visible suspect fungal contamination that may be disturbed or damaged during regular maintenance, repair, renovation or demolition activities.

The buildings included in this project, as defined by Parks Canada, are as follows:

- ~~Parks Canada Maintenance Compound in Lake Louise, Alberta; and~~
- Parks Canada McKay Maintenance Compound in Kootenay National Park:
  - ~~Garage;~~
  - ~~Stores Building;~~
  - ~~Carpentry/Paint Shop;~~
  - ~~Electrical/Plumbing Shops/Lunchroom; and~~
  - Superintendent's House.

2.0 REGULATIONS, GUIDELINES AND CODES

Parks Canada employees are federally regulated. Most other parties conducting work for Parks Canada are governed by provincial regulations.

2.1 Federal Regulations

In federal jurisdictions, hazardous building materials are regulated by Human Resources and Social Development Canada (HRSDC) under the Canada Labour Code, Part II. Specifically, Part X, Hazardous Substances, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- maintain a record of all hazardous materials;
- undertake a hazard investigation by a competent person;
- ensure materials are properly stored and handled;
- post warning signs;
- inform and educate employees regarding hazards; and
- control exposure through substitution, engineering or protective equipment.

In Canada, environmental matters including the handling of hazardous building materials generally fall under the Government of Canada's Canadian Environmental Protection Act, 1999, S.C. 1999 c. 33 (as amended up to 2003) and applicable regulations and guidelines.

Other federal regulations are detailed below.

Lead-Based Paint

Lead was used as a pigment and drying agent in alkyd oil-based paint. The Liquid Coating Materials Regulations were enacted under the Hazardous Products Act in 1976 to restrict the lead content of paints and other liquid coatings on furniture, household products, children's products, industrial surfaces and exterior and interior surfaces to 0.5% by weight. The Canadian Paint and Coatings Association (CPCA), the national trade association for Canada's paint manufacturers, recommended that the Canadian paint industry voluntarily stop using any lead compounds in consumer paints by the end of 1990. Over the years, the amount of lead in paint has continued to decrease, due to the co-operative efforts of government and industry.

Polychlorinated Biphenyls (PCB)

PCBs are used as a dielectric fluid in electrical equipment such as transformers. The use of capacitors in fluorescent lamp ballasts was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152 prohibits the use of PCBs in this electrical equipment installed after July 1, 1980. The Federal Chlorobiphenyls Regulation, SOR/92-507, outlines the handling, storage and disposal of PCBs and PCB-containing equipment.

Prior to disposal, all ballasts should be compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.

Ozone-Depleting Substances (ODS)

In 1994, the federal government filed the Ozone-Depleting Substances Regulations to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations, effective July 1, 1999, was filed to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning.

Canadian Environmental Protection Act (1999), Ozone-Depleting Substances Regulations, 1998, controls the import, manufacture, use, sale, and export of ODS. The regulation also requires that permits be obtained to import or export used, recovered, recycled and reclaimed ODS.

Radioactive Materials

Radioactive material found in smoke detectors is regulated under the Atomic Energy Control Act, Atomic Energy Control Regulations.

2.2 Provincial Regulations

2.2.1 Alberta

Alberta Occupational Health and Safety Code

The Alberta Occupational Health and Safety Code is law which was passed to protect the health and safety of workers on the job. As such, the Code and the sections under the Code are enforceable by law. The Code places the onus on both the employer and the employee to ensure a safe working environment.

Part 4, Chemical Hazards, Biological Hazards and Harmful Substances, represents minimum requirements and specifies, among many other things, the general requirements for working with and around harmful substances. Control of worker exposure to airborne contaminants is detailed and the occupational exposure limits are specified in Schedule 1 of the Regulation.

Part 4 and Schedule 1, Table 2 in the Alberta Occupational Health and Safety Code outlines the general requirements to be followed when working with asbestos. It also defines occupational exposure limits (OEL) for a variety of airborne contaminants. The OEL for a particular contaminant represents conditions to which it is believed that nearly all workers may be exposed,

day after day, without suffering from adverse health effects. Due to individual susceptibility, a small percentage of workers may experience discomfort at concentrations below the applicable OEL. An 8-hour OEL refers to the average concentration of a substance over an 8-hour period.

Sections 28 through 38 in Part 4 of the Alberta Occupational Safety Code outline the requirements related to asbestos in facilities. Sections 31 to 35 specifically outline the limitations on the use of asbestos in buildings. The requirements of Sections 31 through 35 are summarized below:

- if asbestos fibres may be released in a building all necessary steps to correct this unsafe condition must be taken;
- asbestos products that have the potential for releasing fibres may not be installed;
- all materials containing crocidolite are banned from use;
- spray-applied asbestos products are banned from use;
- asbestos products, in general, must not be in a form or location where they could release airborne fibres and allow them to enter a ventilation system;
- buildings to be demolished are to have all materials with the potential of releasing asbestos fibres removed; and
- all materials with the potential of releasing asbestos fibres that may be impacted by a renovation must be either encapsulated, enclosed or removed.

Alberta Employment, Industry and Immigration does not consider materials containing less than 1% asbestos by weight to be asbestos-containing materials requiring specialized handling, removal and disposal practices. However, there are two exceptions: first, where a material contains less than 1% asbestos but will release sufficient fibres to create a "restricted area" the material must be removed prior to it being impacted. A "restricted area" is defined as an area of the work site where there is a reasonable chance airborne concentrations of asbestos will exceed the OEL. Second, vermiculite insulation contaminated with asbestos fibres must be removed prior to being impacted regardless of its percent asbestos content.

For the purpose of this assessment, drywall joint compound containing less than 1% by weight of asbestos will be considered as asbestos-containing, because there is a reasonable chance that during hand demolition or renovations a "restricted area" may be created.

Alberta Employment, Industry and Immigration Asbestos Abatement Manual

The Alberta Employment, Industry and Immigration Asbestos Abatement Manual is a guide published by Alberta Employment, Industry and Immigration - Workplace Health and Safety that is used as a guide for determining compliance with the Occupational Health and Safety Code in

the Province of Alberta. It covers basic information on asbestos, its health hazards, requirements for worker protection, safe work practices, assessing exposure risk, and the basic principles to follow for the safe abatement of ACM.

Assessing Exposure Risk

Asbestos must be inhaled or ingested to cause disease. Intact and undisturbed asbestos presents no direct health hazard but does present a potential exposure hazard should fibres be released and taken into the body. As a result there is some risk associated with all asbestos installations.

The health risk is considered minimal for ACM in good condition in an inaccessible location and protected from damage. Where damage can be controlled or prevented, managing the exposure risk is often the most cost-effective control measure. Where damage or disturbance cannot be controlled or where deterioration is due to uncontrolled natural causes, management of the exposure risk is very difficult.

The use of air monitoring of occupied areas is not considered an acceptable method to determine whether or not ACM must be removed, enclosed, encapsulated or may be left as is (with a management system). Air monitoring alone is insufficient to determine the potential health and exposure risk since asbestos fibres cannot usually be detected above background levels unless the material is disturbed in some way. Additional criteria are needed to determine the risk of exposure of the need for removal.

The risk exposure criteria and levels of action as defined by the Alberta Asbestos Abatement Manual are detailed in Table 2.1: Assessing Exposure Risk and Table 2.2: Determining the Level of Action.

Table 2.1: Assessing Exposure Risk

Factor	Description	Rating
Accessibility of Material	• accessible in high activity areas • accessible in low activity areas or beyond the reach of area occupants	• high (H) • medium (M)
	• enclosed	• low (L)
Condition of Material	• severe damage • mild to moderate damage • good condition	• high (H) • medium (M) • low (L)
Friability of Material	• easily breaks apart • mild to moderate friability • non-friable	• high (H) • medium (M) • low (L)

Table 2.2: Determining the Level of Action

	Asbestos Not Present in Return Air Plenum		Asbestos Present in Return Air Plenum
	Less than 20% Asbestos Content in Material	Greater than 20% Asbestos Content in Material	
Immediate Control Measures Required	2Hs or 3Ms	1H or 2Ms	Immediate control and abatement required unless 3Ls and less than 20% asbestos content in material
Control Measures Required	1H or 2Ms	1M	
No Control Required	1M or 3Ls	3Ls	

Alberta Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act is law which was passed to protect and enhance the environment. As such, the Act and the regulations under the Act are enforceable by law. The Act places the onus on the owner, employer and employee to ensure no adverse effects are experienced in the environment.

Though asbestos is not considered hazardous waste, Alberta Environmental Protection has published guidelines for the disposal of asbestos waste. Within the guidelines, criteria have been established for the handling, transportation and disposal requirements of asbestos waste. Also, within the guidelines, the types of landfills that can accept asbestos waste are outlined.

The Waste Control Regulation (Alberta Regulation 129/93 with amendments up to and including Alberta Regulation 257/93), refers to the Alberta User Guide for Waste Managers, which outlines the materials and criteria to be used to characterize waste as hazardous. PCBs and mercury have established criteria which define whether or not these materials are hazardous waste.

In accordance with Section 13.1 of the Waste Control Regulation, PCB-containing equipment is defined as any equipment, machinery or similar manufactured items, including a capacitor, and an electrical transformer, that contains a PCB liquid or solid. This definition includes fluorescent light ballasts which contain PCBs in the capacitor. Following removal of all fixtures, the barrelled PCB-containing light ballasts must be appropriately labelled, manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Alberta Environmental Protection.

Elemental mercury used in switches can be recycled as outlined under Part 1 – Hazardous Waste and Hazardous Recyclables of the Waste Control Regulation. Within Part 1, the conditions, requirements and operating conditions for recycling facilities are outlined.

The Ozone-Depleting Substances and Halocarbons Regulation (Section 181/2000), in the Environmental and Protection and Enhancement Act, provides details for identification, uses and disposal of ODS in Alberta.

2.2.2 British Columbia

In British Columbia, workplace health and safety is regulated by the Workers' Compensation Board of British Columbia (BC WCB) under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999).

In British Columbia, environmental matters pertaining to waste generally fall under the jurisdiction of the Ministry of Water, Land and Air Protection (MWLAP), pursuant to the Waste Management Act (RSBC) 1996, as amended October 1997. The key waste regulation under the Waste Management Act relating to hazardous building materials is the Special Waste Regulation (SWT), BC Reg. 63/88.

Asbestos-Containing Materials (ACM)

The Workers' Compensation Board of British Columbia has published Safe Handling of *Asbestos, A Manual of Standard Practices*. This manual outlines basic information on asbestos and asbestos products, health hazards requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACM. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

Polychlorinated Biphenyls (PCB)

Prior to disposal, all ballasts should be compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.

Mercury

When taken out of service, handle, store and dispose of mercury-containing building materials in accordance with the requirements of BC Reg. 296/97, as amended by BC Reg. 185/99 and the British Columbia Ministry of Water, Land and Air Protection – Special Waste Regulation. Mercury is commonly found in buildings as mercury vapour lighting, in thermometers, thermostats and in some electrical switches. Mercury can also be found in small amounts in fluorescent lamp tubes and in paints and adhesives. Mercury or mercury vapour in light fixtures or thermostats poses no risk to workers or occupants provided the mercury containers remain intact and undisturbed. Prior to demolition, mercury-containing materials and equipment must be removed and disposed of in accordance with provincial regulations.

Ozone-Depleting Substances (ODS)

Ozone-Depleting Substances and Other Halocarbon Regulations (including amendments up to B.C. Reg. 109/2002), in the Waste Management Act of British Columbia, establishes criteria for ODS. Schedule A in the regulation lists all ozone-depleting refrigerant types. Equipment containing ODS should be maintained by a licensed contractor and handled in accordance with provincial regulations. ODS are present in refrigerators and freezers, vending machines (refrigerated), water fountains/water coolers, and air conditioning systems.

2.3 Other Guidelines

Presently there are no regulations in Alberta and BC specifically addressing lead levels in paint. However, there is still an onus on an employer to ensure the health and safety of workers engaged in the work and on the work site of that employer, and there are requirements under the Environmental Protection and Enhancement Acts to prevent the release of lead into the environment. In these circumstances, Golder has used the regulations set by the Hazardous Products Act (HPA) and the U.S. Department of Housing and Urban Development (HUD). The HPA classifies lead-based paint as 0.5% lead by weight tested by chemical analysis. HUD classifies lead-based paint as any paint application containing at least 0.5% by weight (5,000 mg/kg) or 1.0 milligram of lead per square centimetre of surface area (mg/cm^2).

There are no specific regulations governing fungal contamination in Alberta and BC, however, according to Health Canada[1] and the Canadian Construction Association[2] guidelines on assessment and remediation of fungi in indoor environments, building materials supporting microbiological growth must be remediated *as rapidly as possible* in order to ensure a healthy

[1] *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods*, Health Canada, July 2004.
[2] *Mould Guidelines for the Canadian Construction Industry*, Canadian Construction Industry, Copyright 2004.

environment. Repair of the defects that led to water accumulation should be conducted in conjunction with or prior to the remediation.

2.4 Transportation of Hazardous Waste

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods Act and Regulations which outline the requirements for storage, handling, and transportation of such waste.

3.0 METHODOLOGY

Available information was gathered about the buildings including age, type of structure, presence of renovated areas or additions, and any details regarding the building mechanical systems. The systems reviewed were:

- mechanical: building mechanical systems such as the heating, ventilating and air conditioning (HVAC) systems were inspected for the presence of hazardous building materials. The inspection included insulation on ductwork, pipework and fittings, such as steam, condensate, chilled water, glycol, and domestic hot and cold water.
- structural: the method of construction of the building was determined, including interior store areas, mezzanines and roofing support systems. Fireproofing, fire-stop and other materials installed as a part of the structure were reviewed.
- architectural: the presence of hazardous building materials was assessed in building materials and finishes such as floor and ceiling tiles, texture coats, asbestos sheet materials, condensation control applications, spray-applied acoustical materials, light fixtures, paints and spray-applied insulation on areas of the structure.

The assessments were conducted on a building-by-building and room-by-room basis. During the assessment Golder assigned room names and numbers as required and detailed notes were taken with each sample including the room number, type of material and sample location. A digital photograph was taken of each sampling location. Floor plans sketched by Golder indicating room names are provided in Appendix I.

Materials suspected of containing asbestos were sampled and submitted to ATC Associates, Inc. for analysis to determine asbestos type and percentage content using Polarized Light Microscopy and dispersion staining techniques in accordance with the United States Environmental Protection Agency (EPA). Samples of vermiculite were obtained by hammering into cinderblock walls. The holes were then sealed with spray adhesive and duct tape by Golder. Golder did not sample materials where the sampling would have affected the operation of equipment (e.g., wiring).

Testing for lead-based paint was conducted by X-ray fluorescence (XRF) analysis using a Niton XL-700 XRF paint analyzer. The use of an XRF analyzer allows for the rapid, accurate, on-site determination of lead-based paint. Accessible painted surfaces were tested for the presence of lead. Where inconsistencies were revealed in the recorded levels, repeat measurements were taken. Results from this device were reported as mass of lead per unit area mg/cm^2.

The buildings were visually assessed for the presence of PCBs in fluorescent light ballasts. Suspected PCB-containing light ballasts were inspected and compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of being PCB-containing. A limited, yet representative number of fixtures were assessed.

The buildings were visually assessed for the presence of mercury in thermostats, pressure sensing devices and lightbulbs; radioactive materials in smoke detectors; ODS in items or systems such as air conditioning units and refrigerators; and miscellaneous chemicals.

The buildings were visually assessed for signs of rodent infestation which could indicate the possible presence of Hantavirus. Specifically, Golder conducted a visual inspection to identify rodent droppings, rodent nests, evidence of gnawing or visual identification of a mouse. The assessment was conducted following guidelines produced by the Centre for Disease Control.

The visual fungal investigation was conducted following Health Canada and American Conference of Governmental Industrial Hygienists (ACGIH) protocols for microbiological assessment and control, and was limited to areas with visual moisture damage. Where water staining, water damage or suspect fungal contamination was observed, Golder proposed to observe and document the impacted areas.

The assessment was completed during normal operating hours.

4.0 RESULTS AND DISCUSSION

4.1 Asbestos-Containing Materials

Seventy-nine samples of materials suspected to contain asbestos were collected and submitted for analysis. Sixteen of the samples were found to contain asbestos. The identified ACM are summarized in Table 4.1: Identified Asbestos-Containing Materials. The full results of asbestos analysis and the laboratory reports are provided in Appendix II. Photographs of the identified ACM are presented in Appendix III.

Table 4.1: Identified Asbestos-Containing Materials

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected: No/Yes: Type
Lake Louise Maintenance Compound			
Intentionally remove from this report			
Garage, McKay Maintenance Compound			
Intentionally remove from this report			
Stores Building, McKay Maintenance Compound			
Intentionally remove from this report			
Carpentry/Paint Shop, McKay Maintenance Compound			
Intentionally remove from this report			
Superintendent's House, McKay Maintenance Compound			
B-1	3" Pipe Elbow Mudding	Basement	Yes: 3% Chrysotile
B-4	Straight Run Aircell Pipe Insulation	Basement	Yes: 50% Chrysotile
1-1	Sheet Flooring, White Mosaic	Main Floor, Living Room	Yes: 10% Chrysotile
1-7	Sheet Flooring, Red Orange Mosaic	Main Floor, Washroom	Yes: 10% Chrysotile
2-2	9" x 9" Floor Tile, Blue with White Streaks	Second Floor, Master Bedroom	Yes: 2% Chrysotile
2-3	9" x 9" Floor Tile, White with Orange and Brown Spots	Second Floor, Master Bedroom	Yes: 2% Chrysotile

The majority of the ACM identified were observed to be in good condition at the time of the assessment. However, there were some ACM that were observed to be in moderate condition at the time of the assessment. Materials in moderate condition are outlined in Table 4.2: Asbestos-Containing Materials in Moderate Condition.

Table 4.2: Asbestos-Containing Materials in Moderate Condition

Building	Location	Asbestos-Containing Material
Garage, McKay Maintenance Compound	Intentionally remove from this report	
Carpentry/Paint Shop, McKay Maintenance Compound		

4.2 Lead-Based Paint

Forty-three samples of paint were analyzed for lead content. Two of the samples were found to be lead-based. The identified lead-based paints are detailed in Table 4.3: Identified Lead-Based Paint. The full results of the paint analysis by XRF are provided in Appendix IV.

Table 4.3: Identified Lead-Based Paint

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Carpentry/Paint Shop, McKay Maintenance Compound				
	Intentionally remove from this report			

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification

4.3 Polychlorinated Biphenyls (PCB)

A limited yet representative number of ballasts were assessed in each building. ~~One suspect PCB-containing ballast was identified in the Second Floor Women's Washroom in the Main Garage at the McKay Maintenance Compound.~~ However, based on the age of the buildings it is expected that more PCB-containing ballasts may be present in the other buildings surveyed.

4.4 Mercury

Mercury-containing thermostats were not identified in the buildings surveyed.

Fluorescent light bulbs that may contain mercury vapour were identified throughout the buildings surveyed.

4.5 Radioactive Material

~~A smoke detector was observed in the North and South Stairwell of the Lake Louise Maintenance Compound and the Second Floor Kitchen in the Main Garage at the McKay Maintenance Compound.~~

4.6 Ozone Depleting Substances

Equipment suspect of containing ODS are detailed in Table 4.4: Suspect ODS Equipment and Location.

Table 4.4: Suspect ODS Equipment and Location

Building	Location	Equipment	Quantity
Lake Louise Maintenance Compound	Intentionally remove from this report	Fridge	1
Garage, McKay Maintenance Compound			

Table 4.4: Suspect ODS Equipment and Location (Continued)

Building	Location	Equipment	Quantity
Stores Building, McKay Maintenance Compound	Intentionally remove from this report		
Carpentry/Paint Shop, McKay Maintenance Compound			
Superintendent's House, McKay Maintenance Compound	Kitchen	~~Fridge~~	1

4.7 Miscellaneous Chemicals

Various types of chemicals were observed in the buildings at the time of the survey. The chemicals observed were consistent with those expected for normal operation of the buildings.

~~4.8 Hantavirus~~

There were no visual sign of rodent infestation observed at the time of the survey.

4.9 Fungal-Contaminated Building Materials

~~Water staining was observed on the ceiling tiles in the east and west office cubicle areas on the Second Floor of the Lake Louise Maintenance Compound.~~

~~Water damage was observed on the east wall in the mechanical room on the Second Floor of the Lake Louise Maintenance Compound.~~

Suspect fungal contamination was not observed at the time of the survey in any of the other buildings surveyed.

It should be noted that destructive wall cavity inspections were not included in the scope of work for this assessment.

5.0 CONCLUSIONS

Based on site observations and laboratory analysis, Golder makes the following conclusions:

1. The locations of the identified ACM are summarized in Table 5.1: Locations of Asbestos-Containing Materials.

Table 5.1: Locations of Asbestos-Containing Materials

Building	Location	Asbestos-Containing Material
Lake Louise Maintenance Compound	Intentionally remove from this report	
Garage, McKay Maintenance Compound		
Stores Building, McKay Maintenance Compound		
Carpentry/Paint Shop, McKay Maintenance Compound		
Superintendent's House, McKay Maintenance Compound	Throughout	3" Pipe Elbow Mudding
	Throughout	Straight Run Aircell Pipe Insulation
	Main Floor Living Room	Sheet Flooring, White Mosaic
	Second Floor Common Room	Sheet Flooring, White Mosaic
	Second Floor Bedroom	Sheet Flooring, White Mosaic
	Main Floor Washroom	Sheet Flooring, Red Orange Mosaic
	Master Bedroom	9" x 9" Floor Tile, Blue with White Streaks
	Master Bedroom	9" x 9" Floor Tile, White with Orange and Brown Spots

The majority of the ACM identified were observed to be in good condition at the time of the assessment. However, there were some ACM that were observed to be in moderate condition at the time of the assessment. Table 4.2: Asbestos-Containing Materials in Moderate Condition, outlines the location, condition and type of material.

~~Asbestos-containing vermiculite lose-fill insulation was confirmed to be present in the cinderblock wall along the perimeter walls of the Garage. It is expected that the vermiculite insulation is present throughout all four exterior cinderblock walls of the Garage.~~

2. The light grey-blue paint was found to be lead-based door and door frame and on the ceramic wall tiles.
3. ~~One suspect PCB-containing ballast was identified in the second Floor Women's Washroom in the Main Garage.~~ Based on the age of the facility it is expected that other PCB-containing ballasts may be present in the buildings surveyed.
4. Mercury-containing thermostats were not identified in the buildings surveyed. Fluorescent light bulbs that may contain mercury vapour were identified throughout the buildings surveyed.
5. ~~A smoke detector was observed in the North and South Stairwell of the Lake Louise Maintenance Compound and the Second Floor Kitchen in the Main Garage at the McKay Maintenance Compound.~~
6. ODS were observed throughout the building surveyed, Table 4.4: Suspect ODS Equipment and Location, identifies the location of suspect ODS, type of equipment and qualities.
7. Various types of chemicals were observed in the buildings at the time of the survey. The chemicals observed were consistent with those expected for normal operation of the buildings.
8. There were no visual sign of rodent infestation observed at the time of the survey.
9. ~~Water staining was observed on the ceiling tiles in the east and west office cubicle areas on the Second Floor of the Lake Louise Maintenance Compound. Water damage was observed on the east wall in the mechanical room on the Second Floor of the Lake Louise Maintenance Compound.~~ Suspect fungal contamination was not observed at the time of the survey in the other buildings surveyed.

6.0 RECOMMENDATIONS

Based on the results of the sampling and inspection, the following recommendations are made:

1. Prior to renovation or demolition work, ACM that may be impacted must either be protected from impact or removed. The work should be completed by certified workers. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

   ACM in poor condition should be removed or repaired as soon as possible. ACM in moderate condition should be scheduled for repair or removal as scheduling permits but still in a timely manner. ACM in good condition can be managed in place through the use of an Asbestos Management Program, until their condition or redundancy warrants their removal.
2. Disturbance of lead-based paint from construction and demolition may result in exposure to lead, either by inhaling or ingesting lead dust. Contamination can include contact with skin and clothing during the disturbance activities and workers must be aware of proper work procedures. If the items identified with lead-based paint are to be demolished or disposed, safe work procedures must be developed. If lead-based paint is to be abated, safe work procedures must be developed and a Toxicity Characteristic Leaching Procedure (TCLP) test must be performed on the lead-based paint waste prior to disposal.
3. Any fluorescent light ballasts which are to be disposed of should be sorted on-site by qualified personnel based on date of manufacture. PCB-containing ballasts must be identified, barrelled appropriately, and stockpiled on-site. Following removal of all fixtures, the barrelled PCB-containing light ballasts must be appropriately labelled, manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Environment Canada.
4. Mercury in bulbs pose no risk to workers or occupants provided the bulbs remain intact and undisturbed. It is recommended that at the time of renovation or demolition, all mercury-containing bulbs found in fluorescent fixtures should be kept separate from all other waste to prevent damage to the bulbs. These materials may be recycled and reused by qualified personnel or may be disposed of in accordance with regulations.
5. If smoke detectors suspected of containing radioactive material are to be disposed of , it must be handled in accordance with the Atomic Energy Control Act, Atomic Energy Control Regulations.
6. If equipment suspected of containing ODS is to be disposed of, it must be handled in accordance with Environment Canada's Ozone-Depleting Substances, 1998.

7.0 LIMITATIONS

The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted environmental assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

1. The data and findings presented in this report are valid as of the dates of the investigations. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.
2. The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined by the request of the client, the time and budgetary constraints imposed by the client, and availability of access to the properties.
3. Because of the limitations stated above, the findings, observations and conclusions expressed by Golder in this report are not, and should not be, considered an opinion concerning compliance of any past or present owner or operator of the site with any federal, provincial or local laws or regulations.
4. No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of investigation.
5. Golder's assessment reports present professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of the assessment report constitutes acceptance of the limits of Golder's liability. Golder's liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

8.0 CLOSURE

We trust the information presented in this report meets your requirements. If you have any questions please feel free to contact the undersigned at (403) 299-5600. Thank you for the opportunity to be of service.

GOLDER ASSOCIATES LTD.

Report prepared by:

James Kiryakos, B.Sc.
Occupational Hygiene Technologist

Report reviewed by;

Robert Smith, B. Kin
Occupational Hygienist

David Wytrykush, CRSP
Associate/Senior Occupational Hygienist

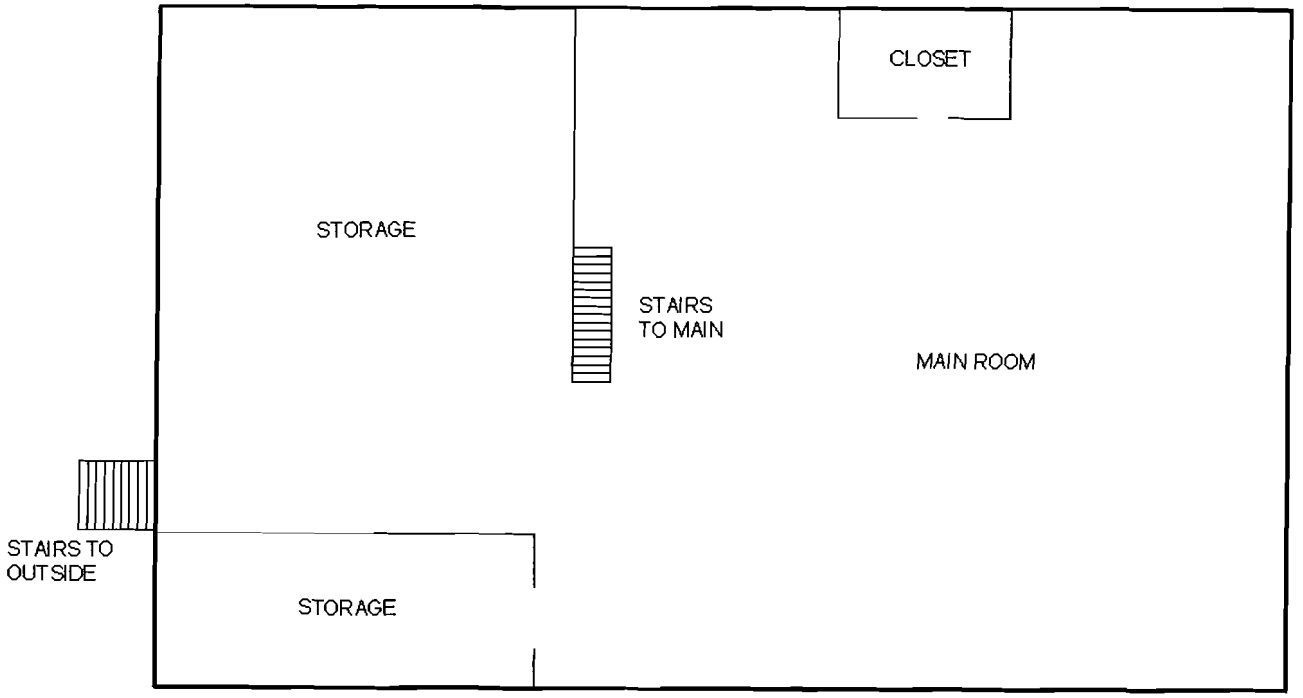
JK:RS:DW/jwc

R:\Active_2007\1325\071325.0391 to 0400\07-1325-0394 Parks Canada\Reports\FNL-RPT_Parks Canada Hazmat Report_07-1325-0394_Nov9-07.doc

APPENDIX I

FLOOR PLANS INDICATING SURVEY AREAS

L:\2007\1325 EHS\07-1325-0394\Fig 8 Basement.dwg Nov 05, 2007 - 9:32am



SCHEMATIC ONLY, NOT TO SCALE

REFERENCE

BASEMENT DRAWN FROM FIELD NOTES.

PROJECT

PARKS CANADA

TITLE

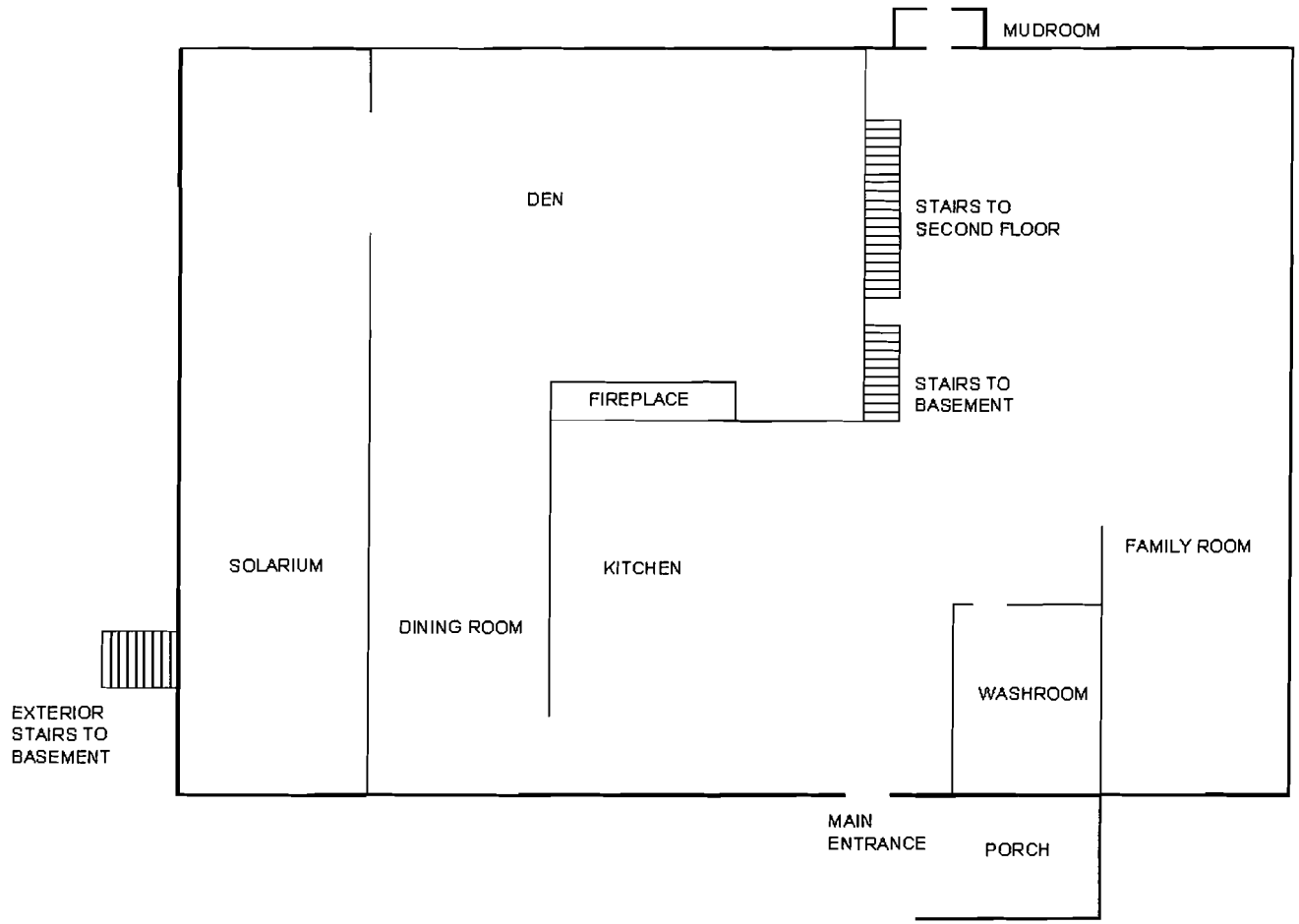
BASEMENT SUPERINTENDENT'S HOUSE

Golder Associates
Calgary, Alberta

PROJECT		07.1325.0394	FILE No.	Basement
DESIGN	RC	23/10/07	SCALE AS SHOWN	REV. 0
CADD	FN	02/11/07		
CHECK	RS	05/11/07		
REVIEW	RS	05/11/07		

FIGURE: 8

L:\2007\1325 EHS\07-1325-0394\Fig 9 Main Floor.dwg Nov 05, 2007 - 9:30am



SCHEMATIC ONLY, NOT TO SCALE

PROJECT

PARKS CANADA

TITLE

MAIN FLOOR SUPERINTENDENT'S HOUSE

Golder Associates
Calgary, Alberta

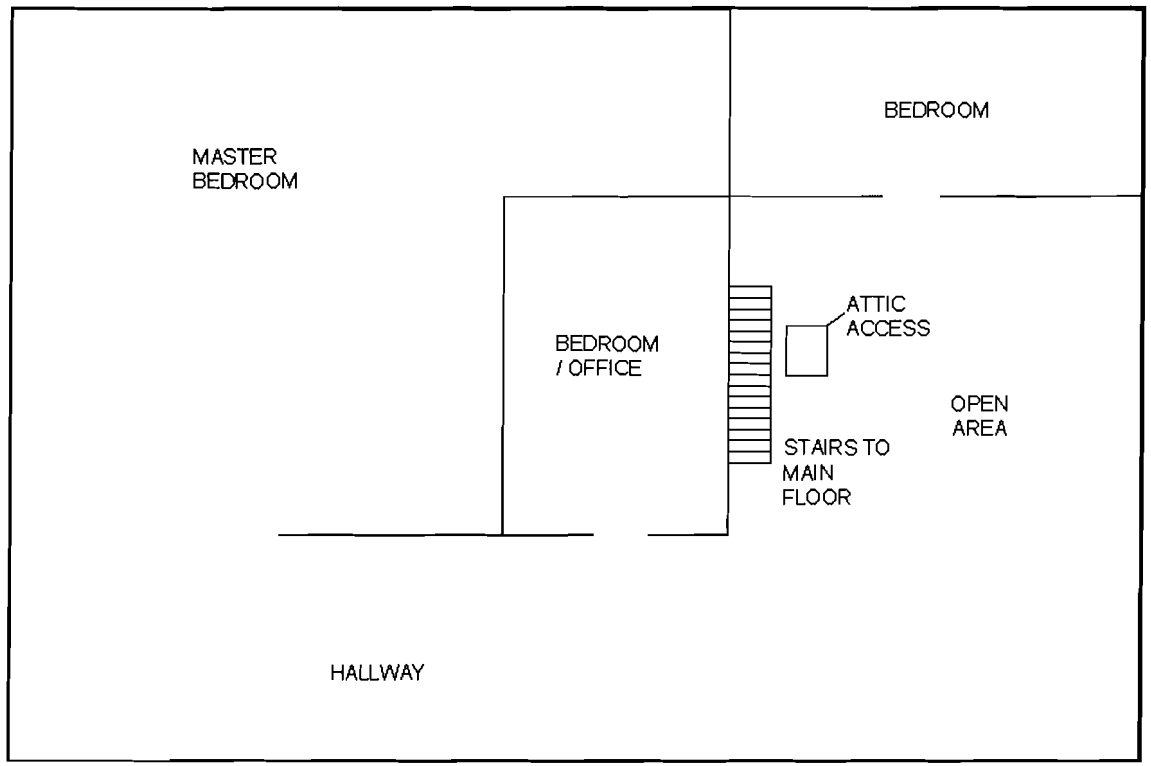
PROJECT		07.1325.0394	FILE No.	Main Floor
DESIGN	RC	23/10/07	SCALE AS SHOWN	REV. 0
CADD	FN	05/11/07		
CHECK	RS	05/11/07		
REVIEW	RS	05/11/07		

FIGURE: 9

REFERENCE

MAIN FLOOR DRAWN FROM FIELD NOTES.

L:\2007\1325 EHS\07-1325-0394\Fig 10 Second Floor.dwg Nov 05, 2007 - 9:28am



SCHEMATIC ONLY, NOT TO SCALE

REFERENCE

SECOND FLOOR DRAWN FROM FIELD NOTES.

PROJECT

PARKS CANADA

TITLE

SECOND FLOOR SUPERINTENDENT'S HOUSE

Golder Associates
Calgary, Alberta

PROJECT		07.1325.0394	FILE No.	Basement
DESIGN	RC	23/10/07	SCALE AS SHOWN	REV. 0
CADD	FN	02/11/07		
CHECK	RS	05/11/07	FIGURE: 10	
REVIEW	RS	05/11/07		

Table A-1: Results of Asbestos Analysis, Lake Louise Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected: No/Yes: Type

Intentionally remove from this report

Table A-2: Results of Asbestos Analysis, Garage, McKay Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected: No/Yes: Type
Intentionally remove from this report			

Table A-3: Results of Asbestos Analysis, Stores Building, McKay Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location / Description	Asbestos Detected: No/Yes: Type
Intentionally remove from this report			

Table A.4: Results of Asbestos Analysis, Carpentry Shop, McKay Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location / Description	Asbestos Detected: No/Yes: Type
Intentionally remove from this report			

Table A.5: Results of Asbestos Analysis, Electrical/Plumbing Shops/Lunchroom McKay Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location / Description	Asbestos Detected: No/Yes: Type
Intentionally remove from this report			

Table A-6: Results of Asbestos Analysis, Superintendent's House, McKay Maintenance Compound

Sample Number	Type of Material Sampled	Sample Location / Description	Asbestos Detected: No/Yes: Type
B-1	3" Pipe Elbow Mudding	Basement	**Yes: 3% Chrysotile**
B-2	Drywall Joint Compound	Basement	No
B-3	Plaster Scratch Coat on Pillar	Basement	No
B-4	Straight Run Aircell Pipe Insulation	Basement	**Yes: 50% Chrysotile**
B-5	Grey/Tan Transite	Basement	No
1-1	Sheet Flooring, White Mosaic	Main Floor, Living Room	**Yes: 10% Chrysotile**
1-2	Plaster Skim Coat on Walls	Main Floor, Living Room	No
1-3	Plaster Scratch Coat on Walls	Main Floor, Living Room	No
1-4	Texture Coating on Walls	Main Floor, Living Room	No
1-5	Drywall Joint Compound	Main Floor, Living Room	No
1-6	Sheet Flooring, White with Pink and Grey Streaks	Main Floor, Kitchen	No
1-7	Sheet Flooring, Red Orange Mosaic	Main Floor, Washroom	**Yes: 10% Chrysotile**
1-8	White Caulking	Main Floor, Washroom	No
1-9	Mortar from the Fireplace	Main Floor, Office	No
1-10	Insulation within Walls	Main Floor, Office	No
2-1	Drywall Joint Compound	Second Floor, Common Room	No
2-2	9" x 9" Floor Tile, Blue with White Streaks	Second Floor, Master Bedroom	**Yes: 2% Chrysotile**
2-3	9" x 9" Floor Tile, White with Orange and Brown Spots	Second Floor, Master Bedroom	**Yes: 2% Chrysotile**
E-1	Dark Green Roof Shingles	Exterior, Roof	No

Laboratory Bulk Asbestos Test Report

ATC ASSOCIATES INC.
Environmental, Geotechnical and Materials Professionals

Client: Golder Associates Ltd.
Address: 10th Floor, 940-6 Avenue SW Calgary, Alberta T2P 3T1
Project Name: Parks Canada Compound, Radium, B.C, (S. House)
Project Number: / P.O. Number: 07.1325.0394/GA07-0733
Date Analyzed: 10/05/07 **Page Number:** 1 of 1

Analytical method: Polarized light microscopy using dispersion staining (EPA/600/R-93/116)

Sample I.D. Number	Laboratory I.D. Number	Sample Color	Type of Asbestos	Percentage of Asbestos	Other Fibers	Percentage of Other Fibers	Type of Material
B-1	07B-28637	Grey	CHRY	3.0	CELL/FBGL	<1.0/20.0	Insulation
B-2	07B-28638	White/Lt. Grey	ND	ND	CELL	<1.0	DW/JC
B-3	07B-28639	Grey	ND	ND	CELL	<1.0	Plaster
B-4	07B-28640	Lt. Grey	CHRY	50.0	CELL/SYNTH	5.0/5.0	Insulation
B-5	07B-28641	Tan/Grey	ND	ND	CELL/SYNTH/ANML	<1.0/<1.0/<1.0	Cement
1-1	07B-28642	Brown/White	CHRY	10.0	CELL	<1.0	Flooring
1-2	07B-28643	White	ND	ND	CELL	<1.0	Plaster
1-3	07B-28644	White	ND	ND	CELL	<1.0	Plaster
1-4	07B-28645	White	ND	ND	CELL	<1.0	Texture Coat
1-5	07B-28646	White	ND	ND	CELL	<1.0	DW/JC
1-6	07B-28647	White/Pink/Grey	ND	ND	CELL/SYNTH	<1.0/2.0	Flooring/Mastic
1-7	07B-28648	Red/Orange	CHRY	10.0	CELL	<1.0	Flooring
1-8	07B-28649	White	ND	ND	CELL	<1.0	Caulking
1-9	07B-28650	Grey	ND	ND	CELL	<1.0	Mortar
2-1	07B-28651	White	ND	ND	CELL	<1.0	DW/JC
2-2	07B-28652A	Blue/White	CHRY	2.0	CELL	<1.0	Floor Tile
2-2	07B-28652B	Black	ND	ND	CELL	<1.0	Mastic
2-3	07B-28653A	White/Orange/Black	CHRY	2.0	CELL	<1.0	Floor Tile
2-3	07B-28653B	Tan	ND	ND	CELL	<1.0	Mastic
E-1	07B-28654	Black	ND	ND	CELL	15.0	Shingle
1-10	07B-28655	Black	ND	ND	CELL/FBGL/SYNTH	5.0/60.0/1.0	Insulation

Abbreviations: ND-None Detected. Asbestos Type: ACTN-Actinolite, AMOS-Amosite, ANTH-Anthophyllite, CHRY-Chrysotile, CROC- Crocidolite, TREM-Tremolite. Other Fibers: CELL-Cellulose, FBGL-Fiberglass/Mineral wool, ANML-Animal, SYNTH-Synthetic, MNRL-Non-Asbestiform Mineral, OTHR-Other. Trace: <0.25%

NOTE: Materials containing heavy binders, small asbestos fibers, or heterogenous asbestos content should not be deemed absent of asbestos, or a non-asbestos containing material based soley on PLM analysis. Such materials include, but are not limited to: floor tiles, plasters, caulking, and joint compounds.

Reported percentage of asbestos is based upon a calibrated visual estimate of area. *Denotes that the asbestos content was verified with point counting. **Denotes that the asbestos content was verified by gravimetric reduction.(EPA/600/R-93/116) Samples that contain discreetly identifiable layers will be analyzed and reported separately, if any layer is found to contain asbestos. When no asbestos is detected in any layer of a sample, or separation of layers is impossible, the sample will be reported as a composite sample. All samples will be held for 60 days before disposal, unless otherwise requested.

Date Received:	10/2/2007
Turnaround Time:	Normal
Report Issue Date:	10/8/2007
Sample Set Number:	72.23404.5588

NVLAP LAB CODE: 200471-0

Analyst Signature: James R Jones, Microscopist

Unsigned reports have not yet been proofread, and should not be considered complete.

ATC Associates, Inc. 11121 Canal Road Cincinnati, OH 45241 Tel: 513.771.2112 Fax: 513.782.6908

ATC ASSOCIATES INC.
Environmental, Geotechnical and Materials Professionals

11121 Canal Road
Cincinnati, OH 45241
Tel: 513.771.2112
Fax: 513.782.6908

Sample Submittal Form for Analytical Services

Client Information

Company Name:	Golder Associates Ltd.	**Project Description:**	Parks Canada Compoud, Radium, B.C. (Superintendant's House)
Report Results to:	James Kiryakos, Robert Smith(Calgary)		
and:	Ryan Campbell		
Email Addresses:	Robert_smith@golder.com Jkiryakos@golder.com, Rcampbell@golder.com		
Fax Number:	403.299.5606	**Project Number:**	071325.0394
Phone Number:	403.299.5600	**P.O. Number:**	GAST-0733
Address:	10th Floor, 940 - 6 Avenue SW Calgary Alberta T2P 3T1	**Billing Address:**	10th Floor, 940 - 6 Avenue SW, Calgary Alberta T2P 3T1

Turnaround Time (Check One)

☑ Normal (3 to 5 days) ☐ Rush (24 to 48 hours) ☐ Emergency Rush (less than 24 hours)

Type of Analysis Requested (Check One)

☑ Bulk Asbestos (PLM) ☐ Air Asbestos ☐ Lead Analysis ☐ Biological ☐ TEM

Sample Log

Sample Number	Sample Location and Description	Laboratory Number
B-1	Basement, 3" Pipe Elbow Insulation	07B-28637
B-2	Basement, Drywall Joint Compound	
B-3	Basement, Scratch Coat on Pillar	
B-4	Basement, Aircell Pipe Insulation	
B-5	Basement Stariwell, Transite Board	
1-1	Main Floor Living Room, Borwn/White Mosaic Sheet Floor	
1-2	Main Floor Living Room, Plaster Skim Coat	
1-3	Main Floor Living Room, Plaster Scratch Coat	
1-4	Main Floor Living Room, Texture Coat	
1-5	Main Floor Living Room, Drywall Joint Compound	
1-6	Main Floor Kitchen, White with Pink and Grey Streaks Sheet Floor	
1-7	Main Floor Washroom, Red Orange Mosaic Sheet Floor	
1-8	Main Floor Washroom, White Caulking	
1-9	Main Floor Office, Mortar from the Fire Place	
2-1	2nd Floor Common Room, Drywall Joint Compound	
2-2	2nd Floor Master Bedroom, Blue with White Streaks 9"x 9" Floor Tile	
2-3	2nd Floor Master Bedroom, White with Orange and Brown Spots 9"x 9" Floor Tile	
E-1	Exterior Roof, Dark Green Shingle	
1-10	Main floor, Insulation from walls	
		07B-28655

Special Instructions:

Chain of Custody

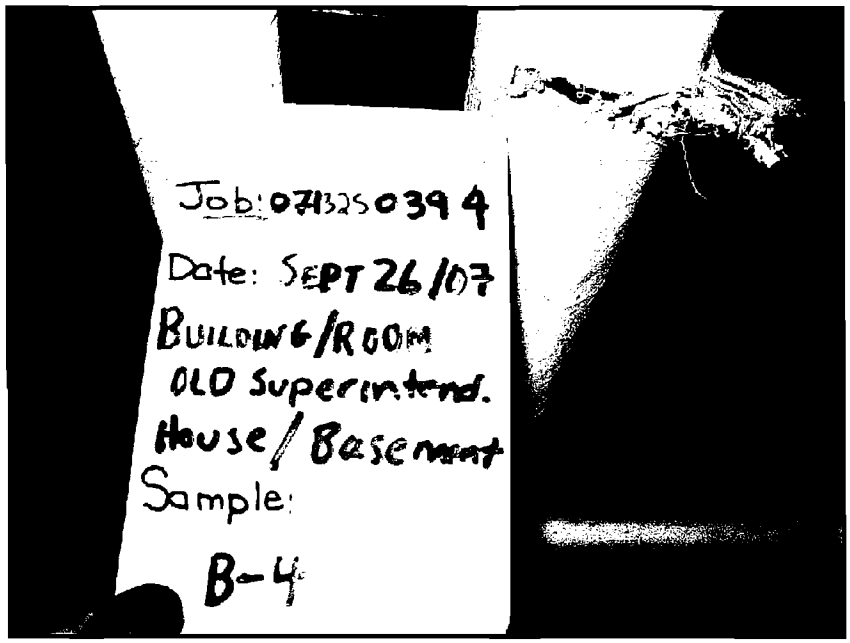
Relinquished By:	Date/Time	Received By:
James Kiryakos	01-Oct-07	FED EX
FED EX	10-02-07 0925	PBREWER
PBREWER	10-02-07 0935	STORAGE

APPENDIX III

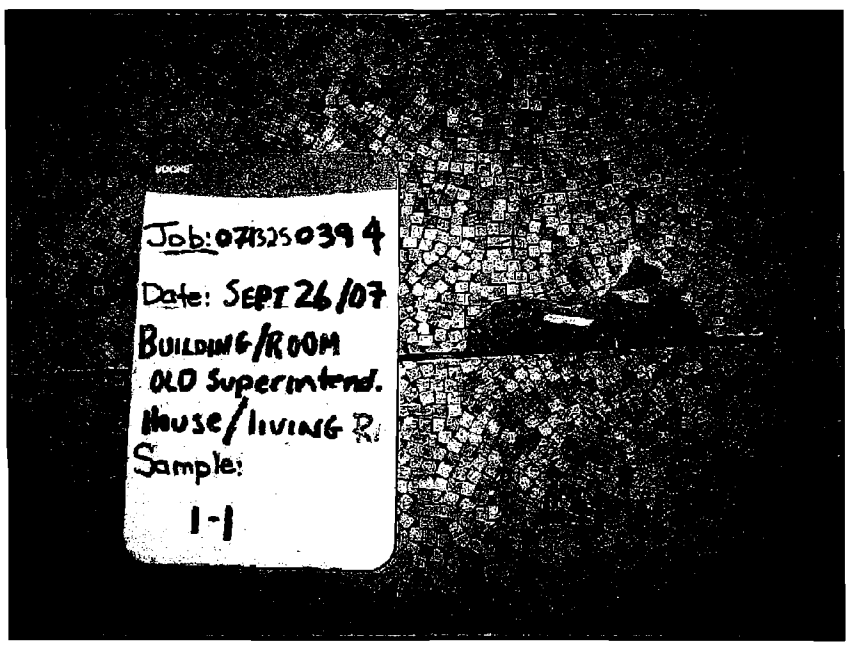
PHOTOGRAPHS OF IDENTIFIED ASBESTOS-CONTAINING MATERIALS

Intentionally remove from this report

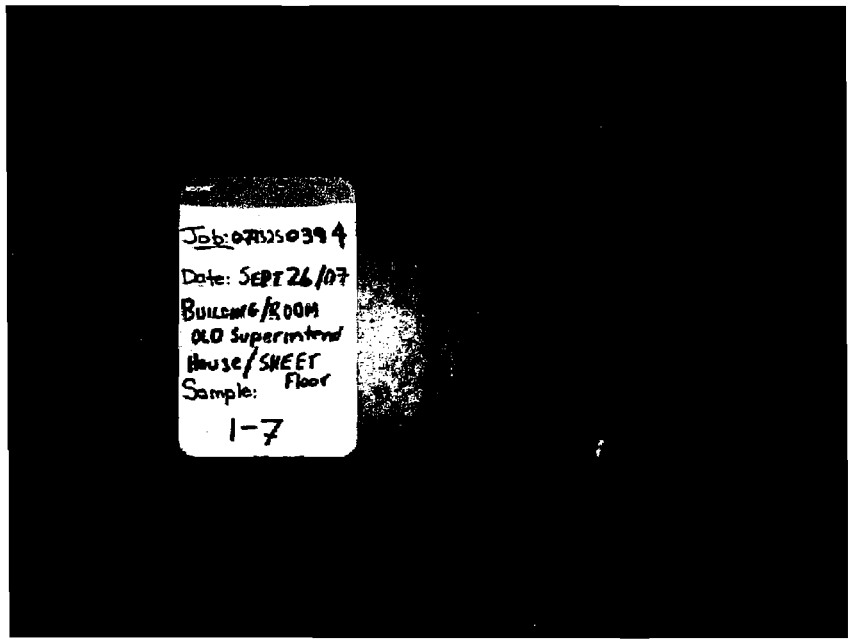
Photograph 10: Sample B-1, 3" Pipe Elbow Mudding, Basement, Superintendent's House McKay Maintenance Compound



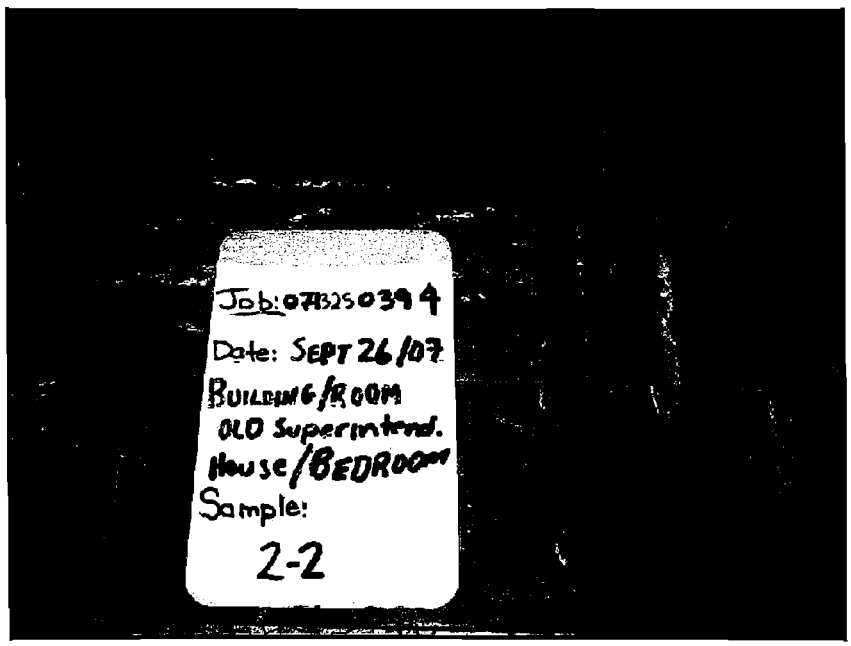
Photograph 11: Sample B-4, Aircell Pipe Insulation, Basement, Superintendent's House McKay Maintenance Compound



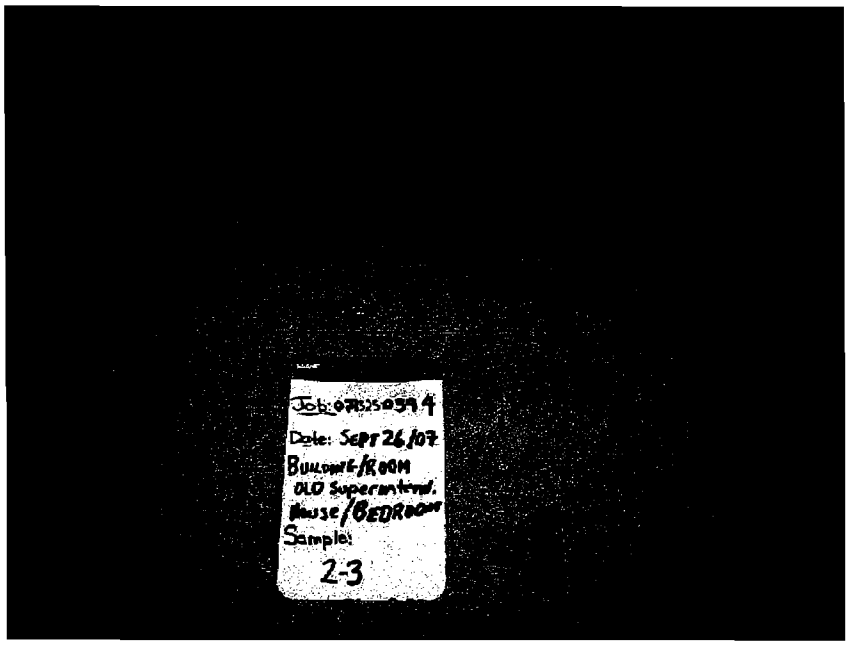
Photograph 12: Sample 1-1, Sheet Flooring, Main Floor, Living Room Superintendent's House, McKay Maintenance Compound



Photograph 13: Sample 1-7, Sheet Flooring, Main Floor Washroom Superintendent's House, McKay Maintenance Compound



Photograph 14: Sample 2-2, 9" x 9" Floor Tile, Second Floor Master Bedroom, Superintendent's House, McKay Maintenance Compound



Photograph 15: Sample 2-3, 9" x 9" Floor Tile, Second Floor Master Bedroom, Superintendent's House, McKay Maintenance Compound

APPENDIX IV

PAINT ANALYSIS RESULTS

Table A-7: Paint Analysis Results, Lake Louise Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Intentionally remove from this report				

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification
(3) < indicates value less than detection limit

Table A-8: Paint Analysis Results, Garage, McKay Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Intentionally remove from this report				

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification
(3) < indicates value less than detection limit

Table A-9: Paint Analysis Results, Stores Building, McKay Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Intentionally remove from this report				

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification

Table A-10: Paint Analysis Results, Carpentry/Paint Shop, McKay Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Intentionally remove from this report				

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification

Table A-11: Paint Analysis Results, Electrical/Plumbing Shops/Lunchroom, McKay Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
Intentionally remove from this report				

Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification
(3) < indicates value less than detection limit

Table A-12: Paint Analysis Results, Superintendent's House, McKay Maintenance Compound

Sample Number	Sample Location	Paint Color	Lead Concentration (mg/cm^2) (1)	Lead-Based Paint (2) (positive/ negative)
LB-1	Basement, Drywall	White	<0.01 (3)	negative
LB-2	Basement, Door and Door Frame	White	0.19	negative
LB-3	Basement, Column	Aqua Green	0.04	negative
L1-1	Main Floor, Texture Coat Wall	White	<0.01	negative
L1-2	Main Floor, Ceramic Tile	White	0.03	negative
L2-1	Second Floor, Drywall	White	0.02	negative

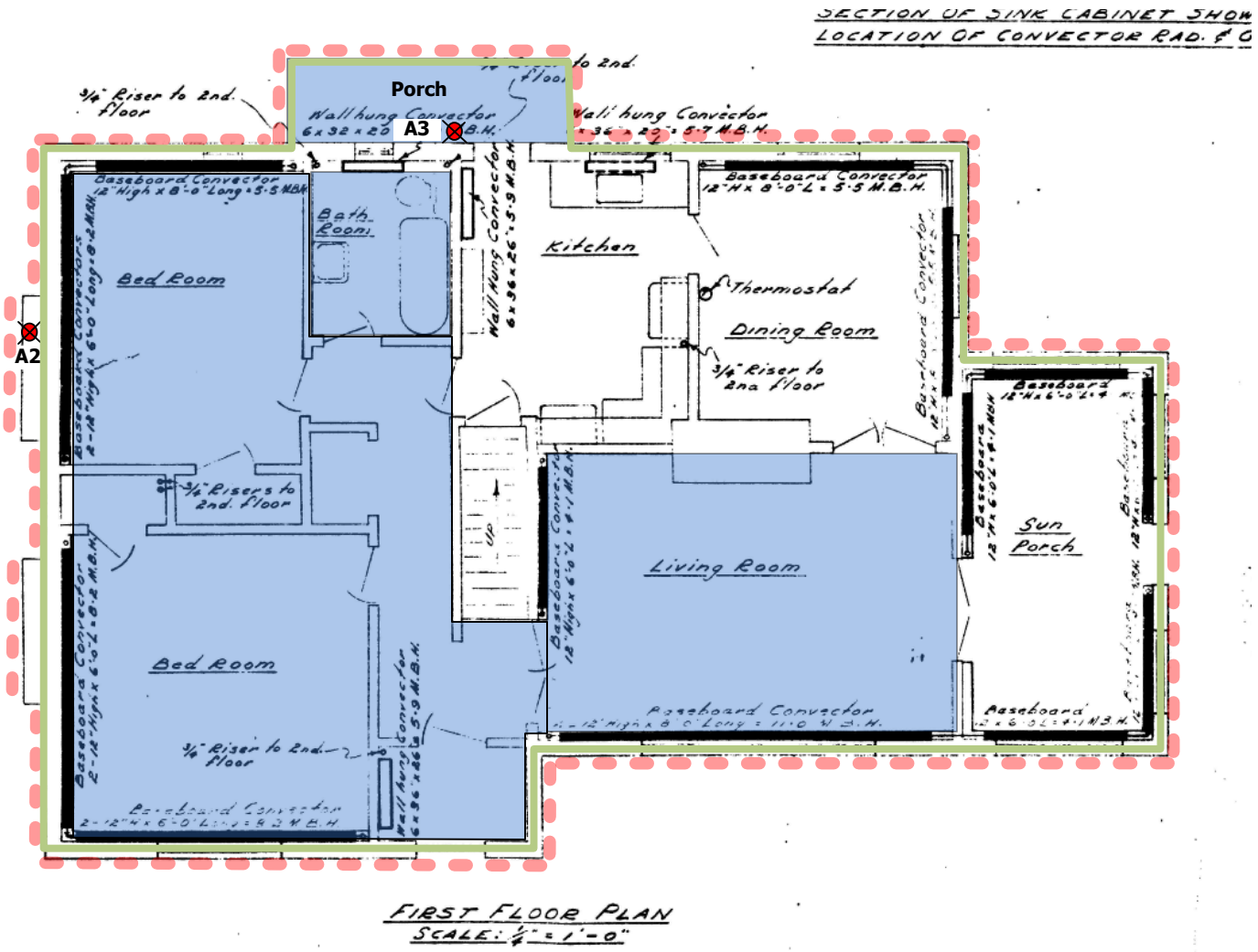
Notes:
(1) milligrams per square centimetre
(2) based on U.S. HUD classification
(3) < indicates value less than detection limit

Appendix 4b

Sampling Diagrams for the Superintendent's House

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead paint
- Window caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: SUPERINTENDENT'S HOUSE
Main Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Dec, 1957
Edited: Jan 17, 2012

Drawn by: National Parks Eng. Svc.
Edited by: EH

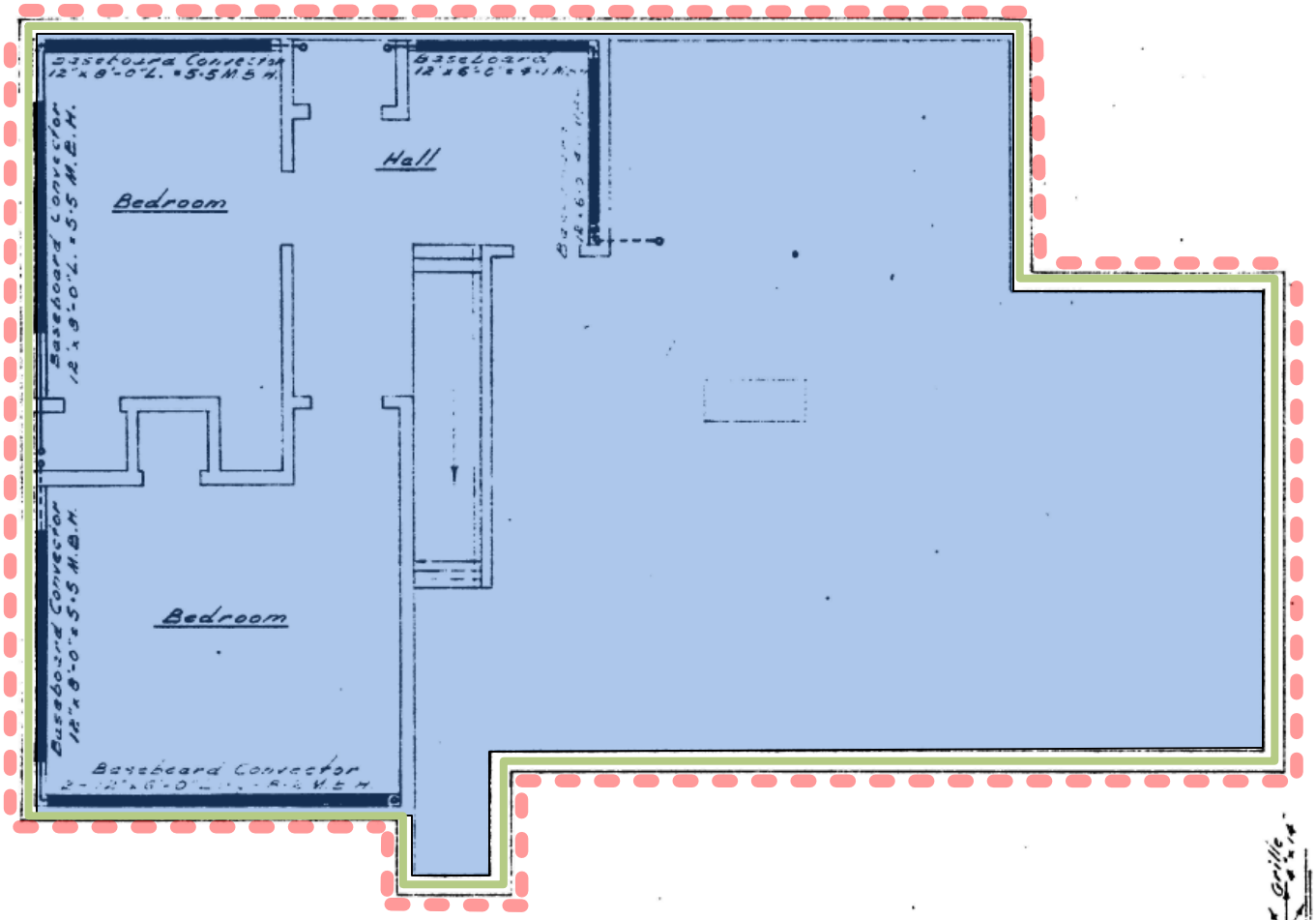
Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 4b-1

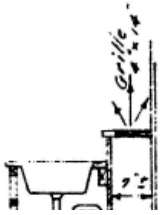
Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead paint
- Window caulking containing Asbestos



SECOND FLOOR PLAN

(Has since been renovated and floor plan no longer as shown)



Scale: NTS

SITE SAMPLING DIAGRAM: SUPERINTENDENT'S HOUSE
2nd Floor

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Dec, 1957

Edited: Jan 17, 2012

Drawn by: National Parks Eng. Svc.

Edited by: EH

Project Name: Hazardous Materials Assessment

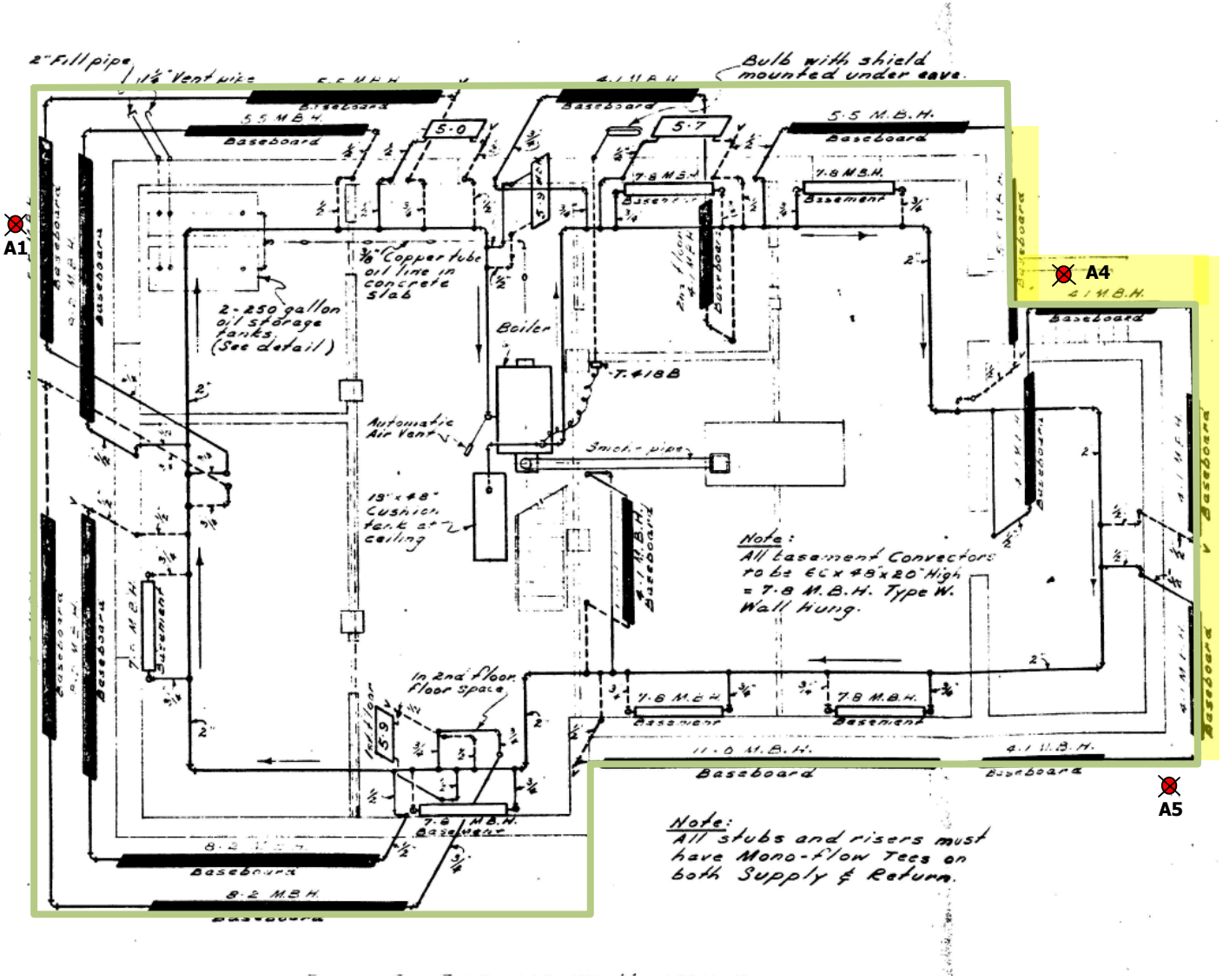
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 4b-2

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead paint
- Window caulking containing Asbestos



Scale: NTS

SITE SAMPLING DIAGRAM: SUPERINTENDENT'S HOUSE
Basement

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: Dec, 1957
Edited: Jan 17, 2012

Drawn by: National Parks Eng. Svc.
Edited by: EH

Project Name: Hazardous Materials Assessment
Project Location: Radium Hot Springs Lodge

Project No.: 11192

Appendix 4b-3

Appendix 4c

Photographic Log for the Superintendent's House

Sample A3 : Off-white sheet linoleum containing asbestos in interior porch

Sample A4 : Gray skim coat containing asbestos on exterior basement walls

Samples P1 and P2 : Brown and taupe paint containing lead on house

Appendix 4d

Laboratory Results for the Superintendent's House

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/19/2011
Report No: 254896
Project: Haz Mat Assessment
Project No.: 11192 - House

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4454220
Client No.: A1
Description / Location: Tan Glazing
Basement Windows N

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: V. Smith

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/19/2011

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Asbestos Testing Laboratories

9000 Commerce Parkway
Suite B
Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - House

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [■] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[■] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A1 (start) - A1 (end) IATL#(s): _____ (start) - _____ (end) Total: 1

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

RECEIVED
OCT 15 2011
IATL - By

Chain of Custody:

Relinquished (Name / Organization):	Erin H. / Ballast Env.	Date: 13 OCT / 2011	Time:
Received (Name / IATL):		Date:	Time:
Sample Login (Name / IATL):		Date:	Time:
Sample Prep (Name / IATL):		Date:	Time:
Analysis(Name(s) / IATL):	VGS 10/19/11	Date:	Time:
QA/QC Review (Name / IATL):	10/20/11	Date:	Time:
Archived / Released:	QA/QC InterLAB Use:	Date:	Time:

- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Date: Oct 12/11

Client: PWGSC Job No.: 11192H

Date Results Required: No. Samples: 4 Page 1 of 1

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	brown	exterior paint	trim & doors	poor	trim + doors.	0740
P2	taupe	"	wood logs	poor	all logs	0740
P3	white striped	ceramic tile	S-cabin unit 3 washroom	good	2 tiles high x 3m	
A1	white	window caulking	~~all~~ bsmt window. N	poor	all windows	0749
			4454220			

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 11/2/2011
Report No: 255970
Project: Hazardous Materials Assessment
Project No.: 11192-House

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4466891 **Description / Location:** Tan Plaster
Client No.: A2 Exterior Trim Work

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4466892 **Description / Location:** Tan Rubber Floor Tile
Client No.: A3 Interior Porch

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.1	Chrysotile	None Detected	None Detected	PC 98.9

Lab No.: 4466893 **Description / Location:** Grey Plaster
Client No.: A4 Exterior Concrete

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4466893 **Description / Location:** Grey Plaster **Layer No.:** 2
Client No.: A4 Exterior Concrete

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: J. Haremza **Approved By:**

Date: 11/2/2011

Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 11/2/2011
Report No: 255970
Project: Hazardous Materials Assessment
Project No.: 11192-House

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4466894
Client No.: A5
Description / Location: Tan Plaster
Exterior Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: J. Haremza

Date: 11/2/2011

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Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

iATL INTERNATIONAL
Asbestos Testing Laboratories

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - House

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [X] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[X] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX ☒ Email

[ ] 10 Day [ ] 5 Day [X] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A2 (start) - A5 (end) IATL#(s): _____ (start) - _____ (end) Total: 4

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): Erin H / Ballast Env. Date: 27 Oct / 2011 Time: 10am
Received (Name / IATL): Date: Time:
Sample Login (Name / IATL): Date: Time:
Sample Prep (Name / IATL): Date: Time:
Analysis(Name(s) / IATL): Date: Time:
QA/QC Review (Name / IATL): Date: Time:
Archived / Released: QA/QC InterLAB Use: Date: Time:

RECEIVED OCT 28 2011

IATL - By

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Lodge Date: Oct 26/11

Client: PlusSC Job No.: 11192-H

Date Results Required: No. Samples: 4 Page 1 of 1

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A2	gray	stucco	exterior trim work	good 4466891	2x(1½x3) 2x(5x2)	12-078
A3	off white	sheet lino	interior porch	good 4466892	1½x3m	112-077
A4	gray	skim coat	exterior concrete	fair 4466893	insmt foundation	112-082
A5	gray	mortar	exterior brick work	fair 4466894	"	112-083

9000 Commerce Parkway, Suite B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/20/2011
Report Number: 254897
Project: HazardousMat'ls.Assessment
Project No.: 11192 - House

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4454221	P1	Brown Exterior Paint Trim&Doors	5.4
4454222	P2	Taupe Exterior Paint Wood Logs	1.5
4454223	P3	White Ceramic Tile Paint S. Column, Unit 3 Washroom	0.0064

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analystical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/15/2011
Date Analyzed: 10/20/2011
Analyst: C. Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
Asbestos Testing Laboratories

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Toll Free: 877 428-4285
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E-MAILED 10.20.11

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - House

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [ ] Bulk [ ] Other
[ ] Water [■] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[■] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[ ] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ (date / time) ❑ Verbals ❑ FAX ■ Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): P1 (start) - P3 (end) IATL#(s): _____ (start) - _____ (end) Total: 3

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): Erin H. / Ballast Env. Date: 13OCT/2011 Time:
Received (Name / IATL): Date: Time:
Sample Login (Name / IATL): 10/25/11 Date: OCT 15 2011 Time:
Sample Prep (Name / IATL): 10/26/11 Date: Time:
Analysis(Name(s) / IATL): Date: Time:
QA/QC Review (Name / IATL): 10/24/11 Date: Time:
Archived / Released: QA/QC InterLAB Use: Date: Time:

RECEIVED IATL - By

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Date: Oct 12/11

Client: PWGSC Job No.: 11192H

Date Results Required: No. Samples: 4 Page 1 of 1

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	brown	exterior paint	trim & doors	poor 4404.1	trim + doors	0740
P2	taupe	"	wood logs	poor 4454.22	all logs	0740
P3	white striped	ceramic tile	S-cabin unit 3 washroom	good 4454.23	2 tiles high x 3m	
A1	white	window caulking	~~all~~ bsmt window N	poor	all windows	0749

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

BATCH / SAMPLE MANAGEMENT REPORT

Customer No.: BAL082

Customer: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Customer Rep: RS

Batch Number: 254897

Project: Haz Mat Assesment

Project Number: 11192 - House

TAT: 3 Day

Date/Time Rec'd: 10/15/2011

# of Samples: 3 **Analysis:** Lead Paint **Time/Date Due:** 10/20/2011

Initials Signaling Acknowledgement ☐ RTP: _____ ☐ To PLM NOB _____ ☐ To TEM NOB _____

Special Instructions:

Admin Notes: Portal

Shipping Error:

_____ Samples were not received in a sealed container. Bulk samples not double bagged.
_____ Air Cassettes received open in bag… sample integrity compromised, possible contamination.
_____ Samples received wet.
_____ Samples received covered with dust… possible cross contamination.
_____ Sample containers damaged, contents spilled… possible cross contamination.
_____ Paperwork received in the same bag as samples possible contamination.
_____ No / Incomplete Chain of Custody Received.
_____ No / Incomplete Sample Log Received.
_____ Sample container IDs do not match the client's sample log.
_____ No Turnaround Time indicated.
_____ PCM Re-prep for TEM NIOSH 7402. Cassettes previously opened and portion of filter removed.
_____ Blank(s) not submitted as required by the requested analytical method.
_____ Minimum shipping requirements not attained. See attached Carrier Air Bill.
_____ Other: _____

Batch Error:

_____ Wrong Client ID Listed:
_____ Wrong Client Location Listed:
_____ Wrong Project ID Listed:
_____ Wrong TurnAround Time Listed:
_____ Wrong Due Date Listed:
_____ Wrong Date/Time Received Listed:
_____ Wrong Analysis Method Listed:
_____ Wrong Number of Samples Listed:

Login Error:

_____ Sample Log Stamped Incorrectly:
_____ Sample Containers Mislabelled:
_____ Duplicate / Extra Samples Not Stamped:
_____ Analyst Bench Sheet Error:

_____

_____

Copy: FE, JN, RS, SC

IATL Laboratories
Commerce Parkway, Suite B, Mt. Laurel, NJ
Telephone: 856-231-9449 Fax: 856-231
INFO@IATL.C

DAILY QUALITY CONTROL DATA

LEAD SAMPLE ANALYSIS

(DATE: 10 / 20 / 11)

Standard	Total Lead (mg)	Percent Recovery **
Reagent Blank	0.000	< LOQ
Blank Spike	0.500	104
Lab control Std # 401	0.424	108
Matrix Spike - LBP *	1.00	104
Matrix Spike - Wipe *	0.94	110
Matrix Spike - Soil *	0.537	105
Matrix spike - Air *	0.050	100
2.5 ppm Standard	0.25	103
10.0 ppm Standard	1.0	104
40.0 ppm Standard	4.0	97

AIHA LAP-LLC No. 100188

NYS-DOH ELAP No. 11021

Analysis Method: ASTM D3335-85A
NIOSH 7082
EPA SW846 3050B 7000B

Comments: IATL assumes that all sampling complies with accepted methods.
All client supplied sampling data is assumed to be correct when calculating results.
Detection limit based upon 0.2 mg/L reporting limit and sample size.
* NIST Traceable.
** 80-120% acceptable limits.

Analyzed By: R. Chad Shaffer

Date: 10/20/11

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

AAS.DailyQC.001

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 31-OCT-11
Report Date: 04-NOV-11 14:38 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1079108

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1079108-1 T1 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	42.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-2 T2 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-3 T3 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.2		0.50	mg/L		03-NOV-11	R2280826
L1079108-4 T4 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	57.3		0.50	mg/L		03-NOV-11	R2280826
L1079108-5 T5 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	3.30		0.50	mg/L		03-NOV-11	R2280826
L1079108-6 T6 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	2.58		0.50	mg/L		03-NOV-11	R2280826

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-CL	Waste	TCLP Leachable Metals	EPA SW846 METHODS 1311 AND 6010B

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-ICP-CL	**Waste**							
Batch R2280826								
WG1381861-2 DUP		**L1079108-1**						
Lead (Pb)-Leachable		42.7	41.2		mg/L	3.6	25	03-NOV-11
WG1381861-1 MB								
Lead (Pb)-Leachable			<0.50		mg/L		0.5	03-NOV-11

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # L1079106

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting Ltd.	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1: erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
		Email 2: elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403-452-3110 Fax: 403-452-3133	Email 3:	**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: 11192	
Company:		PO / AFE: 11192EH	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
		ALS Contact:	**Sampler:**

Sample Identification (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	TCLP-Lead
T1	26-Oct-11		Other	X
T2	26-Oct-11		Other	X
T3	26-Oct-11		Other	X
T4	26-Oct-11		Other	X
T5	26-Oct-11		Other	X
T6	26-Oct-11		Other	X

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observatic Yes / No ? If Yes add
Erin Humeny	31-Oct-11			31 Oct-11	15:21	21 °C				

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 28-OCT-11
Report Date: 04-NOV-11 15:12 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1078192

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-1 T1							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	124.0		42.4-139	%		04-NOV-11	R2281519
L1078192-2 T2							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	100.0		42.4-139	%		04-NOV-11	R2281519
L1078192-3 T3							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	87.0		42.4-139	%		04-NOV-11	R2281519
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	103.0		42.4-139	%		04-NOV-11	R2281519
L1078192-5 T5							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	1.00		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	0.37		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	1.37		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519
L1078192-6 T6							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30	DLIS	0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLIS	Detection Limit Adjusted: Insufficient Sample
DLM	Detection Limit Adjusted For Sample Matrix Effects
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PCB-PAINT-ED	Misc.	PCBs in Paint	EPA 3550/8082-GC-ECD

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-PAINT-ED	**Misc.**							
Batch R2281519								
WG1380593-2 LCS								
Aroclor 1260			110.0		%		65.5-118.8	03-NOV-11
WG1380593-1 MB								
Aroclor 1016			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1221			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1232			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1242			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1248			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1254			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1260			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1262			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1268			<0.30		mg/kg		0.3	03-NOV-11
Surrogate: Decachlorobiphenyl			116.0		%		42.4-139	03-NOV-11

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

L1078192

COC #

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1:	erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Calgary AB T2Z 3V7	Email 2:	elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403.452.3110 Fax: 403.4523.3133	Email 3:		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	11192	
Company:		PO / AFE:	11192 EH	
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
		ALS Contact:	Sampler:	

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCB in paint	Number of Containers
T1	26-Oct-11	-	Product	X	1
T2	26-Oct-11	-	Product	X	1
T3	26-Oct-11	-	Product	X	1
T4	26-Oct-11	-	Product	X	1
T5	26-Oct-11	-	Product	X	1
T6	26-Oct-11	-	Product	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Erin Humeny	28-Oct-11		SK	28 Oct	12:05	24 °C				

GENF 18.01 Front

Appendix 5a

Detailed Room Descriptions for the Outbuildings

Building	Floor	Room	Description	Ceiling	Walls	Floor	Misc.	Ceiling Color	Wall Color	Floor Color/ Pattern	Ceiling Tile Size	Asbestos Sample	Sample ID	Location	Paint Sample	Sample ID	Location	Result
Shed 2	-	exterior	shed; dry storage; power only	asphalt shingles over cedar shakes	wood siding and plywood over paper and plywood	-	bare wood frame; items stored under shed; green and yellow painted boards stored next to shed	green over white shingles	white	-	-	white paper insulation	A1	under wood siding	-	-	-	negative
												yellow/gray glazing	A2	windows	-	-	-	negative
												black/white asphalt shingle	A3	roof	-	-	-	negative
												-	-	-	white	P1	exterior	negative
												-	-	-	yellow	P2	exterior trim	negative
Shed 2	-	interior	shed; dry storage; power only	open wood frame	plywood over wood frame	plywood	2 windows; projector; ceiling texture; pro-set; interior texture; thorite 400 patching mortar	bare	bare	gray; worn paint	-	-	-	-	-	-	-	-
Rock Wall	-	-	retaining wall east of propane tank	-	rock with mortar	-	-	-	-	-	-	gray mortar	A5	retaining wall	-	-	-	negative
-	-	exterior	debris pile north of	-	-	-	white insulation on radiator-like	-	-	-	-	white insulation	A4	adjacent debris pile	-	-	-	negative
Shed 1	-	exterior	storage shed	asphalt shingles over plywood	vinyl siding over tar paper over plywood	-	retaining wall as 2 walls	-	yellow; green door and trim	-	-	-	-	-	green trim and door	P3	shed door	negative
Shed 1	-	interior	storage shed; chemical storage	wood frame	2 concrete; 2 oriented strand board	concrete	cracked floor with staining; motor oil; acrylic sealer; hydraulic oil; car battery; 3 misc. barrels; tire; landscape mulch	bare	yellow concrete; bare wood	bare	-	-	-	-	yellow	P4	east wall; concrete	negative
Bus Shelter	-	exterior	bus shelter	pebbled	pebbled	-	-	bare	bare	-	-	-	-	-	-	-	-	-
Bus Shelter	-	interior	bus shelter	concrete	concrete	concrete	6 benches; 2 empty light fixtures	bare	bare	bare	-	-	-	-	tan over blue	P5	benches	positive
-	-	exterior	road lighting	-	-	-	5 HID light ballasts	-	-	-	-	-	-	-	-	-	-	-

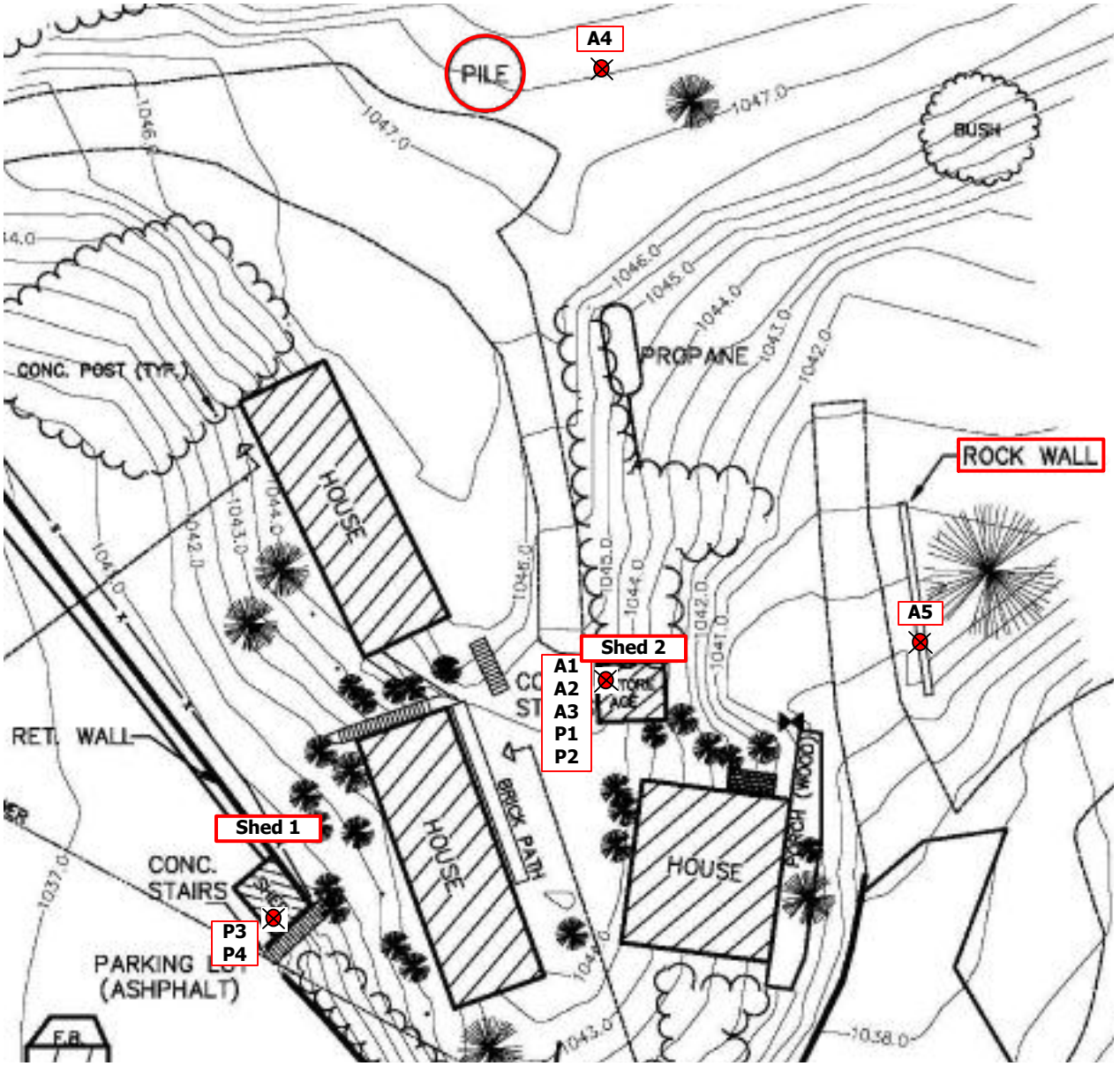
* no access ** limited visibility of area ***Sample not analyzed

Appendix 5b

Sampling Diagrams for the Outbuildings

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



N

Scale: NTS

SITE SAMPLING DIAGRAM: OUTBUILDINGS
Sheds, Rock Wall and Pile

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

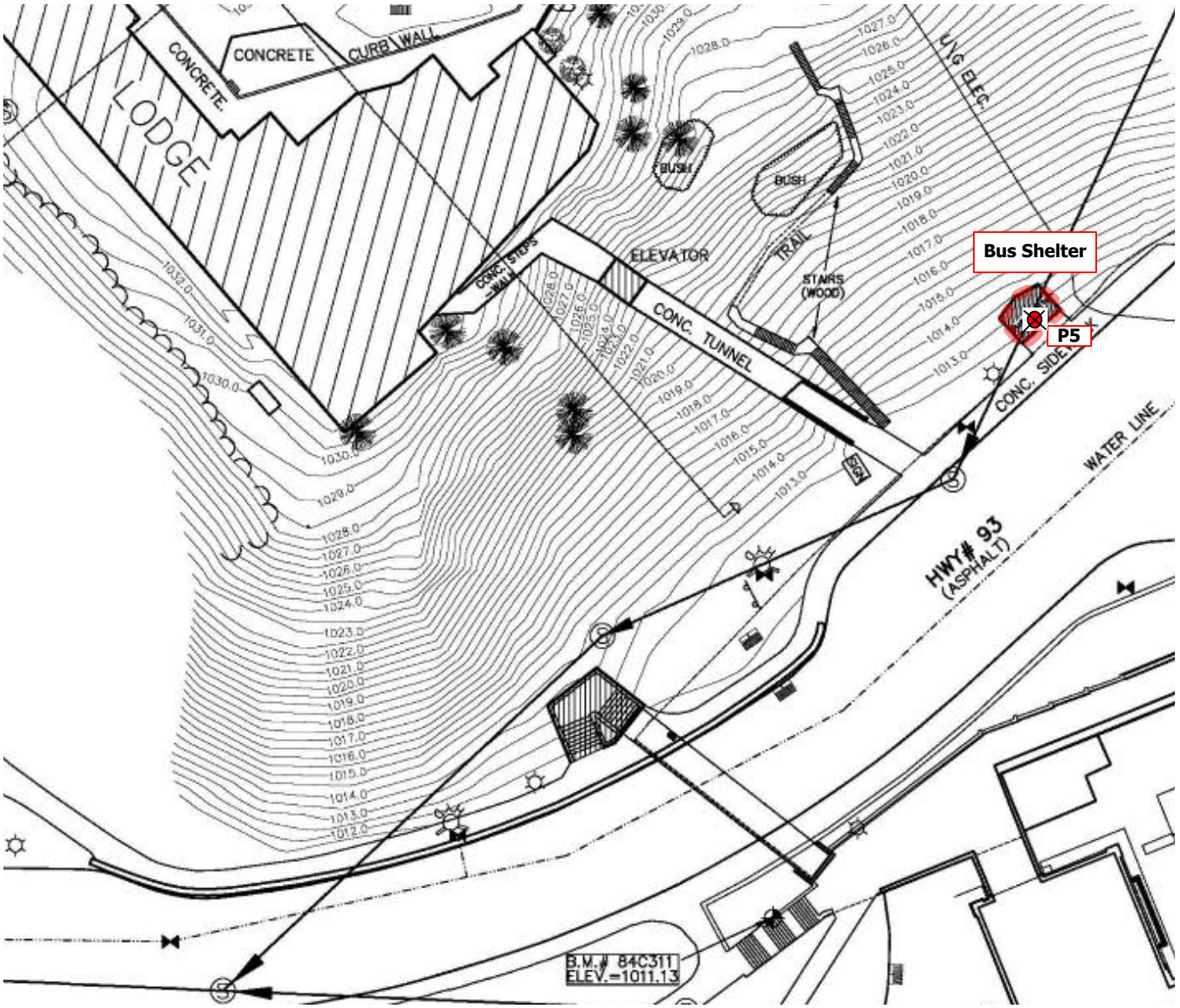
Date: June 2011 | Drawn by: PWGSC | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: January 2012 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 5b-1

Sample ID
A = asbestos sample
P = paint sample

- Sampling Location
- Floor Covering containing Asbestos
- Drywall Mud/Stipple/ Wall Covering containing Asbestos
- Wall and/or Attic Insulation containing Asbestos
- Pipe/tank Insulation containing Asbestos
- Ozone Depleting Substance (ODS)
- ACM Sink Coating
- Radioactive Items
- Mercury
- Lead Paint
- Window Caulking containing Asbestos



N

Scale: NTS

SITE SAMPLING DIAGRAM: OUTBUILDINGS

Bus Shelter

BALLAST ENVIRONMENTAL CONSULTING LTD. - Providing a Balance -

Date: June 2011 | Drawn by: PWGSC | Project Name: Hazardous Materials Assessment | Project No.: 11192

Edited: November 2011 | Edited by: EH | Project Location: Radium Hot Springs Lodge

Appendix 5b-2

Appendix 5c

Photographic Log for the Outbuildings

Bus Shelter

Sample P5 : Tan over blue paint containing lead

PHOTOGRAPHIC LOG

BALLAST ENVIRONMENTAL CONSULTING LTD.
- Providing a Balance -

Taken: ER

Date: October 2011

File No. 11192

Buildings: Outbuildings

Parameter: Lead

Appendix
5c

Appendix 5d

Laboratory Results for the Outbuildings

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254518
Project: Radium Hot Spring Lodge
Project No.: 11192-Out Buildings

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448868 **Description / Location:** Off-White Paper/Insulation
Client No.: A1 Exterior Under Siding, Shed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Cellulose	20

Lab No.: 4448869 **Description / Location:** Off-White Glazing
Client No.: A2 Windows (S1)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4448870 **Description / Location:** Green/Black Shingle
Client No.: A3 Roof (S1)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4448871 **Description / Location:** Off-White Insulation
Client No.: A4 Adjacent Debris Pile

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Fibrous Glass	15

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Approved By:

Date: 10/12/2011

Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway, Ste B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report No: 254518
Project: Radium Hot Spring Lodge
Project No.: 11192-Out Buildings

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4448872
Client No.: A5
Description / Location: Grey Mortar
Retaining Wall - East Adjacent

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditation **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC–Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 10/12/2011

9000 Commerce Parkway
Suite B
Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

iATL INTERNATIONAL
Asbestos Testing Laboratories

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - ~~House~~ out buildings

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [■] Bulk [ ] Other
[ ] Water [ ] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[ ] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[■] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions
See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ❑ Verbals ❑ FAX [■] Email

[ ] 10 Day [ ] 5 Day [■] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): A1 (start) - A5 (end) IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): MM 10/11/11 Date: _____ Time: _____
Sample Prep (Name / IATL): _____ Date: _____ Time: _____
Analysis(Name(s) / IATL): LS 10/12/11 Date: _____ Time: _____
QA/QC Review (Name / IATL): dbc 10-13-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

RECEIVED
OCT 7 2011
IATL - By _____

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Spring Lodge - Outbuildings Date: Oct 5, 2011

Client: Pluesc Job No.: 11192-0

Date Results Required: No. Samples: Page 1 of

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
A1	white	paper insulation	(E) exterior under siding (S1)	covered w/ siding 4448868	exterior shed	111-0772
A2	yellow gray	window glazing	(E) windows (S1)	good 4448869	2 windows (9 panes)	111-0778
A3	black/white	asphalt shingle	(E) roof (S1)	covered with newer shingle 4448870	entire roof	111-0781
A4	white	insulation	(D) adjacent debris pile	poor 4448871	<1m2	111-0789
A5	gray	mortar	Retaining wall - east adjacent	average 4448872	~13m long	111-0790
			LS 10/12/11			

9000 Commerce Parkway, Suite B
Mount Laurel, NJ 08054
Toll Free 877-428-4285
Local: 856-231-9449
Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Report Date: 10/12/2011
Report Number: 254282
Project: Hazardous Materials Asses.
Project No.: 11192-OutBldgs.

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
4448750	P1	White Exterior Paint Exterior Shed	0.17
4448751	P2	Yellow Exterior Trim Paint Exterior Shed	0.10
4448752	P3	Green Exterior Trim&Door Paint Door	0.25
4448753	P4	Yellow Interior Paint/Concrete Walls East Wall	<0.0067
4448754	P5	Tan/Blue Paint/Benches Bus Shelter	0.65
4448755	DupP3	Lead In Paint	<0.0059

Accreditations: **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0024% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/7/2011
Date Analyzed: 10/12/2011
Analyst: C. Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

E-MAILED
10.12.11

9000 Commerce Parkway
Suite B
Mt. Laurel, NJ 08054
Toll Free: 877 428-4285
info@iatl.com
www.iatl.com

IATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

Chain of Custody

Client: Ballast Environmental Consulting Ltd.
PO Box 87073 RPO Douglas SQ
Calgary, AB T2Z 3V7 Canada

Office Phone: 403-452-3110
Cell Phone: 403-860-8524
FAX / Email 1: elvie@ballastenvironmental.com

Project Name: Hazardous Materials Assessment
Project No.: 11192 - ~~House~~ Outbuildings

Contact 1: Elvie Reinson
Contact 2: Erin Humeny
FAX / Email 2 erin@ballastenvironmental.com

Special Instructions:

Matrix:

[ ] Air [ ] Soil [●] Bulk [ ] Other
[ ] Water [●] Paint [ ] Surface Dust / Wipe

Analysis Method:

[ ] PCM : NIOSH 7400
[ ] PCM : OSHA
[ ] PCM : TWA

[ ] AAS : Lead in Air
[ ] AAS : Lead in Water
[●] AAS : Lead in Paint
[ ] AAS : Lead Dust/Wipe [1]
[ ] AAS : Lead in Soil
[ ] AAS : TCLP
[ ] AAS : Metals (Cd, Zn, Cr)

See Page 2 for Bulk Asbestos Specific Log
[ ] PLM : Bulk Asbestos EPA 600
[ ] PLM : Point Counting 198.1
[ ] PLM : NOB via 198.1 (PLM only)
[ ] If <1% by PLM, to TEM via 198.4 [2]
[ ] PLM : See page 2 for instructions

See Page 4 for Mold Specific Log
[ ] IAQ: I Bioaersol Fungal Spore Trap [3]
[ ] IAQ: II Bioaersol Fungal Spore Trap [4]
[ ] IAQ: Tape, Bulk, Misc. Qualitative [3]
[ ] IAQ: Tape, Bulk, Misc. Quantitative [3]
[ ] IAQ: Other Culturable ID [2]

[ ] TEM : AHERA
[ ] TEM : NIOSH 7402
[ ] TEM : Dust / Wipe
[ ] TEM : Dust / Microvac
[ ] TEM : NOB 198.4
[ ] TEM : Bulk Analysis
[ ] TEM : Potable Water
[ ] TEM : Non-Potable Water
[ ] TEM : Other
[ ] Total Dust : NIOSH 0500
[ ] Total Dust : NIOSH 0600

1- Requires ASTM acceptable material 2- Call to confirm TAT 3- Non-culturable 4- With Non-fungal Microscopic Exam

Turnaround Time:

Preliminary Results Requested By... _____ date / time ☐ Verbals ☐ FAX [●] Email

[ ] 10 Day [ ] 5 Day [●] 3 Day [ ] 2 Day [ ] 1 Day* [ ] 12 Hour** [ ] 6 Hour** [ ] RUSH**

* End of next business day unless otherwise specified. ** Matrix Dependent. Please notify the lab before shipping.

Sample Numbers:

Client #(s): P1 (start) - ~~P4~~ P5 (end) & DupP3 IATL#(s): _____ (start) - _____ (end) Total: _____

Please use your sample log to supply sampling information (ex. Volumes, areas, descriptions, locations, etc.) or download forms at iatl.com

Chain of Custody:

Relinquished (Name / Organization): _____ Date: _____ Time: _____
Received (Name / IATL): _____ Date: _____ Time: _____
Sample Login (Name / IATL): M 10/10/11 Date: _____ Time: _____
Sample Prep (Name / IATL): G.10/11 Date: _____ Time: _____
Analysis(Name(s) / IATL): _____ Date: _____ Time: _____
QA/QC Review (Name / IATL): dbc 10-13-11 Date: _____ Time: _____
Archived / Released: _____ QA/QC InterLAB Use: _____ Date: _____ Time: _____

RECEIVED
OCT 7 2011
IATL - By _____

BALLAST
- Providing a Balance -

BULK MATERIAL SAMPLING LOG

Worksite: Radium Hot Spring Lodge - Out building Date: Oct 5/11

Client: Pacific Job No.: 11197-0

Date Results Required: No. Samples: Page__of__

Sample #	Colour	Description	Location	Condition	Estimated Amount	Picture ID
P1	white	extenor paint	extenor shed (S1)	poor 4448750	entire shed	111-0773
P2	yellow	extenor trim paint	" (S1)	poor 4448751	all trim	111-0773
P3	green	extenor trim + door	(S2) door	poor 4448752	door + frame	0796
P4	yellow	interior concrete walls	(S2) east wall	poor 4448753	2 concrete walls	0795
P5	tan/blue	benches	bus shelter	poor 4448754 4448755	6 benches + supports	
DupP3						

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

BATCH / SAMPLE MANAGEMENT REPORT

Customer No.: BAL082

Customer: Ballast Enviro. Conslt'g Ltd.
PO Box87073 RPO DouglasSq.
Calgary AB T2Z 3V7

Customer Rep: RS

Batch Number: **254282**

Project:

Project Number: **11192**

TAT: **3 Day**

Date/Time Rec'd: **10/7/2011**

# of Samples: **6** **Analysis:** **Lead Paint** **Time/Date Due:** **10/12/2011**

Initials Signaling Acknowledgement ☐ RTP: _____ ☐ To PLM NOB _____ ☐ To TEM NOB _____

Special Instructions:

Admin Notes: Portal

Shipping Error:

_____ Samples were not received in a sealed container. Bulk samples not double bagged.
_____ Air Cassettes received open in bag… sample integrity compromised, possible contamination.
_____ Samples received wet.
_____ Samples received covered with dust… possible cross contamination.
_____ Sample containers damaged, contents spilled… possible cross contamination.
_____ Paperwork received in the same bag as samples possible contamination.
_____ No / Incomplete Chain of Custody Received.
_____ No / Incomplete Sample Log Received.
_____ Sample container IDs do not match the client's sample log.
_____ No Turnaround Time indicated.
_____ PCM Re-prep for TEM NIOSH 7402. Cassettes previously opened and portion of filter removed.
_____ Blank(s) not submitted as required by the requested analytical method.
_____ Minimum shipping requirements not attained. See attached Carrier Air Bill.
_____ Other: _____

Batch Error:

_____ Wrong Client ID Listed:
_____ Wrong Client Location Listed:
_____ Wrong Project ID Listed:
_____ Wrong TurnAround Time Listed:
_____ Wrong Due Date Listed:
_____ Wrong Date/Time Received Listed:
_____ Wrong Analysis Method Listed:
_____ Wrong Number of Samples Listed:

Login Error:

_____ Sample Log Stamped Incorrectly:
_____ Sample Containers Mislabelled:
_____ Duplicate / Extra Samples Not Stamped:
_____ Analyst Bench Sheet Error:

_____

_____

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway, Suite B, Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818
INFO@IATL.COM

DAILY QUALITY CONTROL DATA

LEAD SAMPLE ANALYSIS

(DATE: 10 / 12 / 11)

Standard	Total Lead (mg)	Percent Recovery **
Reagent Blank	0.000	< LOQ
Blank Spike	0.500	104
Lab control Std # 401	0.464	110
Matrix Spike - LBP *	1.02	104
Matrix Spike - Wipe *	1.58	103
Matrix Spike - Soil *	0.443	104
Matrix spike - Air *	0.050	102
2.5 ppm Standard	0.25	102
10.0 ppm Standard	1.0	103
40.0 ppm Standard	4.0	97

AIHA LAP-LLC No. 100188 **NYS-DOH** ELAP No. 11021

Analysis Method: ASTM D3335-85A
NIOSH 7082
EPA SW846 3050B 7000B

Comments: IATL assumes that all sampling complies with accepted methods.
All client supplied sampling data is assumed to be correct when calculating results.
Detection limit based upon 0.2 mg/L reporting limit and sample size.
* NIST Traceable.
** 80-120% acceptable limits.

Analyzed By: Chad Shaffer
R. Chad Shaffer

Date: 10/12/11

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

AAS.DailyQC.001

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 31-OCT-11
Report Date: 04-NOV-11 14:38 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1079108

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1079108-1 T1 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	42.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-2 T2 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.7		0.50	mg/L		03-NOV-11	R2280826
L1079108-3 T3 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	11.2		0.50	mg/L		03-NOV-11	R2280826
L1079108-4 T4 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	57.3		0.50	mg/L		03-NOV-11	R2280826
L1079108-5 T5 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	3.30		0.50	mg/L		03-NOV-11	R2280826
L1079108-6 T6 Sampled By: CLIENT on 26-OCT-11 Matrix: OTHER **Individual leachate metal** **TCLP Leachable Metals** Lead (Pb)-Leachable	2.58		0.50	mg/L		03-NOV-11	R2280826

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-CL	Waste	TCLP Leachable Metals	EPA SW846 METHODS 1311 AND 6010B

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-ICP-CL	**Waste**							
Batch R2280826								
WG1381861-2 DUP		**L1079108-1**						
Lead (Pb)-Leachable		42.7	41.2		mg/L	3.6	25	03-NOV-11
WG1381861-1 MB								
Lead (Pb)-Leachable			<0.50		mg/L		0.5	03-NOV-11

Quality Control Report

Workorder: L1079108 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # L1079106

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting Ltd.	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1: erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
		Email 2: elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403-452-3110 Fax: 403-452-3133	Email 3:	**Analysis Request**
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: 11192	
Company:		PO / AFE: 11192EH	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
		ALS Contact:	**Sampler:**

Sample Identification (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	TCLP-Lead
T1	26-Oct-11		Other	X
T2	26-Oct-11		Other	X
T3	26-Oct-11		Other	X
T4	26-Oct-11		Other	X
T5	26-Oct-11		Other	X
T6	26-Oct-11		Other	X

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observatic Yes / No ? If Yes add
Erin Humeny	31-Oct-11			31 Oct-11	15:21	21 °C				

BALLAST ENVIRONMENTAL CONSULTING
ATTN: ERIN HUMENY
P.O. Box 87073
RPO Douglas Sq.
Calgary AB T2V 3V7

Date Received: 28-OCT-11
Report Date: 04-NOV-11 15:12 (MT)
Version: FINAL

Client Phone: 403-452-3110

Certificate of Analysis

Lab Work Order #: L1078192

Project P.O. #: 11192EH
Job Reference: 11192
C of C Numbers:
Legal Site Desc:

Kelly Hunt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-1 T1							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	124.0		42.4-139	%		04-NOV-11	R2281519
L1078192-2 T2							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	100.0		42.4-139	%		04-NOV-11	R2281519
L1078192-3 T3							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<3.0		3.0	mg/kg		04-NOV-11	R2281519
Total PCBs	<3.0	DLM	3.0	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	87.0		42.4-139	%		04-NOV-11	R2281519
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1078192-4 T4							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	103.0		42.4-139	%		04-NOV-11	R2281519
L1078192-5 T5							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	1.00		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	0.37		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	1.37		0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519
L1078192-6 T6							
Sampled By: CLIENT on 26-OCT-11							
Matrix: BULK							
PCBs in Paint							
Aroclor 1016	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1221	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1232	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1242	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1248	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1254	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1260	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1262	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Aroclor 1268	<0.30		0.30	mg/kg		04-NOV-11	R2281519
Total PCBs	<0.30	DLIS	0.30	mg/kg		04-NOV-11	R2281519
Surrogate: Decachlorobiphenyl	0.0	SOL:MI	42.4-139	%		04-NOV-11	R2281519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLIS	Detection Limit Adjusted: Insufficient Sample
DLM	Detection Limit Adjusted For Sample Matrix Effects
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PCB-PAINT-ED	Misc.	PCBs in Paint	EPA 3550/8082-GC-ECD

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7

Contact: ERIN HUMENY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-PAINT-ED	**Misc.**							
Batch R2281519								
WG1380593-2 LCS								
Aroclor 1260			110.0		%		65.5-118.8	03-NOV-11
WG1380593-1 MB								
Aroclor 1016			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1221			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1232			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1242			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1248			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1254			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1260			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1262			<0.30		mg/kg		0.3	03-NOV-11
Aroclor 1268			<0.30		mg/kg		0.3	03-NOV-11
Surrogate: Decachlorobiphenyl			116.0		%		42.4-139	03-NOV-11

Quality Control Report

Workorder: L1078192 Report Date: 04-NOV-11

Client: BALLAST ENVIRONMENTAL CONSULTING
P.O. Box 87073 RPO Douglas Sq.
Calgary AB T2V 3V7
Contact: ERIN HUMENY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

L1078192

COC #

Page 1 of 1

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)
Company:	Ballast Environmental Consulting	☑ Standard ☐ Other		◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Erin Humeny	☑ PDF ☐ Excel ☐ Digital ☐ Fax		○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	PO Box 87073 RPO Douglas SQ	Email 1:	erin@ballastenvironmental.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Calgary AB T2Z 3V7	Email 2:	elvie@ballastenvironmental.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	403.452.3110 Fax: 403.4523.3133	Email 3:		
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	11192	
Company:		PO / AFE:	11192 EH	
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
		ALS Contact:	Sampler:	

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCB in paint	Number of Containers
T1	26-Oct-11	-	Product	X	1
T2	26-Oct-11	-	Product	X	1
T3	26-Oct-11	-	Product	X	1
T4	26-Oct-11	-	Product	X	1
T5	26-Oct-11	-	Product	X	1
T6	26-Oct-11	-	Product	X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Erin Humeny	28-Oct-11		SK	28 Oct	12:05	24 °C				

GENF 18.01 Front

Appendix 6

References

Advances in Environmental Measurement Methods for Asbestos. Michael E. Beard and Harry L. Rook, Editors. January 2002. ASTM Stock Number: STP1342.

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Safe Work Practices for Handling Asbestos. WorkSafe BC. 2006.

Standard Guide for Limited Asbestos Screens of Buildings. ASTM International. August 2005. 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States.

Standard Guide for Readily Observable Mould and Conditions Conducive to Mould in Commercial Buildings: Baseline Survey Process. ASTM International. March 2006. 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States.

Occupational Health and Safety Guidelines, Part 6 Substance Specific Requirements - Asbestos. WorkSafe BC. Including revisions up to October 26, 2011. http://www2.worksafebc.com/publications/ohsregulation/Part6.asp

Occupational Health and Safety Guidelines, Part 20 Construction, Excavation - Section G20.112 (Hazardous Materials - Asbestos). WorkSafe BC. Issued June 18, 2008. http://www2.worksafebc.com/publications/OHSRegulation/GuidelinePart20.asp#SectionNumber:G20.112

Occupational Health and Safety Regulation, Part 6 Substance Specific Requirements - Asbestos. WorkSafe BC. Including amendments up to February 1, 2011. http://www2.worksafebc.com/publications/OHSRegulation/Part6.asp

Occupational Health and Safety Regulation, Part 20 Construction, Excavation and Demolition - Section 20.112 (Hazardous materials). WorkSafe BC. Including amendments up to February 1, 2011. http://www2.worksafebc.com/publications/OHSRegulation/Part20.asp#SectionNumber:20.112

Superfund Method for the Determination of Releasable Asbestos in Soils and Bulk Materials. United States Environmental Protection Agency.

Appendix 7

QA / QC

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The purpose of Quality Assurance and Quality Control (QA/QC) procedures is to ensure that data used to evaluate site conditions are accurate and reliable. Quality Assurance is a complete program designed to produce results which are valid, scientifically defensible, and of known precision, bias, and accuracy and includes planning, documentation and quality control activities. Quality Control is a system of activities to ensure a quality product, including measurements made to ensure and monitor data quality and includes calibrations, duplicates, blanks, and spiked measurements, inter-laboratory comparisons and audits.

DUPLICATES

Duplicate samples are analyzed to check the reproducibility of sampling and analytical results. A duplicate is any additional sample collected at the same time as another in a manner that minimizes differences. One duplicate should be collected and analyzed for approximately every twenty samples collected.

Reproducibility of duplicate samples is calculated by calculating the relative percent difference.

Relative percent difference (RPD): A measure of precision, calculated by:

$Rd\% = \{X_1 - X_2\}/X\ ave \times 100$

where:

X_1 = concentration observed with the first detector or equipment;

X_2 = concentration observed with the second detector, equipment, or absolute value; and

X_{ave} = average concentration = ((X1 + X2) / 2)

The acceptable limits of RPD vary for different constituents ranging from 40% to 50%. An RPD value within the acceptable limit indicates that the laboratory data are consistent and reliable. The following table summarizes acceptable RPD limits:

Constituents	Acceptable RPD
Asbestos	<50%
Lead	<40%

It is common for the paint samples to have interference from the substrate. This arises from the difficulty of sampling paint firmly attached to surfaces.

QA/QC Duplicate Sample Summary for Asbestos

Sample ID	Result (%)	Duplicate ID	Duplicate Result (%)	RPD (%)	Pass/Fail
Lodge					
A59	1.4	Dup 4	0.75	60	FAIL
A73	5.7	Dup 5	6.3	10	PASS
A83	None detected	Dup 6	None detected	0	PASS
A68	None detected	Dup 7	None detected	0	PASS
A77	None detected	Dup 8	None detected	0	PASS
A90	None detected	Dup 9	None detected	0	PASS
Cabin #1 & Cabin #2					
A9	None detected	Dup 1	None detected	0	PASS
A15	1.9	Dup 2	2.2	15	PASS
A32	None detected	Dup 3	None detected	0	PASS

A total of nine duplicate samples were taken for asbestos. All of the samples passed with the exception of Dup 4 and A59 with a 60% RPD.

Sample A59 and Dup 4 were vinyl floor tiles. Five samples of identical tiles from different areas were tested and had results greater than 1% asbestos. The conclusion was drawn that the floor tiles were asbestos-containing. This shows the variability of asbestos in certain products and supports the need for taking multiple samples of similar products.

QA/QC Duplicate Sample Summary for Lead

Sample ID	Result	Duplicate ID	Duplicate Result	RPD	Pass/Fail
Lodge					
P29	<0.0075	Dup 5	<0.0049	42	PASS
P15	0.0044	Dup 6	0.017	118	FAIL
Cabin #1 & Cabin #2					
P1	5.3	Dup 1	1.1	131	FAIL
P3a	0.13	Dup 2	1.1	158	FAIL
Superintendent's House					
P1	5.4	Dup 4	5.8	7	PASS
Outbuildings					
P4	<0.0067	Dup 3	<0.0059	13	PASS

Six duplicate samples were taken for analyzing lead in paint. Three passed and three failed the QA/QC.

The paint samples that failed QA/QC were exterior paint samples. A "clean" sample of the selected colour could not be taken due to the multiple coats of paint on the substrate. Each exterior paint sample had some quantity of paint of a different colour, for example white paint over gray paint over brown paint. It is believed, for this reason, that there is great variability in the lead paint results.

Environmental Assessment Amendment
Radium Hot Springs Lodge
Demolition & Site Remediation, Kootenay National Park

Revised March 27, 2013
Prepared for

Parks Canada
Public Works & Government Services Canada
Riddell Kurczaba Architecture Engineering Interior Design ltd

By
Elements Network Inc.

ELEMENTS

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT OVERVIEW AND LOCATION

An Environmental Assessment was previously approved by Parks Canada to reduce infrastructure and restore associated areas to improve wildlife habitat and corridors in the Sinclair Canyon area located in Kootenay National Park including the former Parks Canada administration building, the old Superintendent's house, and consolidation of Redstreak Campground in Kootenay National Park. Parks Canada is now preparing to remove the Radium Hot Springs Lodge (RHSL) and remediate this land to further contribute to this initiative. The purpose of this report is to be an amendment to the 2007 EA for the Consolidation and Restoration of Facilities and Water/wastewater at Radium Hot Pools and Redstreak Campground, prepared by Jacques Whitford, with the focus on the remaining infrastructure in and around RHSL, including a review of:

- A summary of demolition plans and rehabilitation plans presented in separate reports by other disciplines,
- New information on Species at Risk; and
- New issue areas or information important to the works that was not part of the 2007 EA.

This report will evaluate the potential environmental effects associated with the demolition and restoration of lands in and around RHSL and propose appropriate mitigation for any potential adverse environmental impacts. In this amendment, mitigation measures are included in the discussion and are also summarized within a Summary Table of Mitigation Measures in Appendix 1.

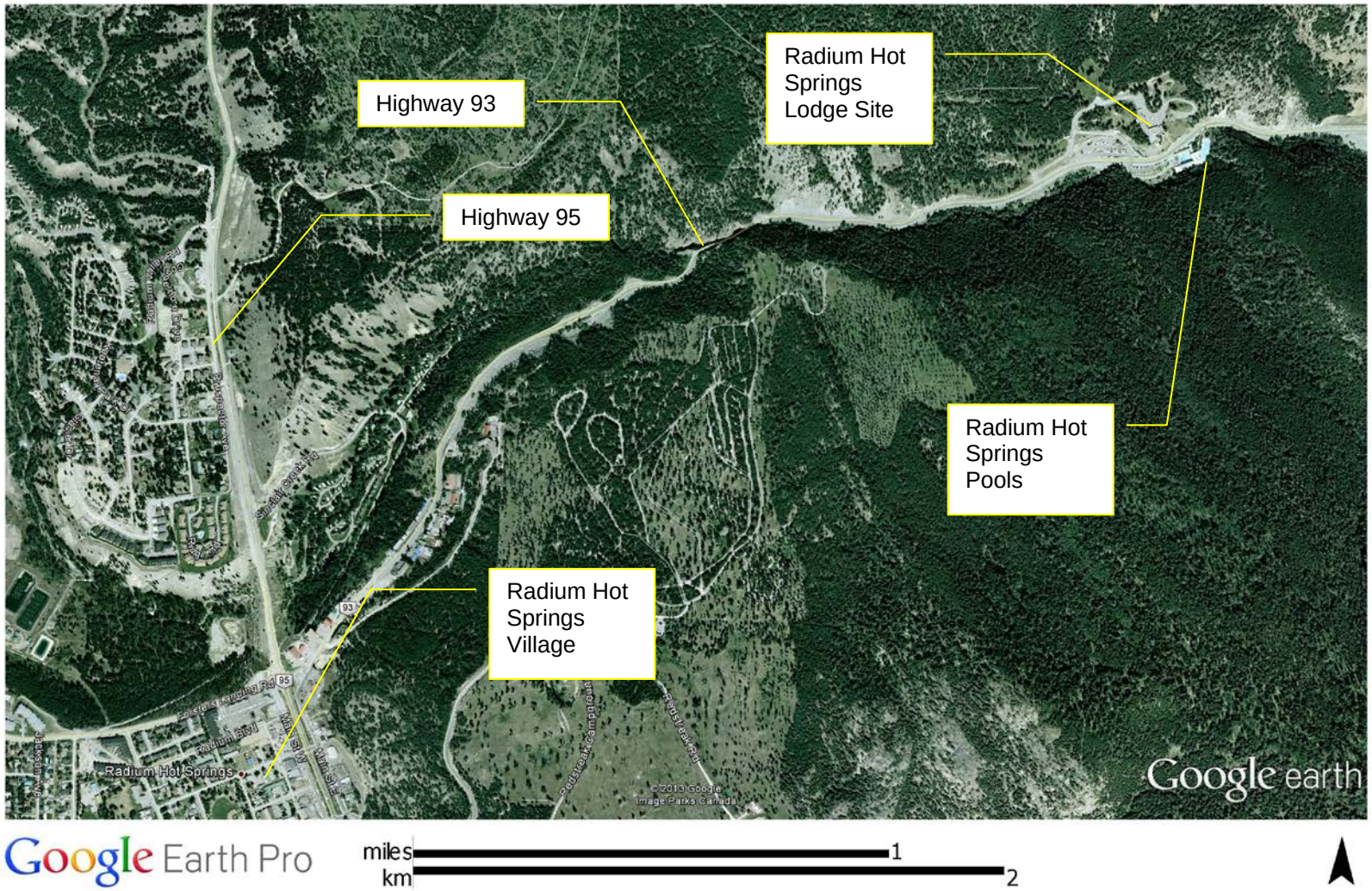
The environmental issues reviewed included input from reports by others, site visits and observations at the Radium Lodge area of the Lodge, the staff housing, the Superintendent's house to the east, 3 small former staff cabins, as well as the disturbed areas around these features.

Parks Canada is also planning to carry out a large scale tree thinning and prescribed burn project to further contribute to restoration initiatives. Due to uncertainty regarding this potential project as part of a larger restoration initiative to enhance wildlife habitat, forest modification outside the RHSL site will not be evaluated in this report. Any, future plans for the forest thinning and prescribed burning, once details are known, will be evaluated in a separate report if required

by Parks Canada's policy for application of the Canadian Environmental Assessment Act (2012).

The project site is located 2.8 kilometres (km) east of the intersection of Highway 93 and Highway 95 in the Village of Radium Hot Springs. It is on the north side of Highway 93 in Kootenay National Park. Radium Hot Springs pool, an operating tourist attraction, is located on the opposite side of the highway. The north side parking lot for the hot springs along the highway will continue to be used and no demolition is planned for it.

Figure 1.0 Kootenay Park & Radium with the area of the proposed demolition works. (Radium Hot Springs Lodge Site).



1.2 PROJECT SCHEDULE

The table below outlines the current proposed project schedule subject to funding. Delays should consider a similar schedule due to the need to minimize effects on wildlife and on the visitor experience. Note some activities scheduled may need to be altered subject to the results of pre demolition wildlife surveys for nesting birds and Species at Risk (American badger and Rubber boa). The schedule is subject to approved funding for the project in 2013.

Project Activity	Timing for 2013/2014**	Comments
Hazmat removal	July until start of demolition OK	Inside buildings-i.e. asbestos. Superintendent's house to be inspected for snakes prior to initiating removal.
Asphalt removal	Winter to Spring (November-May 01)	
Services decommissioning	Winter to Spring (November-May 01)	
Building demolition & concrete stockpiling	Winter to Spring (November-May 01)	Low impact equipment needed to minimize vibration and noise in order to reduce risk to the hot springs, care with slope stability, sensitive wildlife and habitat disturbance and visitor experience.
Re contouring and reclamation	Spring (before May 01)	Frozen ground conditions after demolition may preclude final re-contouring until spring 2014 until after the snake emergence and migration. Re-contouring must be completed before May 01, or be resumed after June 15th when sheep migration is complete.
Revegetation	Spring or Summer	May occur if re-contouring is completed prior to May 01.

*****If works not undertaken in 2013/2014, then a similar schedule is recommended for other subsequent years to minimize effects to wildlife as well as the visitor experience.***

1.3 DEMOLITION/ABANDONMENT PLANS

The reports of the various discipline specific requirements of each type of infrastructure were submitted as separate reports. The following is a summary of the primary decommissioning recommendations as identified in the 'Civil Concept Design Report for Radium Lodge, Kootenay National Park Demolition and Remediation, Requisition No. – E0209 – 121526, March, 2013 by McElhanney Consulting Services Ltd.'

1.3.1 RECOMMENDATIONS FOR DECOMMISSIONING UTILITIES

There are a number of engineering recommendations for utility decommissioning for various utility services on site. The utilities that will be decommissioned include:

- Sewer pipe,
- Water mains and services,
- Manholes,
- Catch basins,
- Septic tank(s),
- Electrical utilities,
- Hydrants, and
- Culverts.

There are variations on the types of demolition objectives recommended for the decommissioning of utilities; however all above ground utility features are intended to be removed unless otherwise directed by Parks Canada. Structures and equipment above grade will be removed to 1 meter (m) below grade. Large pipe, manholes and other similar structures in the ground over 200 millimetres [mm] in diameter or across would be filled typically with fillcrete on the small infrastructure and sand/gravel on large ones such as manholes and any septic tanks that might be present. Smaller pipe (less than 200mm), may be left in place and abandoned as follows: seal the pipe to be abandoned at all exposed ends with a manufactured compression/mechanical type plug to prevent water ingress/egress within the abandoned system, or as per engineer's direction.

Septic tanks differ from other infrastructure because they may need to be pumped out before decommissioning. It is possible that at least one septic tank exists near the three cabins. If it or other ones exist, the tank(s) are to be identified by the demolition contractor and if necessary partially excavated to determine what the tank is made of and its size. If practical to do so, without disturbing key vegetation and wildlife features, it will be removed. Otherwise, it will be filled in with a suitable filler such as clean concrete, gravel and/or soil.

Because culverts are likely to fail over time from corrosion and exposure, it is recommended that they be completely removed. Culverts in areas that would benefit from not being disturbed may be removed by pulling the end of a short section through with large tracked equipment. Alternatively to avoid offsite damage to adjacent vegetation and habitat, or if they are in areas to be part of the surface works demolition, they may need to be excavated and removed. This,

however, is an item that may require field determinations (in consultation with the Parks Canada representative) about approach and timing to ensure that culverts needed during demolition to carry water are not removed too soon. The field determination should also consider the disturbance effects to habitat and natural vegetation, soil conditions (i.e. frozen), time of year and surface water movement potential to enable a more controlled procedure for the removal of these structures.

Overhead power poles no longer required will be dismantled and removed by BC Hydro and hauled outside the park and either stored or disposed of at an appropriate site or facility. Light stands at the lodge site and along roadways slated for decommissioning will be salvaged and hauled to McKay Compound for storage.

Removal of utility services would be expected to likely include a combination of physical manual labour and two pieces of equipment, probably an excavator and a truck mounted portable welder.

1.3.2 RECOMMENDATIONS FOR DECOMMISSIONING SURFACE WORKS

There are a number of engineering recommendations for surface works decommissioning on site. The surface works include:

- Asphalt pavement,
- Signs, posts and fences,
- Concrete curb, gutter, and sidewalk, and
- Artificial site drainage.

Although some organizations bury or cap asphalt, it does have the potential to continue to discharge very low levels of volatile compounds over time, principally heavier hydrocarbons. Parks Canada has a policy requiring that asphalt be removed and if possible, recycled for re-use. If there is no recycling, then the other option is to place it in a secure off park landfill. This policy recognizes the environmental benefit of recycling, while minimizing additional off gas emissions typical of new asphalt and reducing demands on oil used in the production of new asphalt.

Concrete curb, gutter and sidewalk structures will be broken up into small pieces with low noise & vibration equipment, such as a processor/pulverizer, in areas in close proximity to the hot springs pools and other sensitive areas such as the Superintendant’s house and hot spring aquifers. Clean concrete will be placed in

designated disposal areas where other concrete from buildings and retaining walls have been broken up and placed for disposal on site.

The removal of the asphalt and concrete are anticipated to be undertaken using an excavator and likely a loader. In addition, gravel trucks will also be on site as the likely method of transport to haul away asphalt and any concrete material not suitable for use as fill on-site. It is estimated there will be approximately 72 truckloads of asphalt to be hauled away. Gravel trucks may also be used to bring landscape and reclamation soils and related materials on-site. It has been assumed based on inspections to date that the concrete is clean and can be disposed on site.

Once the buildings and asphalt are removed, the effectiveness of natural site drainage will improve. Depending on the timing of earthworks and ground disturbances there could be a period of 4 to 7 months after the completion of demolition activities until all final restoration activities occur. For example, there could be frost/snow conditions which would preclude effective seeding and as a result there may be a period of time where the exposed soils are at risk of erosion and sedimentation. Care must be taken to ensure drainage is not concentrated at the sites and that interim erosion and drainage control measures are in place until all disturbed areas have been stabilized.

1.3.3 RECOMMENDATIONS FOR DEMOLITION OF BUILDINGS

There are a number of recommendations for decommissioning buildings and other specified above ground infrastructure on-site. The buildings and their key components include:

- The wood portion of the Superintendent’s house,
- The concrete foundation and walls of the basement of the Superintendent’s house,
- The rock retaining wall staircase outside of the Superintendent’s house,
- Pre-cast retaining wall,
- Cast-in-place concrete retaining wall,
- Timber retaining walls,
- Wood Frame Structure for Cabins 1, 2, 3 and Storage sheds 1 and 2,
- Concrete foundations and piers for Cabins 1 and 2,
- Concrete Lodge Structure,
- Timber Structure portion of the lodge, and
- Concrete elevator shaft and tunnel.

There are variations of very similar types of approaches recommended for the decommissioning of buildings and related materials. All above ground structures will be removed to 1 metre below grade. In the case of the Superintendent's house, there is a recommendation to relocate the wooden building and to do the same for the other cabins or buildings in usable condition. Timber from other buildings not being relocated, including the lodge, is recommended for salvage, if feasible, as the preferred option. Some wood that may not be salvageable would be disposed of at a suitable landfill outside of the park.

Hazmat Removal

Materials inside buildings such as asbestos in ceilings, PCB lighting ballasts, lead pipe or other potential hazardous materials must be first removed before demolition can proceed. This is expected to take place as early as the summer but can occur up until demolition starts in the fall.

Hydraulic hoist leaks in the hoist vault of the elevator at the lodge may be a concern therefore the area should be thoroughly inspected and cleaned prior to removing any concrete (Envirotech Solutions Inc, 2001).

The area between RHSL and the Superintendent' s house was formerly the Radium Hot Springs Village. There is potential for asbestos piping (or other unidentified of environmental concern) to be encountered during demolition. Care should be taken when removing asphalt and gravels under the parking lots so as to not expose contaminants. If asbestos piping or other contaminants are encountered, it must be assessed as a potential hazard prior to being removed from site (Envirotech Solutions, 2001). If contaminants are exposed, the contractor may need to delay work in this area until investigations are complete and a course of action developed in consultation with Parks Canada's representatives.

Concrete Demolition

There are two key issues with concrete demolition on this project: noise and vibration. Noise is a concern where it can affect the visitor experience at the nearby hot springs pool, or disrupt wildlife patterns, in particular denning or active rubber boa snakes. Vibration is a concern where levels associated with traditional demolition (i.e. blasting and impact hammers) could disrupt the subsurface hot water aquifers to the hot springs as well as affect snakes on or in their dens (hibernacula).

Another concern with any demolition techniques is the generation of uncontrolled dust on the surrounding natural vegetation and habitat.

Concrete demolition must take place with the use of low noise and low ground vibration inducing equipment and techniques for the entire project site however of particular concern is noise and vibrations levels within 100m of the Hot Pools site and at sensitive sites including the Superintendant's house, the bus shelter and the elevator shaft. For example, equipment could include but is not limited to a processor or pulverizer attached to an excavator, expansive grouts or noise reduced masonry saws. The contractor must prepare a noise management plan for demolition work and also must ensure dust control is part of whatever technique or equipment is chosen to meet these objectives.

Clean concrete from the walls and basement, once collapsed and broken, is to be disposed of on site in the designated disposal areas (See landscape cut and fill plans) which include the basement of the RHSL and the parking lot. Concrete disposed of on site should be sized and piled to ensure there are no gaps with the potential to cause subsidence of the surface cap. The engineering/landscape assessment has determined all concrete on site can be stockpiled and placed in the basements or on the old parking lot and re-contoured with a gravel fill, topped with weed free topsoil and seeded to create a natural grassland setting. At this time there is no expectation of a need to dispose of concrete off site.

The floor, walls and footings below grade do not need to be processed or removed. Additional concrete from the cast in place retaining wall on the site will be similarly handled. Openings, fissures or cracks should be created in the basement floor and remaining walls of the RHSL and the Superintendent's basement using low impact methods to ensure subsurface water drainage. Adequate drainage, as per engineer's specification, should also be ensured within the concrete rubble fill area in front of the precast concrete wall to be retained. The elevator shaft and tunnel protruding above grade would be demolished to 1 m below grade. The shaft has good potential be become an artificial hibernacula for rubber boa and based on the recommendations of Dr. St. Clair in his report, is to be filled with larger irregular shaped concrete pieces (sizes 250-500mm) from the demolition to create interstitial space for snakes and small mammals. This can be covered or capped with organic material that will not compact and seal off the interstitial spaces.

Demolition of buildings is expected to include a combination of physical manual labour and heavy equipment which may include excavators, loaders and gravel trucks. It is the intention to avoid the significant noise and ground vibration from various types of heavy equipment and as a result, large impact hammers or rock crushers are not permitted for use on this project. The need for explosives has not been identified to date and is not foreseen as being needed so as a result, no explosives will be permitted as part of this project.

NOTE: Only clean concrete with rebar cut to the size of the concrete and clean soils will remain on site. All other demolition materials will be removed from site. The materials to be removed include but are not limited to lumber used in the buildings, interior fixtures, piping, wire, insulation, drywall, asphalt, plastics and metal as well as contaminated soils and concrete.

1.4 LANDSCAPING & RESTORATION

The landscaping and restoration activities are key to the project, with a focus on returning the area to a natural setting with native grasses and if available native forbs. The following is a summary of the primary landscaping and restoration recommendations as identified in the 'Landscape Concept Design Report for Radium Lodge, Kootenay National Park Demolition and Remediation, Requisition No. – E0209 – 121526, 2012 by McElhanney Consulting Services Ltd.'

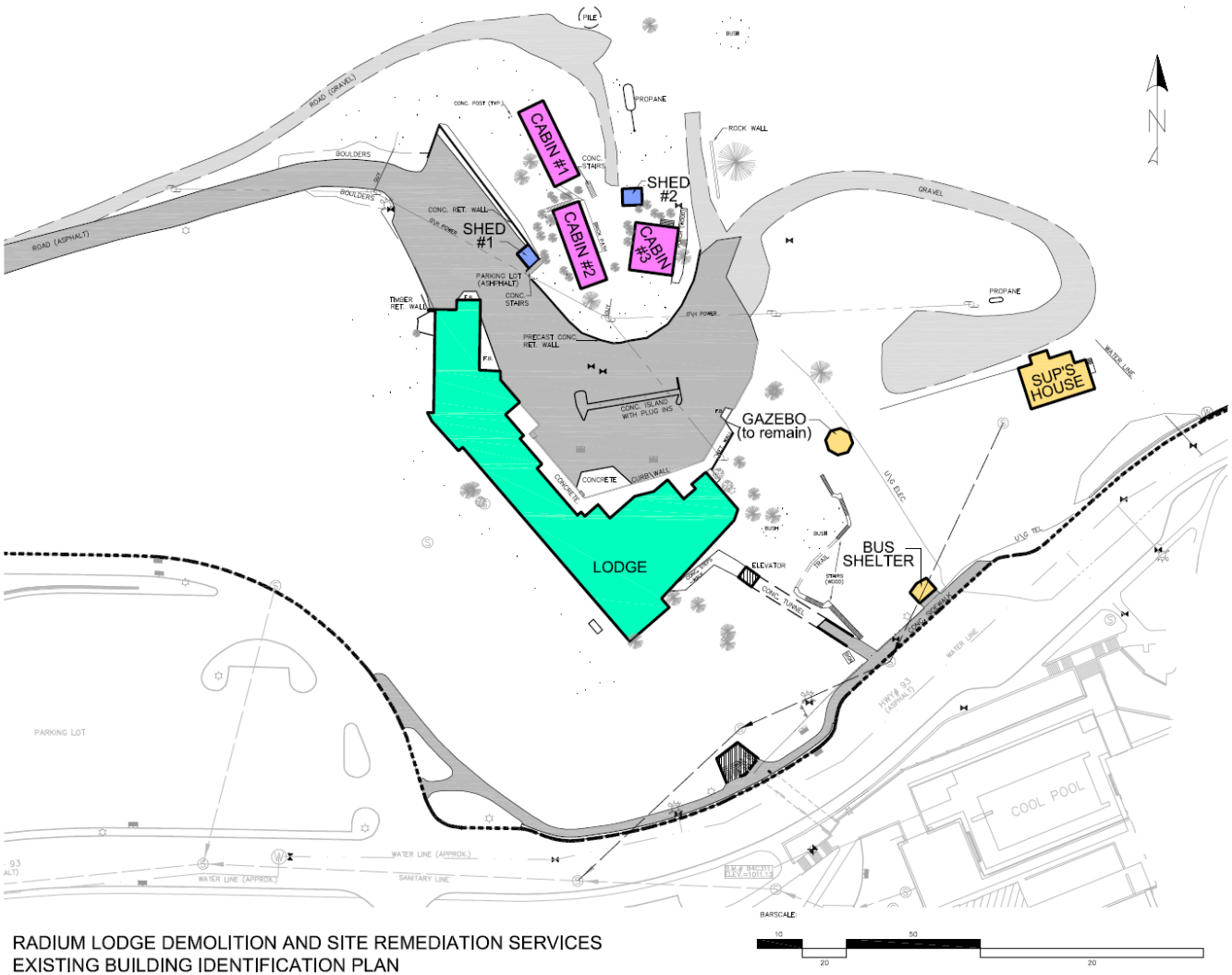
It is anticipated that Parks Canada will conduct pre-demolition weed control during the spring and summer of 2013 to reduce unwanted seed that can get onto open exposed soils.

The primary tasks in these activities will include:

- Using gravel from trails and under the pavement for filling interstitial openings in stockpiles of concrete and importing an additional 170 loads of gravel for capping the concrete,
- Removal of specified (by Parks Canada) non-native vegetation (e.g. lilacs),
- Scarify and de-compact the soils on the road beds and parking lots,
- Depending on the effects on the re-contouring and the type of road bed materials, some of the existing on site road gravels and from the road surfaces or road beds may be used for capping stockpiles of concrete,

- Covering bare ground with soil and topsoil (Note: topsoil (160 loads) will have to be imported from off-site),
- Re-contouring and grading to return site to natural contours,
- Implement temporary erosion control measures where needed (i.e. erosion control mats, silt fences, etc.,
- Hydroseeding with a biodegradable mulch using a seed mix specified by Parks Canada,
- Monitoring, weed control and touch up seeding.

Figure 2.0 Overview Image of the study area showing the buildings and areas of focus for demolition and restoration.



RADIUM LODGE DEMOLITION AND SITE REMEDIATION SERVICES
EXISTING BUILDING IDENTIFICATION PLAN

2 COMPONENTS COVERED IN THE 2007 EA

The Jacques Whitford 2007 EA included a number of components that will not be re-iterated in this report (except for applicable mitigation measures). The 2007 report included the following sections:

- Planning and Permitting,
- Waste Disposal,
- Emergency Response,
- Project Development and Operations,
- Site Description,
- Land and Human Use,
- Landforms,
- Vegetation,
- Hydrology,
- Aquatic Resources,
- Wildlife,
- Cultural Features, and
- General Mitigations (Waste, Pollution Minimization).

The wildlife issues and project benefits report were presented for this site in the 2007 EA. There are, however, two at risk species known to occur in the area: American badger (*Taxidea taxus*) which is endangered under Schedule 1 of the Species at Risk Act (SARA) and the Rubber boa, (*Charina bottae*), which is a species of special concern under Schedule 1 in SARA. These species will be discussed further, along with the Columbian ground squirrel which is an important food source on-site for the badger.

3 ENVIRONMENTAL ASSESSMENT , EFFECT & MITIGATION

A combination of information from readily available data, including field studies from other projects, review of research data and input from Parks Canada have been used to identify the environmental resources associated with the project and determine potential effects of the project and mitigation for the project.

3.0 WILDLIFE

Sound levels and vibration are a concern to wildlife and are discussed briefly below.

Although it is not known what levels may affect Rubber boa, it is likely excessive vibration during the denning period could cause disturbance to the Rubber boa in the den and significant vibration could alter the hibernacula. For this reason high impact equipment such as large jackhammers on excavators are prohibited near sensitive features and structures.

In 2010 as part of a rock scaling project in Sinclair Canyon, vibration levels were measured at the Hot Pools throughout the work. Loaded magnasite trucks travelling along the highway were measured to produce vibrations of 4.5 mm / s at a distance of about 4 m from the nearest axel (N. Summers, pers comm). The existing population of Rubber boa that inhabit the Hot Pools area throughout the year seem to persist at current vibration and noise levels of the highway.

Excessive sound pressure could also affect this species, and disturb their patterns, particularly during the denning phases. Sound is not expected to have a significant impact to the snakes when in the den as soil, ground and rock are adsorptive and resistant to sound pressure propagation and transmission.

Excessive noise can disturb and potentially alter behaviour of badgers and bighorn sheep if they occur in close proximity to the wildlife and especially during key life cycle phases. Both species have lived in close proximity to ongoing traffic and human noise and are expected to be habituated and reasonably adaptive in response to routine noise and as well as moderate incremental levels from trucks and heavy equipment that may occur with the demolition.

For this project, high impact equipment and techniques causing excess noise and ground inducing vibration are prohibited. This includes large jackhammers,

equipment with unmaintained silencers, rock crushers and blasting. Section 3.9 (Visitor/Public Facilities and Services) further discusses sound levels and proposes a maximum level guideline for the project.

3.1 RUBBER BOA

Rubber boas are well documented as occurring in the immediate vicinity of the proposed works and ranked as a special concern species. This rank or status means management strategies must be successfully implemented or these species will likely decline until they are threatened or become an endangered component of the fauna of Kootenay National Park. They exist here near the northern end of their range. Due to the influence of the thermal effects of the hot springs they are frequently found there and have even been observed in the winter. Protection of their habitat and systematic monitoring of the population are considered important management objectives for the park as well as during this project.

Figure 3.0: Rubber boa. Stock photo

The Rubber boa in the Radium Hot Springs report (by Robert St. Clair, PhD, 2004) provided to Elements, included staff interviews as well as on-site ground searches during July of 2003. Investigation in the study area focused on observing snakes as well as habitat potential. The survey, however, was not designed to determine migration corridors, gestation sites and hibernacula locations. Subsequent to this report, Dr. St. Clair conducted a further investigation in 2012 in light of proposed demolition approaches and provided additional

recommendations and observations in light of the habitat potential for this snake species on site.

Existing Conditions

There are several areas throughout the Sinclair Canyon, in and around the hot springs and over in the Redstreak Campground with documented habitat and sightings of Rubber boa. Critical habitat such as hibernacula and gestation sites are not known.

The Superintendent's house was reported to have had an active snake in it during the winter when the building was occupied suggesting perhaps it was foraging as a building like this likely hosted populations of small mammals. There is very suitable forage habitat up slope to the east and north with cover and thermal regulating features (south and southwest exposures). Dr. St. Clair provided an expert opinion in the 2004 report that the south facing slopes may provide summer foraging and the old house may be a den or hibernacula. In the 2012 field assessment, Dr. St. Clair re-affirms the value of the slopes and also the potential for the now vacant superintendent's house to be a possible hibernacula as well as a suitable foraging site hosting prey species.

Other features in and around the lodge area such as the rock wall at the house and the rock wall down on the lower parking lot and landscape rock along the roads leading up to the lodge (see Figure 4.0) are of the type that could provide shelter and or thermal regulating features.

Figure 4.0 Photo of landscape rock providing good habitat potential to be left undisturbed and retained after demolition.

A snake survey in the spring during emergence may be conducted by Parks Canada to better assess potential for foraging by Rubber boas and the presence of hibernacula on or near the site. Temperature levels in the Superintendent's basement are currently being monitored by Parks Canada to better determine thermal suitability of the basement as a hibernation site.

Effects

The demolition activities planned in the area have the potential to disrupt the movement of snakes. Demolition can pose a risk because equipment and vehicles can harm snakes directly, causing mortality. This risk increases significantly as snakes are more active or are migrating during the spring or fall denning season and are more likely to take shelter under unattended equipment or in piles of demolition debris material.

There is a possibility of a gestation area for gravid females incubating their young. No studies have been done to determine if that is the case. Gestation areas tend to require a combination of thermal regulating features facing south or south west combined with good quality ground cover features. Demolition could disrupt this activity causing gravid females to move to alternate locations where they may not be as secure from predation or perhaps if they do not move, then they are at risk of injury or mortality from equipment. A loss of a gravid female would also result in the loss of the young of the year from that female. Multiple losses of females in a given year could have a measureable impact on the year class and perhaps the population.

There also exists a possibility of hibernacula occurring in or around the site where the activities are anticipated to occur. The knowledge of the Rubber boa in the area is largely limited to observations of the animal during the foraging season. There have been no seasonal assessments or studies identifying actual or candidate (potential with some evidence) hibernacula. Rubber boa hibernacula needs are not as well documented as other species. Typically hibernacula are expected to need secure entrance/exit access with cover features that merge desirable thermal regulating attributes with protection from predation. The actual chamber of the hibernacula also needs to be below the frost line. Demolition works could cause the following effects to hibernacula if they occur in a building or in the footprint of the activities:

1. Disturbance or loss of cover features near the den entrance could lead to increased exposure to predation;

2. Injury or mortality to snakes if works are done during the emergence or entry phases in the spring and fall;
3. Impedance or blockage of the entrance preventing successful hibernation or causing a choice of a less desirable, less secure hibernacula;
4. Heavy equipment excavating or moving material or operating on an unstable formation could cause collapse of the hibernacula before snakes enter which could have a similar effect to number 3 above. Alternatively a collapse with snakes in the den could cause a limited to significant mortality effect including a negative population effect depending on the numbers using the hibernacula.

Demolition activities could occur on areas potentially used as foraging sites, for example the residual habitat around part of the lodge or the Superintendent's house. This footprint by people and equipment is expected to be as much as 4 to 7 metres in width adjacent to these buildings to allow safe navigation and movement by equipment. Should there be cover and available forage species (small mammals), snakes may be using this and the disruption or loss of those will cause a temporary displacement of foraging until restoration is completely successful. If these are productive foraging areas, there may be a loss of vigour or vitality in individuals relying on these areas. If these works occur during the foraging season, there could also be direct effects on snakes resulting in injury or mortality. It is expected that there may be 1 to 2 m disturbance of the habitat edges around the parking lots and along roadways which could also have the same type of effects.

Existing features such as rock piles, rock walls or precast concrete retaining walls may provide cover, foraging sites and thermal regulating functions. Disassembly, removal or changes to these could affect the quality of these functions, putting snakes at risk to predation, or pushing them to seek out less secure and less effective alternatives, which in turn can affect mortality rates and vitality.

Final landscaping activities including contouring/re-contouring not only could have an effect on hibernacula as described above but could also result in changes to the landforms which in turn could affect thermoregulation, particularly if features that provided this capacity are altered or removed.

Snakes may also seek shelter around building sites or when in the area foraging for food which increases the risk of mortality by vehicles, equipment and related activities. Crossing large expanses without cover, such as a parking lot, also puts snakes at increased risk of predation. Alternatively, the restoration of these areas

over the near term (2-5 years) is expected to counter those effects by providing additional habitat with better cover and even additional foraging potential.

As the works progress, there may be minor short term effects on habitat immediately adjacent to the buildings, roadways and parking lots. This would primarily be disturbance to the vegetation and in some cases loss of vegetation. However, over the longer term once restoration is completed, including the small areas of temporary disturbance, this project is expected to add approximately 1.2 ha of additional habitat in the Sinclair Canyon which is an area of high value habitat for a number of wildlife species including Rubber boa.

Residual Effects to Wildlife are discussed in Section 3.4 while cumulative effects are discussed in Section 4. Overall the project will provide net benefits to snake habitat provided the mitigation is implemented and there are no population effects from damaging a hibernacula. Dr. Robert St.Clair was hired to provide expert recommendations and mitigation strategies to reduce the impact of demolition activities and improve the area for rubber boas and their habitat.

Figure 5.0: Map of Rubber boa observations

Mitigation

The objective of this work, to restore and increase natural grassy habitat, is expected to significantly benefit snakes.

There are a number of mitigation measures that will be taken to avoid or lessen potential impacts of the project on the rubber boa (including its individuals, the residences of the individuals or the critical habitat of the species). Measures include several recommendations suggested by Dr. Robert St. Clair a rubber boa specialist, hired to assess potential impacts of demolition activities and provide recommendations on mitigation strategies for the project to protect rubber boas and their potential habitats.

Dr. St. Clair in his review, has identified 3 areas of the project works where there is a significant potential to improve snake habitat from the use of materials from demolition to create artificial dens and foraging habitat. They are the precast concrete (block) retaining walls, the Superintendent's house basement and the elevator shaft. The precast walls and the superintendent's house basement may already be functioning as foraging habitat and perhaps in the case of the house, hibernacula if there are suitable temperature regimes.

The key components of the plan are to use larger demolition concrete debris (250 mm to 500 mm to stockpile in the basement of the Superintendent's house, around the precast concrete wall and in the elevator shaft that will create interstitial spaces that will attract small mammals which are forage for the snakes. In the case of the elevator shaft and the basement these spaces could also provide overwintering denning habitat for the snakes with suitable management of demolition and restoration. For these approaches to work, the surface cannot be capped with gravel and soil, though coarse mulch such as chipped wood could be used intermittently in layers and on the surface as small mammals and snakes can find ways through. With that in mind, the key aspects of the mitigation to accomplish this are:

- Retain various features or modify demolition strategies of several buildings and structures in the project area to protect potential rubber boa habitat. These include: Superintendent's house, pre-cast retaining wall, elevator shaft, timber retaining wall, existing rock piles and rock retaining walls.
- For the timber retaining wall, as long as the timbers are not treated with creosote (or pressure treated), keep as much of the wood retaining wall intact as possible. Only remove timbers if absolutely necessary. If they need to be removed, leave the timbers in a pile to be left to rot in place.
- For the Superintendent's house, hibernation value will be increased by using concrete and rock fragments of suitable size to fill the basement. Fragments should be large enough so openings between them would allow access for rubber boas and their prey to the depth of the existing foundation. Size of fragments should be large cobble to small boulders (approximately 250 mm - 500 mm). The site should not be capped with compacted gravel and seeded soil because this will make the basement inaccessible to snakes and small mammals. Safety to hikers may be an issue if openings between the boulders are concealed, so the concrete rubble may be left open. Organic mulch may be added at any time. Because the concrete could be considered initially unsightly, an interpretive sign may be added to indicate that the site is an artificial hibernaculum.

- If snakes are confirmed to be utilizing the Superintendent's house as a hibernacula it will be important ensure that the hibernacula elements are retained that are important to snakes. Mitigation under this circumstance may include one or another of the following, a combination there of or perhaps other alternatives:
    - Determine the ingress and egress points that snakes are likely to use and maintain the integrity of that element;
    - Remove above ground structures methodically, perhaps with specialty equipment and primarily by manual labour carefully under supervision of the Parks Canada Environmental Officer; and
    - Install any artificial components to the hibernacula as per the above criteria to ensure its integrity after the building removal.
- For the precast concrete retaining wall, place coarse material adjacent to it that permits useable interstitial spaces against the wall using concrete debris in the 250 mm to 500 mm range. Do not cap it with soil or gravel but coarse mulch (i.e. wood chips) may be used. Ensure drainage as per engineer's specification so that the rubble fill area does not fill with water.
- For the elevator shaft, the lower portion can be filled with crushed concrete and rubble but on the top 6 metres (subject to final engineering drawings), place coarse material that permits interstitial spaces inside the shaft using concrete debris in the 250 mm to 500 mm range. Do not cap it with soil or gravel but coarse mulch (i.e. wood chips) may be used.
- Structures to be demolished on site including the staff houses and sheds, cast-in place concrete wall, timber retaining wall, and Superintendent's house will be inspected by the Parks Canada Environmental Monitor for snakes prior to the start of demolition and throughout the demolition works. If snakes are found, mitigation measures will be developed depending on the type of use (i.e denning vs occasional foraging) and the contingency plan (described below) will be implemented.
- If available, use on-site natural large rocks that may be unearthed during the works and logs to build additional cover features for snakes. This requires specific expertise to identify suitable slopes and locations. Alternatively, these may also be distributed over exposed concrete rubble of the constructed artificial hibernacula and the forage areas around the precast concrete retaining walls. Limbs from logs may be chipped and distributed over the rubble.

- Existing rock piles that likely provide suitable habitat for snakes (e.g. rock piles along the road to the lodge) will not be used as angular rock in the drainage or gully areas, removed or relocated unless approved by Parks Canada. These rockpiles should be delineated or flagged off to protect them from being covered or otherwise moved as part of road decommissioning activities.

The general mitigation measures for protection of snakes and snake habitat during the demolition are:

- Conduct demolition activities during the dormant period to minimize impacts on snakes potentially in the area. The proposed schedule is to focus the bulk of the works in late fall through winter and early spring to avoid effects on snakes (November-May 01).

- A spring survey during emergence and migration may be conducted by Parks Canada. This may help confirm the presence or absence of potential hibernacula as well as migratory corridors. Snakes tend to bask at the hibernacula for several days depending on temperatures before they migrate to summer locations. Pre-scouting the area before emergence could identify key habitat with the potential for denning areas and it could be monitored in the spring. In addition it is planned that the Superintendent's house will be investigated regularly before and through emergence in the spring to determine if it supports a hibernacula function or if it is connected to one. Emergence and migration are a key period of the life cycle where the chance of observing the snakes is significantly enhanced over the balance of the year. If any surveys confirm that snakes are using the Superintendent's house for hibernating, additional mitigations may be warranted (e.g. changes in demolition schedule for the house, protecting any identified den entrance features etc.) Temperature levels in the Superintendent's basement are currently being monitored by Parks Canada to assess thermal suitability of the basement as a hibernation site. Immediately before demolition, the Superintendent's site will first be surveyed for hibernating snakes.

- With proposed site works to start in the late fall, conducting a fall denning survey may add additional confidence to the data collected in the spring. If for some reason, the schedule is altered and works occur in the fall during the denning re-entry period, the Parks Canada Surveillance Officer will be required to regularly inspect the area to determine if snakes are entering the worksite or passing through it.

- Hazmat removal, including asbestos removal tentatively scheduled for summer 2013. Hazmat removal could also precede the demolition in the fall. In either case, this requires a pre work inspection of the Superintendent's house for snakes.
- Dr. St. Clair recommends additional baseline surveys in the spring which may be undertaken by Parks Canada to better determine the foraging areas as well as the status of the Superintendent's house as a possible hibernacula. If the house is confirmed as hibernacula, this would affect the demolition schedule and current plans to create an artificial hibernacula.
- The Parks Canada Environmental Surveillance Officer or other designated environmental monitor will provide a worker orientation prior to commencement of the job which will include a review of mitigation measures for snakes such as speed limits, observations and handling constraints.
- Parks Canada Environmental Surveillance Officer will monitor on site snake activity and assist in the management and if necessary relocation of snakes.
- Ensure speed limits of vehicles and equipment do not exceed 10km/hr on the access roads and tracks during the migratory or other active periods.
- Workers will not handle, harass, or disturb snakes, if observed. Any observations will be reported to Parks Canada Environmental Surveillance Officer. Only trained staff will be permitted to handle and relocate snakes.
- Routine inspection of all parked equipment and vehicles as well as stockpiles of construction and building materials prior to movement during the active snake season. Low impact equipment (low noise and low vibration) will be used in proximity to sensitive areas to reduce noise and vibration.
- Demolition of the Superintendent's house and restoration of the area will be undertaken cautiously and with limited use of large machinery in order to provide ample opportunity to observe and protect any snakes potentially denning in the structure. Demolition of the basement should involve the use of masonry saws, or similar equipment low impact equipment, and a small excavator to slowly and carefully fill the basement with specified concrete rubble. No dumping of rubble must occur. Due to the potential for snakes denning either in the basement or surrounding area (e.g. talus slopes behind the house), the contractor must select the quietest type of tools and equipment (including noise-reduced saw blades and/or sound

reducing attachments) available in order to minimize noise disturbance. During demolition of the Superintendent's house, the contractor will:

- Minimize the use of heavy and excessively loud equipment or tools;
- Respond and adapt to unforeseen events, snake observations and wildlife incursions ; and
- Demolish these features/structures in a careful and methodical manner.

- If snakes are encountered during the project works, work will stop or be delayed to prevent harm or injury and to assess the nature of the occurrence as well as develop alternative strategies.
- During the period that snakes are active, the only planned activities are hazmat removal and restoration/landscaping. Snakes uncovered during these phases may be kept until their habitat is restored or they may be released in adjacent suitable habitat under the direction of the Parks Canada representative and wildlife biologist.
- A contingency plan will be established in the case that snakes are uncovered during demolition activities. If uncovered during hibernation, snakes may be maintained overwinter by being kept cool and moist in a refrigerator until they can be released in warmer weather (e.g. June) (St. Clair, unpublished report).
- A consideration would be to collect some of the woody debris, especially larger logs from the potential future Parks Canada thinning project and pile them discreetly in suitable habitat for cover.

Follow-up and Monitoring

A Parks Canada or independent Environmental Monitor will be on site during demolition and critical reclamation activities to monitor all mitigation measures and strategies outlined in this report and will assist contractors in complying with environmental best practices. Typically, a project with potential effects on a SARA listed species will also include post construction monitoring. This should include follow-up surveys or inspections for 2 to 3 years to determine if there are residual effects and unforeseen consequences from the works, particularly in the areas of constructed artificial hibernacula. Plans for corrective action after all demolition and restoration are completed will be the responsibility and direction of Parks Canada.

3.2 AMERICAN BADGER

The American badger is an endangered component of the fauna of Kootenay National Park. Under SARA, one cannot harm, harass, kill, capture or take a Species at Risk individual listed as endangered or threatened or harm/damage its residence. Protection of its habitat and systematic monitoring of the population are considered important to successfully managing this species.

The badger generally prefers open areas and may also frequent brushlands with little groundcover. When inactive, it occupies underground burrows. Young are born in underground burrows. Badgers in British Columbia are found in many biogeoclimatic zones - from hot, dry grassland valley bottom to alpine tundra. However, preferences seem to be for grasslands/fields or open-canopied forests (BC CDC, 2012). The preferred food source, Columbian Ground Squirrel, is abundant in residual habitat adjacent to the Radium Lodge, the parking areas and roadways.

Badger presence is determined by presence or absence of dens and physical observation of the animal in its habitat during the wildlife surveys. As this is a highly mobile species, surveys should be done seasonally prior to the initiation of project works. Surveys should identify the type of den/burrow use. For example a den used for brooding young of the year may be occupied all season while a transient male may build and use one as an overnight shelter while hunting and foraging. This knowledge directly affects project scheduling.

Figure 6.0: American Badger. Stock Photo (Istock).

Existing conditions

There is no recent known badger activity within or immediately adjacent to the project area. However, the BC Conservation Data Centre (CDC), reports historical observations up until 1998 of their presence in the general study area including Redstreak Campground, the Springs Golf Course, Sinclair Canyon and Botts Channel. In addition, CDC occurrence mapping presents surveys and studies which have identified badger populations both north (Edgewater) and south of Radium through to Cranbrook. Habitat conditions have been altered around the Redstreak Campground to improve badger habitat.

Effects

There may be a short term displacement of badgers, if present, due to noise from demolition activities. Badgers tend to avoid humans and equipment and are unlikely to be directly harmed.

Displacement of a mother and young of the year from their preferred selected habitat could result in loss of vigour and increased risk of predation when they relocate if the new location does not provide a similar quality secure habitat.

Damage by heavy equipment to a den used for brooding could have similar effects as above, but mortality would be an added risk if the den is occupied when it is damaged.

Over the long term, it is expected that with reduced presence of people, a very good food source of Columbian ground squirrels and restoration of the habitat, badgers may be found in the area more frequently as their habitat improves over time.

Mitigation

The mitigation measures for protection of badgers during the demolition are:

- Conduct a survey prior to demolition activity to identify presence of badger burrows/ dens in proximity to the project area (within 100m). The survey should determine the type of use (seasonal parturition & brooding vs occasional or temporary foraging) to incorporate into the project plans and schedule.

- Adjust the schedule of project works to avoid disturbance or displacement of badgers from active dens. This adjustment will be dependent on the type of use observed (as per first mitigation bullet).

- Ensure badger dens/burrows are not damaged or destroyed as part of this project. Dens within the project footprint or immediately adjacent to it must be flagged as no go zones by the Parks Canada Surveillance Officer.

- Live trap and relocate the ground squirrels, a key food source for badger. The areas for trapping are to be determined by the final footprint of the project.

- Establish buffer zones along roads and parking lots of 1m to minimize effects on ground squirrel burrows. These areas are to be flagged by the Parks Canada Surveillance Officer prior to the initiation of the project works. Use of equipment outside of these flagged no go zones, must be approved by the Parks Canada Surveillance Officer. See section 3.3 for additional mitigation related to ground squirrels. Demolition activities will avoid destruction of key ground squirrel burrows.

- Ensure equipment and vehicles stay on the project site. Intrusions (beyond the flagged no go zones) into adjacent habitat are not permitted without the approval of Parks Canada.

Follow-up and Monitoring

No specific monitoring is required for badgers if they are not found on site. If pre work surveys determine there are badgers burrows present on or near the work site, the Parks Canada Surveillance Officer must establish no go zones around the burrow site(s) and monitor them for activity. In the unlikely event that works have potential to displace badgers, schedules should be altered based on direction from the Surveillance Officer in consultation with the Parks Canada Wildlife Biologist. For example, if a badger is observed occupying any burrows in the vicinity of the project area, work in that area will stop until the Parks Canada Wildlife and Species at Risk Specialists are consulted on the appropriate course of action. Work may need to avoid the area until the badger has moved on.

3.3 COLUMBIAN GROUND SQUIRRELS

This species, though common in the area and widespread throughout the park, is considered a key forage species for the endangered American badger. It is deemed desirable to live trap and relocate individuals in close proximity to the project activities to avoid detrimental effects from demolition activities and to preserve as much of the population as possible.

Results

Parks Canada recently conducted a study of Columbian ground squirrels in the area and mapped active and inactive burrows in anticipation of the decommissioning and restoration work in 2013 (Figure 4.0). There is a significant population in and around the Lodge in residual habitat which is in close proximity to some of the areas of access and disturbance.

Figure 7.0: Map of Ground Squirrel Burrows

Effects

Ground squirrels are similar to many other species of small mammals and are susceptible to injury and mortality in this type of setting if there is an encounter with equipment or vehicles during demolition and restoration of the site.

The live trap and relocation is generally successful when animals are released into a similar habitat provided precautions to protect the animals from predation are taken as per the recommendations from the report prepared in anticipation of this project, Yuill, 2011, Protocol for Relative Abundance, Live Trapping, and Colony Translocation of Columbian Ground Squirrels for Redstreak Restoration Area, Kootenay National Park.

No long term effects are anticipated once the population re-establishes itself. After restoration of the site there would be an increase in suitable habitat for the ground squirrels.

Mitigation

The primary mitigation required for Columbian ground squirrels is to live trap and relocate them to another suitable habitat in the Park as determined by Parks Canada Wildlife Specialists. If numbers remain down after restoration, then adults could be trapped and stocked back into the project area. However, based on the mapped locations of active burrows and constraints to disturbance, it is likely the numbers that will need to be relocated are small, and should not have an effect on the population around the site. Live trapping early in the active season is expected to allow animals suitable time to adapt to their new surroundings. Parks Canada has developed a draft capture and translocation protocol that will be finalized prior to initiation of capture and relocation.

Ground squirrels using active dens within a few metres of the project activity boundaries will be considered for relocation.

In addition to protection of the ground squirrels through capture and relocation, the following mitigation measures will be implemented:

- Establish buffer zones along roads and parking lots of 1m off the edge to minimize effects on ground squirrel burrows in areas where the burrows are observed and documented (see Figure 4.0). These areas or no go zones are to be flagged by the Parks Canada Surveillance Officer and the

relocation biologist prior to the initiation of the project works. Use of equipment outside of these flagged no go zones, must be approved by the Parks Canada Surveillance Officer. Removal of base and sub base gravels from roads in close proximity to active ground squirrel burrows or other critical wildlife features (e.g. road below cut slope to the Superintendent's house) should be carried out carefully so as to not encroach into established no –go zones to protect burrows.

- Ensure equipment and vehicles stay on the project site. Intrusions (beyond the flagged no go zones and planned incursions around the lodge, bungalows and house) into adjacent habitat are not permitted without the approval of Parks Canada.

- Road edge cut slopes will be left to erode naturally to preserve ground squirrel burrows and habitat.

- The contractor will prepare a plan for approval by Parks Canada to describe how they will ensure the use of heavy equipment and vehicles on existing natural vegetation around the lodge and other buildings is minimized. This plan will also include measures to protect ground squirrel burrows as well badger dens (if they occur) from damage or disturbance.

- Spoil material will not be stockpiled on areas with existing burrows wherever possible and will comply with no go zones established by Parks Canada.

Follow-up and Monitoring

The Parks Canada relocation plan has monitoring components to it. This will be implemented by the Parks Canada team responsible for the relocation plan.

3.4 MEASURES FOR BIGHORN SHEEP & WILDLIFE

Current conditions and Potential Effects

In addition to the at risk species there is other wildlife in the area including Bighorn sheep in particular as well as Cougars and Black bear all desirable species from an ecosystem perspective as well as the visitor experience. Black bear and cougar are occasional visitors through the area foraging and hunting and are considered adaptive and likely to avoid areas with human activity such as the

demolition works without a direct effect on the individuals. The Bighorn Sheep however, use Sinclair canyon in a number of ways as discussed below.

According to the Parks Canada Wildlife Biologist, the Bighorn sheep rut begins in early November and carries on deep into December. Some rutting does occur near the Lodge site, however most of it occurs elsewhere (mainly further down Sinclair Creek and near the Village of Radium Hot Springs), and sheep at least have options if there is disturbance at the Lodge.

Another potential concern could be that sheep migrating back to rutting/winter range from their high elevation summer range encounter something of a bottleneck in the Canyon. One major migration route comes directly down Mt. Berland to near the Lodge site; the others connect to Sinclair Creek upstream of the Lodge and Radium Hot Springs pools, and the sheep then follow Sinclair Creek/Highway 93 right through Sinclair Canyon and into the village area or Redstreak benches.

Females and juveniles arrive on average near the end of September, rams about a month later, however neither group arrives all at once. Rather, the migration occurs over a period of weeks, with groups of several to maybe 10-20 animals filtering in to rutting range. A continuous, loud disturbance over a period of days or weeks could disrupt this migration, although in general these sheep are fairly habituated to human activity - it is anticipated that it would take a fair bit of noise to prevent the sheep from getting through (A. Dibb, pers.comm.).

Sheep lambing occurs in steep terrain often associated with outcrops on cliff like features which are known to be well away from the site and would not be disturbed by the project works.

Equipment and demolition approaches must be of the low impact type that do not cause excessive noise or ground inducing vibration. For example, blasting and portable rock crushers are not permitted for the demolition works.

The nature of the work will result in open excavations which present a risk to wildlife (as well as human safety which is addressed under project management and contractor safety plans). Wildlife is at risk of entering open excavations and being trapped or sometimes harmed from a fall.

Mitigation

There are mitigation measures included to protect wildlife during the project works:

- In order to minimize the effect on sheep migration as well as avoid effects to snakes and minimize the disruption to the visitor experience, the work schedule is proposed to occur in November and allow demolition through the winter until the early spring for restoration, prior to May 01. Note: this is during the key period of the rut, however, most of the rut occurs well away from the site and the disturbance is expected to be minimal.
- Crews to have an orientation and be vigilant in observing sheep in the area and temporarily shutting down operations in order to enable sheep to move through in collaboration with the parks Canada Surveillance Officer.
- Ensure open excavations have temporary barriers around them or covers if smaller in diameter to prevent wildlife incursions. Small open excavations not being worked on or left overnight must be covered and have the capability to hold the weight of large mammals such as deer, sheep and bear.
- Larger excavations should be fenced to deter entry by wildlife using page wire or a sturdy construction fence.
- All open excavations must be inspected for wildlife before work commences. Similarly, all stockpiled materials and equipment must be inspected before being moved or operated. Animals must be safely removed under the direction of or by the Parks Canada Surveillance Officer with the assistance of a biologist.
- Crews will not feed bighorn sheep or engage in any other activities that would increase habituation to humans.
- Waste materials and garbage will not be allowed to accumulate on the construction site(s) or at the designated staging areas to minimize potential human-wildlife conflicts.
- The contractor will ensure that vehicles are not leaking any fluids, particularly engine coolant, which is toxic and can be an attractant to bighorn sheep and potentially other wildlife.
- Contractors should store all waste materials and garbage in bear-proof containers.
- Human-wildlife conflicts should be avoided at all times.

- In the event of a potential human-wildlife conflict, Parks Canada must be notified immediately.
- Parks Canada will conduct pre-demolition surveys to ensure there are no unforeseen wildlife issues such as SAR key habitat or intrusions into the work site.
- A gate will be installed at the bottom of the retained access road (leading from the public parking lot to the BC Hydro line) to deter human use in the reclaimed areas. Hikers accessing the Juniper Trailhead would park at the public parking lot for the Hot Pools.

3.5 RESIDUAL EFFECTS ON WILDLIFE

Negative residual effects would occur if there were population effects from mortality or damage and destruction of the dens of the two at risk species, American badger, and Rubber boa or a significant effect on forage species such as the Columbian Ground Squirrel.

If all mitigation measures, and landscaping are successful and plans are adhered to, it is expected that potential long term effects on wildlife will be positive as there will be a significant increase of potential good quality grassland open forest habitat.

3.6 SOILS AND LANDFORMS

The following site description is from the Geotechnical Concept Study prepared by McElhaney, 2012.

Site Description

The site is located on the moderate to steep slope on the north side of Sinclair Creek Valley. The surficial soils generally consist of a thin layer of Topsoil and forest litter overlying Colluvium. The underlying parent soil is Fluvial gravel and or Fluvioglacial gravel. It is likely that glacial till overlies the calcareous bedrock underneath the gravel layer. The near surface Colluvium are largely composed of eroded fluvial gravels. Fluvio gravels have a component of silt. Because of the calcareous nature of the bedrock (mainly limestone) the undisturbed soils tend to be slightly cemented. Similarly these soils are moderately permeable.

There was no evidence of exposed bedrock on the site where the works are proposed; however, based on surroundings the geotechnical engineer suggests that bedrock might be encountered as shallow as 6m and possibly as deep as 30m in some locations. Ground water is probably present at the bedrock surface or at the glacial till surface and will vary in depth considerably on a seasonal basis.

Effects

This project will result in approximately 1.2 Ha of open exposed soils during demolition and initially after landscaping and re-contouring until there is successful germination and vegetation establishment.

Open exposed areas have a significantly increased risk of soil erosion from sudden large rainfall or snow melt events. Soil movement can cause loading and loss of adjacent vegetation, enter watercourses affecting water quality and loss of aquatic life, affect aesthetics in the area and cause direct effects to highway use and operations and if significant, safety issues.

Re-contouring creates a risk of effects to surface drainage and perhaps ground water if it interrupts or re-directs water flow. This could result in changes in water volume and flow rates for both surface and ground water. In addition, this could also cause erosion with the changes. Changes to ground water regimes, especially ones near surface can also cause effects to slope stability resulting in large mass slope movement. Abandonment of existing underground piping also presents potential for alteration of natural drainage patterns as the integrity of the infrastructure degrades over time.
The wasting of concrete on site, if not done appropriately, could result in potential slope or soil instabilities with resulting environmental impacts.

There is also a potential concern with the extended use of high impact equipment for concrete demolition which could interrupt shallow ground water flows due to high levels of vibration affecting landform integrity.

Mitigation

The planned mitigation measures to prevent effects to soils and landforms are:

- Clean concrete material and gravel to be used as fill on site is to be installed according to qualified professional engineers' direction to reduce potential for slope subsidence and instability. Engineers are to provide design and/or specifications on how the concrete is to be disposed of in

the waste areas and should be inspected by qualified engineers or personnel to ensure the fill material is installed as per the engineering requirements. Underground piping left in situ will also be decommissioned as per engineer specifications developed by a qualified professional engineer.

- Topsoil will be salvaged and conserved prior to initiation of demolition activities for later use in reclamation.
- Piles of topsoil and subsoil will be stored separately to prevent admixing of soils.
- Erosion and sediment control measures will be implemented during and after demolition and may include the use and installation silt fences and water breakers or diversion berms.
- Low impact demolition equipment and methodologies will be employed that do not generate significant noise or vibration levels in proximity to the thermal springs, hot pools or sensitive wildlife habitat. All demolition activity must ensure there is no impact to subsurface thermal hydrological resources.
- Re-vegetation will focus on the use of native grasses and if available, forbs that will benefit wildlife. All disturbed areas will be seeded with a native grass seed and forb mixture as specified by Parks Canada. Seeding will take place as soon as ground conditions permit after recontouring is completed which is anticipated to be the spring of 2014 or alternatively the spring following demolition when the project is funded.
- Native topsoil stripping will be avoided, however if required it must be done in accordance with direction provided by the Parks Canada Surveillance Officer.
- Slopes will be reshaped to a maximum 2.5:1 slope to rise ratio unless otherwise specified by Parks Canada or engineer's direction.
- Demolition equipment and associated vehicle traffic will use existing access roads, trails and disturbed areas for movement and access to minimize offsite damage to existing vegetation. Low ground pressure equipment should be used whenever possible to minimize damage to root structure and natural vegetation when working off the designated access trails.

- Implement geotechnical and erosion control mitigation measures from the draft geotechnical report, or as per engineers direction from a qualified professional engineer, including installation of coarse rock in current erosion prone areas and in other identified locations.
- Design of the re-contouring includes existing and known historical water movement and collection.
- Soil material will not be stockpiled or temporarily placed in any surface drainage channels or ditches, catchbasins that direct runoff to Sinclair Creek, or within 30 m of a watercourse;
- Severely compacted soils should be de-compacted during reclamation.
- Only non-contaminated soils will be used for backfilling and reclamation.
- No equipment will be refuelled within 30 m of a watercourse.
- Equipment adequate to facilitate cleanup of a spill will be kept onsite and will be identified in the Emergency Response Plan. Spill kits must be in place prior to the commencement of work.Equipment operators should be made aware of spill kit locations and be familiar with all fuel spill emergency response protocols.
- The PC Environmental Specialist will be notified immediately of any spills or upon discovery of historical contamination.
- Toxic and/or hazardous materials will either be removed from the site upon completion of the working day or stored within staging areas where secondary containment is provided.
- Any soil contaminated as a result of a spill will be removed and disposed of in compliance with the requirements of PC.

Monitoring and Follow-up

A Parks Canada Surveillance Officer or other designate will monitor key phases and conduct an inspection immediately after significant rainfall/snowmelt events to ensure erosion control features and systems are performing as anticipated. This should be done for 2-3 years after completion of restoration.

Residual Effects

Removal of storm water drains may affect the amount of water to be adsorbed, though the near term revegetation of the disturbed areas will decrease the build up of storm water and therefore the ground water should not have significant change.

Installation of erosion control features both temporary and permanent along with timely re-vegetation will ensure there are no long term residual effects. These features however must be monitored regularly for the first 2 or 3 seasons after major rainfall/snowmelt events and would require that corrective action be implemented if they are not functioning as anticipated.

3.7 AQUATIC RESOURCES

Sinclair Creek flows through the canyon near the project site. It flows below the hot pools complex immediately across highway 93 from the site. The nearest surface exposure is approximately 120 south east (somewhat upstream) from the Superintendent's house and about 170 m southwest of the old lodge (downstream). Surface drainage patterns currently on site and after re-contouring carry water from southerly to westerly directions. The intervening highway 93 with its water management system interrupts surface flows and re-directs them eventually to the creek.

There are no in stream or riparian zone works as part of this project.

Effects

Erosion carrying sediment which could make its way to the creek downstream is a concern as described in the soils and landforms section (3.4) which can cause sediment loading in the creek and resultant direct or indirect impairment to aquatic life, especially during key cycles (i.e. sedimentation & suffocation of fish eggs during incubation).

Mitigation

The mitigation measures to prevent effects to aquatic resources are:

- The contractor will prepare an Erosion and Sediment Control Plan for review and approval by Parks Canada before any on-site demolition work is carried out.
- Installation of temporary and permanent erosion control features and systems including options such as rock placement, straw bales (if clean of weeds), water diversion berms and silt fences.
- Minimize off site equipment and vehicle travel to reduce damage to existing vegetation.
- Expedient revegetation after site recontouring is completed.

- Any silt or soil accumulated at Highway 93 will be removed and either placed back on site (depending on work phase) or disposed at a regional landfill. Silt along the highway will not be flushed along roadway as drains directly enter Sinclair Creek.
- Soil material will not be stockpiled or temporarily placed in any surface drainage channels or ditches, highway catchbasins or within 30 m of a watercourse;
- A Parks Canada Surveillance Officer will monitor key phases and conduct and inspection immediately after significant rainfall/snowmelt events.

Monitoring and Follow-up

A Parks Canada Surveillance Officer or other designate will monitor key phases and conduct and inspection immediately after significant rainfall/snowmelt events to ensure erosion control features and systems are performing as anticipated. This should be done for 2-3 years after completion of restoration.

Residual Effects

Installation of erosion control features along with timely re-vegetation will ensure there are no long term residual effects. These features and systems, however, must be monitored regularly for the first 2 or 3 seasons after major rainfall/snowmelt events and corrective action implemented if they are not functioning as anticipated. Long term site restoration will reduce run-off from parking lots, roadways and building roofs with the grounds natural adsorptive ability.

3.8 AESTHETICS

Effects

There is a low potential for slope subsidence over time as a result of slope modification and concrete burial which could cause undesirable visual intrusions. Demolition, with partially dismantled buildings along with stockpiling of concrete and other building materials as well as barren slopes during restoration will all be potential short term visual effects to visitors whether passing through on the highway or visible at the hot pools.

Mitigation

Mitigation measures that will reduce the aesthetic effects of the project works include:

- Erosion control and surface water management to prevent soil and slope movement along with expedient restoration and revegetation.
- Limit the time on site and schedule demolition to lower visitor periods which also coincides with least effects to wildlife. Demolition work will occur in winter, preferably from November or December through the winter. Demolition and ideally reclamation should be completed by May 01 to avoid effects on Rubber boa and Bighorn sheep.
- The contractor will keep a neat and tidy work place and storage of materials is organized and in designated staging areas.
- Identify staging areas that are more visually protected from highway travelers and visitors to the hot springs.
- Erect signage and implement a communication strategy to inform the public about the project objectives and timing of activities.

Monitoring and Follow-up

A Parks Canada Surveillance Officer or other designate will monitor key phases and conduct and inspections regularly to ensure compliance with the EA and contracts. Parks Canada will initiate monitoring of the site for 2-3 years after completion of the works to ensure the revegetation and erosion control are successful.

Residual Effects

Installation of erosion control features along with timely re-vegetation will ensure there are no long term residual effects. These features and systems, however, must be monitored regularly for the first 2 or 3 seasons after major rainfall/snowmelt events and corrective action implemented if they are not functioning as anticipated. The net benefit will be positive as the area will be returned to a more natural setting which is considered desirable from a visual aesthetics perspective in a national park setting.

3.9 VISITOR/PUBLIC FACILITIES AND SERVICES

A project of this nature may have some concerns with the potential for the activities to affect the visitor experience during the works periods as well as after the completion of the demolition works. Visitor experience issues include concerns about noise levels, landscape aesthetics (during demolition until the restoration is successful), traffic and parking during busy periods.

A review of various best management practices with respect to managing sound levels resulted in developing a noise level guideline for this project based on the conservative science based approach developed, vetted and used by the Alberta Energy Resources Conservation Board and the Alberta Utilities Commission which regulate noise in the environment for the electrical and energy industries. The background levels used in these guidelines are driven by science and extensive data re-affirming the levels. The focus on the permitted sound levels (PSL) is at the receptor and the effects it can have on quality of life, in particular night time levels and effects on sleep. As a result they are among the more stringent or cautious requirements, especially in the protection of pristine environments. The following discussion is intended to clarify and present a guideline noise level for the project at the receptor, a visitor using the pools.

A normal PSL for a night time background level is 40 dBA in a rural or pristine environmental setting more than 1.5 km from towns, highways and other sources of man made noise. However this is adjusted to 50 dBA for buildings in close proximity to a highway which is a significant source of sound added to the environment. Because the project works will only occur during the daytime, the noise level is further adjusted to 60 dBA because daytime noise levels increase due to a number of factors such as more highway activity and more environmental noise (i.e. wind). The human ear generally cannot discern a change in sound levels until there is at least a doubling of sound pressure (about 3 dBA) and it takes about 6 to 10 dBA change to become a nuisance or noticeable. There is some additional noise in the pool area from conversation, water movement, etc that add to the potential sound levels. However, being conservative to avoid effects to the visitor experience, it is recommended that the noise levels from demolition not exceed 66 dBA leq(h) inside the pool area where leq is the levels on an hourly average.

Significant noise for the short term for 1 day or 1 week may be tolerated if it is known that there will be limits to the duration. A guideline for louder anticipated demolition activity at the elevator shaft, Superintendent’s house (using concrete saws) and the bus shelter in very close proximity to the pool is likely short term

and should only occur between 8 am and noon on weekdays. Background levels will not be measured for this project, however, should there be complaints, there is a process outlined in the mitigation measures to reduce sound levels.

Effects

There are anticipated effects on visitor facilities and services which are identified separately as the demolition and restoration work phases and post demolition (after restoration).

Demolition & Restoration

Utilities, hot springs buildings, and the parking lots are not expected to be affected in a direct manner from the project works. There are however short term effects anticipated to visitor services and facilities which include:

- Noise and disturbance from heavy equipment on site as well as trucks hauling out asphalt and hauling in topsoil may affect the visitor experience by causing annoyance or a nuisance at the hot springs as well as in the parking lots.
- Traffic disruptions and potential for temporary loss of the lower public parking area are likely to occur due to construction traffic and establishment of staging areas.Visitors that would hike in through the area or use the Gazebo as a viewing area may be affected by the noise and disturbance as well as the limitations to their access where the works are being conducted. This could frustrate or annoy visitors who are unaware of the works.
- During restoration, there may be areas off limits until restoration is determined to be successful enough that the new vegetation can withstand hiking and other related activities. This could cause some visitor annoyance as above. Unlike the demolition which is planned to occur during a low visitor period, revegetation would occur through the spring and summer of the first full operating season after restoration which are higher visitor periods and also periods when more people are likely to be hiking in the area.

Dust generation, and its impacts on the environment, is discussed under the Vegetation section.

Post Demolition & Restoration

- Subsidence, or erosion that may occur on soils could delay or affect visitor access and usage of the area over a longer term than above and may necessitate some additional disturbance from equipment returning to the site to take corrective action.
- Completed successful restoration is anticipate to have a positive benefit to the visitor experience with additional natural areas that will improve the viewscape and provide and the opportunity for viewing wildlife and nature in a more natural setting.
- There are no anticipated residual effects to visitor services or facilities as the results are expected to enhance the current experience.

Mitigation

Noise, the generation and propagation of nuisance, uncomfortable or excess sound levels, can affect the visitor experience at the hot springs and on hiking trails in the area.

Demolition & Restoration

The planned mitigation to minimize effects to visitor services and facilities include:

- Implement the phases of work with higher sound levels and the key hauling periods during lower visitor periods in the late fall and early winter.
- All construction equipment and vehicles will have proper noise-suppressing equipment installed before arriving on site.
- Ensure that noise reduction devices are fitted and operating effectively. Use specially quieted equipment, such as quieted and enclosed air compressors, mufflers on all engines etc.
- Low impact demolition methods will be used for the project, and in particular in close proximity to the sensitive thermal springs, snake habitat and Hot Pools. Particularly sensitive areas include: the Superintendent's house, bus shelter, elevator shaft and other structures within 100 m of the Hot Pools.
- High impact equipment known to cause higher noise levels and potential for higher ground vibrations will not be used. Blasting, portable rock crushers and large jackhammers are not permitted.

- Noise barriers, such as temporary walls or piles of excavated material, may need to be installed between noisy activities and noise sensitive receptors, such as the Hot Pools.
- Schedule noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately.
- The contractor is to take care when dropping materials from a height, for example, when dumping concrete material into the Superintendent's basement and elevator shaft.
- Shut or throttle down equipment (such as backhoes, loaders, generators, bobcats) whenever they are not in actual use.
- In the case that there is excessive noise or noise complaints, the contractor will undertake options such as:
    a. Adjust the work schedule of the activity causing the noise; or
    b. Take steps to reduce the sound levels emanating from the source of the noise (use of acoustic barriers, etc).; or
    c. Implement alternative processes; or
    d. Provide alternative quieter equipment
- Should the complaints continue and the contractor is unable to take corrective action, Parks Canada may consider conducting sound level monitoring to determine both the sound levels and the source of the noise complaint generating equipment or technique. Work may be suspended until the issue is resolved at no cost to the project proponents. If the solution requires direction from Parks Canada, it will be implemented without additional cost.
- Noise levels from demolition in combination with other anthropogenic sound sources (i.e. highway sounds) cannot cause levels to exceed 66 dBA leq(h) at the main pool in the hot springs except for those activities noted for scheduling between 8 am and noon which should not exceed 75 dBA for more than 5 days.
- Subject to daylight periods and type of activity, works will undertaken within daylight hours and be constrained to weekdays (approximately 8am to no later than 5pm) and suspended for weekends and holiday periods by Friday noon (Thursday noon before Good Friday). Work will also avoid the 2 week Christmas holiday and 1 week Easter holiday seasons.

- Equipment use in close proximity to the hot pools at the bus shelter, Superintendents house and the elevator shaft, which will generate significant noise, will adhere to the above requires and in addition, should only be used between 8 am and noon, or as otherwise approved by Parks Canada.

- Share project information with the visitors:
    - Install signs at the park entrance as well as at the hot pools advising visitors of the demolition and planned work periods.
    - Install interpretive signage around areas where access is constrained such as the restoration areas.
    - Include supplemental information for visitors at all 3 mountain park entrances.
    - Post the information on the website.

During restoration or periods of higher visitation, ensure off limits areas are well flagged with signage asking people to stay off. Provide designated, visible or if appropriate alternative access points to hiking trails.

Post Demolition & Restoration

- Any subsidence, or erosion that may occur on soils will have corrective action taken as soon as possible after the event to minimize the restoration time frame.
- No additional measures are required however, optional signage or interpretive information about the history of the area and the project success to restore ecosystem conditions are a consideration.

Overall, effects from the project are anticipated to be temporary. They will be primarily of the nuisance, disturbance type which can be effectively minimized through communication and awareness programs for visitors. The long term effects will be positive for the visitor experience.

3.10 PUBLIC SAFETY

A project of this nature may pose some concerns for public safety.

Effects

The following effects which could occur with the potential to affect public safety are:

- Subsidence of soils/fill material with a risk of injury if someone steps into the subsided area. There may also be potential for tripping hazards at exposed concrete rubble areas at the artificial hibernacula sites.
- Heavy trucks entering and leaving the area turning on and off the highway pose an increased risk of a vehicle incident to inattentive highway travelers.
- Sudden large erosion/slope movements could catch hikers unaware or could cause soils to slide onto the highway posing a safety risk to highway travelers or to pedestrians using the sidewalk below the slope.

Mitigation

Mitigation measures to minimize the risk to public safety are:

- Place warning signs for the public during the actual works to advise of trucks entering and leaving the site.
- Place ‘warning’ and ‘stay off’ signs and flag preferred access around the exposed slopes until restoration is successful. Area closures may need to be implemented as required.
- Use traffic control when the frequency of hauling events is high.
- Schedule the works for late fall and winter during lower visitor periods.
- Inspect the works after a major rainfall, snowmelt event to determine if subsidence or erosion is occurring for the first 2 seasons after restoration. Implement corrective actions if required as soon as reasonably possible.
- Mark and fence off any danger areas. Permanent fencing and/or signage may also be installed at the artificial hibernacula sites by Parks Canada.
- Ensure that materials used in fill (concrete and gravel) are installed to engineering specifications and inspected by qualified engineers or personnel to minimize potential for slope subsidence.

It is expected that the combination of these measures will minimize the safety risk to the public.

3.11 CULTURAL/HERITAGE RESOURCES

The Superintendent's house and the Radium Hot Springs Lodge and associated buildings were evaluated by the Federal Heritage Building Review Office (FHBRO) to determine their cultural heritage value and all were determined to be 'not designated' meaning they are not designated historic resources.

A Parks Canada archaeologist has indicated there are no cultural resource concerns regarding demolition of the existing structures as they are not designated resources and as long as there is no areas of new ground disturbance.

Effects

Areas of new ground disturbance due to landscaping and demolition could affect previously undisturbed heritage resources as there are indications the area of the lodge may have had pit house sites according to Kinbasket Elders (B.Himour, pers.comm).

Mitigation

Mitigation measures for cultural heritage resources are:

- Should a resource be found during the project works, the works at that location will be suspended immediately and Parks Canada will be notified. Parks Canada will undertake an archaeological assessment of the resource.
- Work will not be resumed until approved by a Parks Canada Archaeologist of identified designate.
- Works will be contained on previously disturbed areas. No ground disturbance into non-disturbed areas will be permitted unless reviewed by a Parks Canada Archeologist.
- Photos will be taken of the remaining structures and their location within the landscape prior to demolition and stored for the future.

Monitoring and Follow-up

A Parks Canada Surveillance Officer or other designate will monitor key phases and conduct and inspections regularly to ensure compliance with the EA and contracts. No follow up monitoring is anticipated.

Residual Effects

No residual effects are anticipated provided the mitigation measures are implemented.

3.12 VEGETATION RESOURCES

One of the goals of the project is to re-establish the desired open forest grassland complex that pre-existed fire control. This vegetation unit provides habitat for valued ecosystem components, particularly Bighorn sheep, American badger and Rubber boa.

As part of the assessment, these works were evaluated for potential effects and then measures were developed based on the environmental objectives for the project.

Potential Effects

Although the short to long term effects of the demolition works are very beneficial to wildlife and habitat, they do require monitoring and precautionary measures.

- Operators of heavy equipment and vehicles without clear expectations to minimize the project effects on desirable existing habitat may cause significant damage to the vegetation and surface soils resulting in a reduced available habitat as well as increased potential for invasive species, erosion and additional unwarranted restoration.

- Works during the fire season (generally April through October-seasonally adjusted) pose increased risk of fire from equipment or smoking causing mortality to wildlife, property damage and short term habitat loss.

- Importing topsoil poses additional concerns to ecological integrity if contaminated with weeds not currently on-site.

- Existing weed problems are often exasperated when seeds are tracked around or blown into newly opened and restored soils.

- Damage to large mature tree’s root systems and bark can result in loss of the tree and loss of its potential as a wildlife tree providing nesting and even day roosting for bats under loose bark.

Most of these issues could result in residual effects that carry on for a number of years, especially the invasion by weeds and the effects of a fire. There is benefit to a fire long term in a fire climax ecosystem such as this one, but the short term effects on wildlife and key habitat can be harmful and significant as well as the damage to desirable property and buildings.

Mitigation

In order to minimize effects associated with the demolition activities on the vegetation resources, the following mitigation measures have been prepared:

- The contractor will minimize off-site vegetation damage. Existing native vegetation, particularly mature trees will be retained to the fullest extent possible. Any trees slated for removal must be flagged by Parks Canada.
- Trucks and equipment must stay on the roadways and parking lots. During reclamation of the roads and the parking lot there may be a need to work outside the edge. This will be kept to within 1 m of the outside edge of roads and where there flagged no go zones to protect wildlife or key habitat. The no go zones will be flagged prior to the works by the Parks Canada Surveillance Officer. The exception is where areas are used for stockpiling excess clean concrete where there may be a need to disturb areas 3 to 4 m up slope and 5-6 m down slope to facilitate re-contouring and restoration.
- Areas around buildings requiring excavator access in natural areas must confine access to the edge of the wall or an alternative better suited environment, with access tracks no more than 4-7 m wide.
- Where turnaround and lift/load areas are required, these will be flagged in consultation with the Parks Canada Surveillance Officer to prevent damage to existing mature trees and other sensitive vegetation while minimizing the footprint.
- During the fire season (April to October with seasonal adjustment), all smoking must occur in designated areas, with suitable ash trays and disposal containers and preferably where no combustible materials or ground cover is present.

- The contractor's vehicles and equipment must have fire suppression equipment during the fire season. This includes a wajax type bag, shovel and grub axe. There should be at least one hand tool for each employee on-site. For crews with heavy equipment in use on site, a standby water truck or water tank that is easily accessible must also be deployed. The contractor should develop an Emergency Response Plan that includes procedures to follow in the case of a construction-related fire.
- Potential sources of topsoil for import must be inspected during the growing season and should also have a weed analysis prior to purchasing and hauling. No new types of weeds should be introduced to the site.
- Parks Canada will implement a pre-demolition weed treatment to reduce seed in the area and sources that blow seed easily in the wind (i.e. Canada Thistle).
- Sources of topsoil should be inspected well in advance of use to determine if there are any invasive plant species associated with the soils that could result in the introduction of new weed species on site that are not currently there. Should undesirable species be found, the type of weed and its status need to be identified to Parks Canada who will review options and either permit use of the soil source or reject it.
- All equipment and vehicles entering the site must be free and clean of all soil and vegetative material.
- Dust control of all phases of work is required to prevent dust on the existing adjacent habitat and vegetation as well as blowing to the visitor areas around the hot pools:
    - All activities generating dust or with the potential to generate dust must use dust control techniques to reduce and contain dust to the work site. Excessive dust buildup must be regularly removed.
    - Ensure work minimizes dust generation. Prevent or control blowing of dust and debris.
    - An appropriate dust control program will be developed by the contractor and implemented for all construction areas.
    - Dust suppression/collection equipment should be attached when using sanding and cutting machinery, for example, a wet suppression system or to a vacuum system.

- Enclosures, curtains or shrouds surround the work area may also be used. In this case, the surface dust created should be promptly cleaned from the surface using a wet sweeping process.
- Reduce activities that create fugitive dust during windy conditions.
- Manage storage piles (e.g. by shaping them, installing enclosures or coverings around piles, conducting storage pile activities downwind of sensitive receptors such as the Hot Pools);
- As necessary, use environmentally acceptable dust suppressants or water to control dust on access roads, lay-down areas, work areas, and disposal areas.
- Minimize drop height at material transfer locations (e.g. when loading soil onto haul trucks).

Follow-up and Monitoring

Areas of permitted off-site incursions with equipment will need to be part of the Parks Canada follow-up monitoring on restoration.

There should be a regular (1 to 2 times per season) monitoring of weeds and the implementation of weed management program for up to three seasons after restoration is completed.

3.13 WASTE AND HAZARDOUS MATERIALS MANAGEMENT

Wastes have the potential to cause environmental contamination to the natural environment if not well managed and are considered in an EA.

Demolition waste is primarily excess building materials such as wood, insulation, siding, paint, drywall, shingles, metal roofing, utility (pipe and wiring) materials and concrete. This material is considered non hazardous and is not desirable in the environment as it is visual and not significantly degradable.

Solvent based cleaners, degreasers, larger volumes of fuel and some lubricants used by contractors would however be considered hazardous. In addition, pre construction hazmat assessment has confirmed the presence of asbestos in the in vinyl flooring and on pipe wrap in the Superintendent’s house.

Historic land use practices and potential to uncover historic contaminated soils and material or fuel tanks could cause contamination to spread into the environment.

The former Radium Hot Springs Village is located between RSHL and the Superintendent's house. Previous excavations in the RHSL parking lot as part of a renovation project in 1995 had uncovered asbestos piping and concrete. The lodge parking lot is apparently underlain by remnants of the former Radium Village (Envirotech Solutions Inc, 2001).

Power poles and transformers are located on the RHSL property and the Superintendent's house. There is potential for polychlorinated biphenols (PCB) impact relating to the transformers and creosote, pentachlorophenal (PCP) or chromate copper arsenic (CCA) impact relating to the power poles (Envirotech Solutions, 2001).

Hydraulic spillage was also noted at the hydraulic lift motor area of the RHSL elevator (Envirotech Solutions, 2001).

Personnel from Terrestrial Archaeology, Cultural Sciences Branch Parks Canada investigated an area located adjacent to the former Radium Lodge in Kootenay National Park (figure 1) in 2012 for the presence of unknown buried fuel tanks using a magnetometer. There were three anomalies identified which the investigator suggested are likely related to the nearby Lodge building and are potentially of sufficient size to warrant investigation, through targeted ground-truthing.

Effects

Demolition will result in worker related household type refuse and garbage from meals and beverages. This type of waste in the environment can have a visual impact as well as causing odour, having illness inducing bacteria and attracting wildlife.

The demolition works will have sewage waste which can cause bacterial and chemical contamination of ground and water if it enters the environment.

The land on the site would be considered the primary sensitive receptor if uncontrolled wastes were allowed to be discharged on site causing a low to moderate effect. The impact from wastes of all types is expected to be very low to negligible with the implementation of waste management mitigation described below.

Hazardous materials released in the environment (land, air or water), or in direct contact with humans and wildlife can be fatal, carcinogenic, toxic or persistent as well as a number of other effects.

Mitigation

The demolition contractors will provide their own temporary systems to collect wastes during the project works to prevent site contamination from any waste material. All waste materials are typically removed from the site regularly during demolition and restoration. If waste materials are temporarily stored onsite, they are safely contained, labeled and located within the project boundaries on disturbed or hardened areas.

Temporary facilities will be provided to collect wastes during construction and to prevent site contamination from any waste material. All waste materials will be removed from the site on a weekly basis as a minimum. Food based refuse should be removed daily and must be kept in wildlife/bear proof containers. If waste materials are temporarily stored onsite, they must be safely contained, labeled, and located within the project boundaries .

Effluent and Waste Water
Portable toilets and washrooms will be provided by the contractor during the project. They will be situated well away from environmentally sensitive areas and will be secured to prevent them from overturning. They are expected to be maintained and serviced weekly. Any sewage from uncovered septic tanks will be pumped prior to removal and contents disposed at an approved facility outside the park.

Solid Waste
Solid wastes are primarily construction waste that will be recycled, or landfilled or disposed on site. Solid waste will be temporarily stored in a secure flagged area off of sensitive habitat and vegetation under the direction of the Parks Canada Surveillance Officer.

Solid waste must be disposed of on a routine basis when the site is active. It is expected that a waste management firm could be subcontracted to provide waste handling services on a regular basis (i.e. weekly) during construction.

Hazardous Waste
The demolition of these facilities is expected to generate hazardous wastes requiring special handling (reference).

There will be a hazmat team to remove asbestos and using accepted safety precautions. The asbestos will be disposed at a suitable licensed landfill coordinated by the hazmat removal contractor. The Columbia Valley Landfill on Windermere Loop Road about 25 km from the sight has confirmed they are

capable of accepting this material. This material will be transported in a suitable enclosed trucks or a suitable waste container that can be loaded on to trucks for transport. Waste volume for this phase of work is coarsely estimated at about 2200 m^3. Depending on techniques and container systems used for transport, there may be over 200 truckloads of material removed.

All toxic/hazardous materials will be stored and handled using industry best practices and applicable regulations such as the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act, Worksafe BC and Workplace Hazardous Materials Information Service to prevent accidental release into the environment or contact with wildlife or humans.

All incidents and spills must be reported immediately to the Parks Canada on-site representative.

Hazardous waste from spills of fuel and lubricant on the soil or partial cans of solvents and solvent based paints or other sources must be collected, handled, stored, transported, and disposed of according to both federal and provincial regulations.

Power poles and transformers should be evaluated for potential PCB, creosote, PCP, and CCA impact prior to being decommissioned and removed. In particular transformer oils should be tested for PCBs prior to disposal to determine if they should be classified as hazardous waste.

The elevator hoist area at RHSL must be cleaned and inspected prior to demolition.

Demolition contractors must be made aware of the potential to encounter asbestos piping or other contaminants under the RHSL parking lot or in the area of the Superintendent’s house. Care should be taken by the contractor when removing asphalt and underlying gravels so as to not expose potentially hazardous materials that may have been buried under the parking lot and in areas between RHSL and the Superintendent’s house. If any infrastructure or materials are encountered they should be assessed as a potential environmental hazard prior to being removed from site. If contaminants are exposed, the contractor may need to delay work in this area until investigations are complete and a course of action developed.

- Any contamination found during demolition will be tested, removed and disposed of in accordance with regulatory requirements including being hauled to a licensed landfill facility outside the park. Contaminated sites must be cleaned up to meet the standards established by the CCME Environmental Quality Guidelines for Soil and Water 2007 (with updates to 2012) and CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil 2008 for Residential/Parkland use.

- Septic tanks to be pumped out. Expected concrete tanks can be filled and covered. Propane tank to be removed from site. Supports to be excavated and disposed of.

- Develop removal and contaminant handling protocol for any underground fuel tanks encountered or located as part of the demolition project.

As a result of the magnetometer survey for unknown buried tanks, the demolition contractor will:

- Conduct targeted ground-truthing of the 3 anomalies found and identified in the report from the Archaeology Branch (Appendix 3) to determine if these anomalies are underground tanks.
- Conduct the investigation after removal of the asphalt on the surface and fill under the asphalt in the parking lot.
- Utilize a careful/cautious approach with small equipment or hand excavation techniques to avoid damage or rupture of tanks if present, while conducting a minimum of 2 investigations of each of the mapped anomalies.
- Should underground tanks be found, the contractor will consult with Parks Canada and initiate the contractor's removal and contaminant handling protocol for underground fuel tanks.

4 CUMULATIVE EFFECTS

Typically the cumulative effects analysis is carried out on valued ecosystem components (VECs) which have an effect from the project, there is evidence of potential effects from other recent projects and there is a reasonable certainty the future projects will be carried out. Should there be cumulative effects, then mitigation measures are identified to reduce or avoid effects.

Scoping of the VECs relative to other activities results in cumulative effects analyses of the following issues:

- **Wildlife - Species at Risk including habitat**
- **Vegetation Resources-** Invasive species and wildlife habitat

Wildlife

Parks Canada has removed significant infrastructure to date in the Sinclair Canyon area and this project is the final one in the phased approach to increasing habitat in the park for key species under pressure due to development and coniferous invasion of the grasslands. In addition, Parks Canada has also conducted habitat improvement initiatives in the Redstreak Campground and is planning a tree thinning project adjacent to the site of the proposed works to improve the grassland species that reflect historic conditions.

These efforts to increase habitat currently are and will continue to provide positive effects on wildlife in Sinclair Canyon for Bighorn Sheep, American badger and Rubber boa as well as other wildlife that utilizes this ecosystem.

There will be no negative cumulative effects to wildlife and no additional mitigation is required for cumulative effects, providing all the mitigation and strategies are implemented during this project.

Vegetation Resources

Landscaping and restoration plans call for creating a grassland habitat which will increase the grassland vegetation. Previous, planned upcoming initiatives by Parks Canada including the tree thinning as mentioned in the Wildlife section will improve the open canopy and enhance the grassland habitat that pre-existed fire suppression. This vegetation is inextricably linked to the desired habitat conditions for the key species discussed in this amendment. Overall the net cumulative effect

on vegetation will be to increase the desirable vegetative ecosystems in Sinclair Canyon.

Invasive species are a significant concern and are very evident in and around the site, particularly on previously reclaimed areas. It will be important that Parks Canada initiate an aggressive pre-demolition weed control plan to reduce viable seed in the expected disturbed areas and adjacent to those areas where invasive species such as Canada thistle have air born seeds. This mitigation measure will require regular monitoring combined with an aggressive annual control program to reduce weeds in the area for a recommended 2 to 3 growing seasons to ensure the disturbed areas are well enough established to resist invasive species. With this effort, effects from invasive species on the desired ecosystem will be minimized and other objectives attained.

5 CONCLUSIONS

Project activities are expected to have generally low effects on VECs which can be mitigated to minimize the impact. For the key VEC's analyzed, the following summarizes conclusions with respect to each VEC.

Wildlife

Project activities have the potential to affect wildlife habitat availability and mortality within the Project area. Particular species of concern include bighorn sheep, as well as the SARA listed badger and rubber boa which have a potential to occur in the project area. Precautions are required during the demolition and decommissioning activities that require adherence to good environmental practices as well as the use of low noise and low ground vibration inducing equipment. Mitigation measures to address these potential effects are identified, however, there is still potential for unforeseen situations arising as a result of new information or changes in habitat use by these species. Changes affecting project work phases or schedules which will be managed through ongoing consultation between Parks Canada, Public Works & Government Services and the contractors.

Other projects in the area have the potential to act cumulatively with an effect to wildlife habitat availability, particularly with respect to bighorn sheep use of the Redstreak bench and Sinclair Canyon areas. Recent demolition activity in this area as well as the proposed thinning projects are anticipated to have a net benefit cumulatively on habitat with this project. Changes in the pattern of wildlife movement in the area are not anticipated as a result of the Project other than short term disturbance to wildlife, principally large mammals if the works occur , as planned, during the late fall early winter time frame. Overall, the project will provide a net benefit to wildlife, but mitigation is required in the short term to manage potential short term effects.

Landforms and Soils

The project as proposed will alter the landscape from its current condition. The completion of the project will see clean concrete disposed on site in the basement and on the old parking lot. After the removal of the parking lot surfaces and the remaining buildings (except the gazebo), the area will be restored with contours anticipating the pre site development conditions as much as possible.

There is some potential for soil and slope movement, however, design plans have have been developed to prevent significant effects. Should any of these occur they will require corrective action on a timely basis. Overall, the effects for the period of demolition and the subsequent one or two growing seasons are anticipated to be minimal. There will be a net benefit in the return to more natural conditions for the area's wildlife and the visitor experience.

Vegetation Resources

The focus of the efforts and the primary areas of disturbance will be on manmade features such as the lodge and the parking lot. Notwithstanding there will in a few places be disturbance to the adjacent lands, particularly around the lodge where and an excavator will be needed to process concrete. This footprint could be as much as 4-7 m wide, depending on angles and reach of the arm. This disturbance zone will be checked for active burrows and wildlife would be relocated. Overall the completion of the project will result in a net increase of desirable vegetation ecosystems with the minor short term effects of vegetation disturbance and loss.

Aquatic Resources

There are no measurable impacts anticipated to aquatic resources. The potential for sedimentation and erosion are low with the implementation of preventative mitigation.

Aesthetics

The actual demolition phase and the open exposed slopes and soils during restoration are considerable undesirable from an aesthetic perspective. Overall, these work related effects are short term and once restoration is completed and successful, there will be a more natural setting with a long term beneficial or positive effect on aesthetics.

Visitor Facilities and Services

There will be some disturbance and noise that will affect the visitor experience in the parking lot, hiking or in the hot springs pools. This effect will be limited from a noise standpoint by conducting most of the works during a low visitor period, such as late fall and early winter. Overall, the net benefits of an improved visitor experience with a restored natural setting will be positive.

Public Safety
There will be some public safety risks during the demolition and potentially after. The mitigation planned along with the design and the practices the contractor will use, ensure that the risk is kept low and that there are minimal to negligible longer term safety risks.

Cultural/Heritage Resources
Effects on cultural and heritage resources are expected to be negligible. Mitigation measures ensure any unforeseen findings will be protected and evaluated and work will not proceed without Parks Canada approval where it can impact important cultural resources.

Monitoring
Monitoring is required to ensure that the mitigation measures identified are in place during project activities. Regular follow-up monitoring is also important to evaluate the success of reclamation, invasive species management, erosion control, ground squirrel relocation, specialized rubber boa habitat mitigation measures (if needed) and other mitigation measures.

Summary
Overall, the plans for decommissioning the lodge and remaining infrastructure at this location will provide key additional natural habitat for wildlife and improve the visitor experience. Mitigation is planned that is anticipated to manage the short term effects of the project.

It is recommended that the project proceed as planned with the implementation of the proposed mitigation measures because of its greater benefit to the area.

6 CONTACTS

The following tables include a list of key contacts involved with the project, including their position, responsibilities and phone numbers.

Public Works and Government Services Canada and Parks Canada

Name and Position	Project Responsibilities	Phone and Email
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Steve Morck Principal, Elements	Environmental project coordination & EA preparation	403-547-2049 steve@elementsnetwork.com

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8 APPENDIX 1: SUMMARY TABLE OF MITIGATION MEASURES

Summary Table: Potential Impacts and Mitigation Measures. Compiled from the EA, EA amendment as well as Banff/Kootenay Development Guidelines

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
1. Radium Lodge • Building and materials to be removed from site. • Concrete/stone foundation walls to be collapsed into the basement area and covered with rock, gravel and soil where available on-site in disturbed locations. Much of this material will need to be imported.	• Potential adverse impact to surface and ground water drainage from re-contouring could lead to erosion or changes in ground water patterns and volumes. • Spread of invasive species (weeds) due to the source of fill and top cover and bare areas exposed to seed from adjacent plant • Mortality or displacement of species at risk or valued species utilizing adjacent habitat which will be disturbed. • See modification of slopes activity (4) for similar issues and mitigation on drainage, erosion and other issues.	• Only fill and top cover material approved for use by Parks Canada may be used. • All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Open excavations and equipment will be inspected daily prior to the start of work to ensure no wildlife has entered the site and will be either covered or fenced off at the end of each work day. • Pre-demolition weed control and annual follow-up control programs for 2-3 years. • Traditional blasting is not permitted for demolition. • Re-contouring designs must accommodate the landforms and integrity of existing drainage and avoid ground water recharge areas. • Pre-demolition weed control and annual follow-up control programs for 2-3 years. • Contractor should minimize noise, ground vibration and dust or implement noise and vibration control techniques. High impact equipment and methods (i.e. traditional blasting, un-silenced equipment are prohibited). • Noise levels from demolition in combination with other anthropogenic sound sources (i.e. highway sounds) are not to exceed 66 dBA leq(h) daytime levels at the main pool in the hot springs.	• Parks Canada on site during key phases and activities with potential for effects to the environment • Post construction monitoring will be implemented by Parks Canada of invasive species at all locations and activity areas including adjacent areas infested during previous works. • Monitoring of landforms and drainage as well as sensitive areas affected by demolition (ie SAR habitat features, if identified in the 2013 survey). • Implement corrective action as required

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
2. Superintendent's House • Remove the house intact and salvage. • Concrete /stone foundation walls to be removed to grade. The basement area filled with suitably sized concrete fragments (250-500mm) to create interstitial openings for access by small mammals and snakes. Organic debris may be distributed over exposed concrete rubble. Do not cap the surface with gravel or soil.	• Alterations to surface and ground water drainage could cause erosion or affect the ground water patterns and volumes. • Spread of invasive species (weeds) due to the source of fill and top cover and bare areas exposed to seed from adjacent plants. • Mortality or displacement of species at risk or valued species utilizing part of the Superintendent's house as habitat.	• Only fill and any organic mulch top cover material approved for use by Parks Canada may be used. • All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Open excavations and equipment will be inspected daily prior to the start of work to ensure no wildlife has entered the site and will be either covered or fenced off at the end of each work day. • Pre-demolition weed control and annual follow-up control programs for 2-3 years. • The Superintendent's house will be inspected by Parks Canada prior to the start of demolition – if snakes are found, contingency plans will be implemented for demolition of the house as per the St. Clair report recommendations. • Demolition of the Superintendant's house will be undertaken cautiously by hand or using hand held equipment such as a concrete saw to minimize noise and ground inducing vibration. • The basement of the Superintendant's house will be carefully filled with clean concrete waste material in the size range of 250mm to 500mm to create artificial denning habitat with interstitial spaces. The material is not to be capped other than with a coarse mulch material. • Ensure timing of work will avoid disturbance to wildlife during critical wildlife periods. • Every effort will be made to minimize the disturbance to wildlife in general.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of Superintendent's house and retained rock and concrete wall features for snake presence. • Implement corrective action as required

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
3. Staff Houses (3) and Sheds (2) • Remove the buildings from the site. • Remove all concrete to 1 m below finished grade except for Cabin #3, where the foundation wall will be left in place to help to continue toF support existing vegetation. • Cover concrete with rock, gravel and soil. •	• Alterations to surface and ground water drainage could cause erosion or affect the ground water patterns and volumes. • Spread of invasive species (weeds) due to the source of fill and top cover and bare areas exposed to seed from adjacent plants. • Mortality or displacement of species at risk or valued species utilizing part of the Staff houses and sheds as habitat.	• Only fill and top cover material approved for use by Parks Canada may be used. • Pre-demolition weed control and annual follow-up control programs for 2-3 years. • The staff houses and sheds will be inspected by Parks Canada prior to the start of demolition – if snakes are found, mitigation measures will be developed depending on the type of use (i.e denning vs occasional foraging). • Timber retaining walls adjacent to the cabins will be retained to the fullest extent possible if they are not treated with creosote or other preservatives. In the case that the timber retaining wall must be dismantled for cabin removal, leave the timbers in a pile left to rot naturally over time. Inspect retaining wall for snakes prior to removal.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. • Implement corrective action as required

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
4. Modifications of Slopes • Place angular rock at the small slide to match the level of original surface. • Place angular rock in eroded gully. • Place organic specialty erosion control as needed on cut slopes and on access roads. • Site drainage and re-grading on areas disturbed by demolition activities in order to disperse natural drainage over a larger portion of the slope. • Proposed removal of landscape rock. • Fill designated areas with clean concrete, cap with gravel and restore with native seed mix.	• Alterations to surface and ground water drainage could cause erosion or affect the ground water patterns and volumes. • Soil migration could cover habitat, affect highway operations, retained parking lots, aesthetics and safety. • Spread of invasive species (weeds) due to the source of fill and top cover and bare areas exposed to seed from adjacent plants. • Mortality or displacement of species at risk or valued species utilizing slopes as habitat.	• Topsoil will be salvaged and conserved prior to initiation of demolition activities for later use in reclamation. • Preservation of mature native trees will be attempted to the fullest extent. • Pre-demolition weed control is expected to be implemented by Parks Canada/Public Works and Services Canada with an annual follow-up weed control programs for 2-3 years. • All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Re-vegetation will focus on the use of native grasses that will benefit wildlife. All disturbed areas will be seeded with a native grass seed mixture as specified by Parks Canada. • Only fill and top cover material approved for use by Parks Canada may be used. • Native topsoil stripping will be avoided, however if required it must be done in accordance with direction provided by the Parks Canada Surveillance Officer. • Slopes will be reshaped to a 2.5:1 slope unless otherwise specified by Parks Canada or engineer. • Demolition equipment and associated vehicle traffic will use existing access tracks and disturbed areas for movement and access. Low ground pressure equipment should be used whenever possible to minimize damage to root structure and natural vegetation when working off the designated access trails. • Implement geotechnical and erosion control mitigation measures from the concept/draft geotechnical report or as per geotechnical engineer's specifications. • Do not remove or relocate existing piles of rock that may provide suitable habitat for snakes for use of angular rock in the drainage or gully areas. • Road edge cut-slopes will be left to erode naturally to preserve ground squirrel burrows and habitat. • Careful consideration will be taken to ensure that demolition activities do not impact subsurface hydrological resources (i.e. hot springs). For example, only low vibration equipment will be used. • A brief wildlife survey will be conducted by Parks Canada personnel within 1 week prior to initiation of works. • Mature trees, wildlife trees and potential wildlife trees are to be conserved and not removed during demolition and restoration unless approved by Parks Canada.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. • Erosion control features to be inspected after major rainfall or snow melt events to ensure proper functioning. • Implement corrective action as required

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
5. Retaining Walls and Stairways • Rock retaining walls that are stable, reasonably constructed and well drained are to be left in place. • Lower stairway to Superintendent's house to be left in place (unless otherwise indicated by Parks Canada). • Pre-cast concrete walls used as foraging habitat by installing concrete demo materials of 250 mm –to 500 mm size range to the height and for 2 or 3 m away from the wall to create interstitial space for small mammal and snake use.	• Loss of habitat provided by retaining walls provide species habitat and maintain slope stability. • Potential for slope instability through removal of retaining walls. • Alterations to surface and ground water drainage could cause erosion or affect the ground water patterns and volumes. • Spread of invasive species (weeds) due to the source of fill and top cover and bare areas exposed to seed from adjacent plants. • Mortality or displacement of species at risk or valued species utilizing slopes as habitat.	• Retaining walls that are not stable and are to be removed will first be inspected for species of concern by the Parks Canada EA Coordinator. • Only fill and top cover material approved for use by Parks Canada may be used. • All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Pre-demolition weed control and annual follow-up control programs for 2-3 years. • Rock retaining walls identified as key Rubber boa habitat will be retained. • Rock walls must inspected by Parks Canada prior to the start of demolition – if snakes are found, mitigation measures will be developed depending on the type of use (i.e denning vs occasional foraging). • The cast in place retaining wall will be carefully removed and dismantled. • Precast concrete walls will be part of the artificial habitat creation where there will be clean concrete waste material in the size range of 250mm to 500mm installed adjacent to the wall and left uncapped create artificial foraging habitat.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. • Implement corrective action as required.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
6. Underground Utilities, Culverts and Manholes • Sewer and water lines will be capped and left in place if not easily removed without disturbing ground conditions; however surface structures will be demolished/removed. • Manholes to be demolished/removed to within 1 m of finished grade or a lesser specified depth if approved by Parks Canada. • Power poles no longer required will be inspected for contamination (and cleaned up if required) and removed from site to a suitable location outside the park. Light stands no longer required will be removed and stored at McKay Compound for future use.	• Mortality or injury to wildlife residing adjacent to buried pipes, culverts and manholes or entering the site when open. • Spread of invasive species (weeds). • Alterations to surface and ground water drainage could cause erosion or affect the ground water patterns and volumes.	• All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Only fill and top cover material approved for use by Parks Canada may be used. • Culverts and Manholes will be inspected by Parks Canada prior to the start of demolition – if snakes are found alternate plans may be required. • Cover open manholes and other related features to prevent wildlife injury and entry when the site is not active. • Careful consideration will be taken to ensure that demolition activities do not impact subsurface hydrological resources (i.e. hot springs). • Any pipe that is abandoned in the ground will be assessed for long term impact to natural drainage patterns and any soil or slope instabilities it may cause including the need to be filled. Pipes to be left in situ shall be decommissioned as per engineer specification. • PWGSC will provide a contract geotechnical engineer to assess long term impacts to natural drainage patterns and develop measures to ensure drainage patterns are maintained and erosion is prevented.	• Parks Canada on site during key phases and activities with potential for effects to the environment • PWGSC will arrange for a contract engineer to be on site to inspect key phases of the works for compliance prior to covering or filling and restoring the area.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
7. Surface Works (asphalt paving, curbs, sidewalks, stairs, bus shelter, concrete posts, fences, signs, etc) • Demolish and remove unless otherwise specified by Parks Canada. • Use as clean fill if permitted.	• Adverse impact to wildlife residing adjacent to surface works. • Spread of invasive species (weeds). • Potential adverse impact to surface and ground water drainage.	• Crew environmental orientation will include an overview of wildlife issues and how to contact someone who can relocate wildlife that inadvertently enters the site. • Parks Canada will trap and relocate Ground Squirrels prior to demolition work. • Ensure speed limits of vehicles and equipment do not exceed 10km/hr on the access roads and tracks during the migratory periods. • Asphalt and contaminated road gravel are to be removed from the park and taken for recycling if possible Clean concrete and road gravel may be buried in the foundation of the Lodge, designated waste areas, or in the elevator shaft/tunnel as per engineers specification • Soils under decommissioned roads and parking areas will be de-compacted. • Re-vegetation will focus on the use of native grasses and forbs if available, that will benefit wildlife in a mixture specified by Parks Canada. • Equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Only fill and top cover material approved for use by Parks Canada may be used. • All existing human-made surface features (other than those specified by Parks Canada) shall be removed to a minimum 300mm below finished grade and the void filled with soil.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. Implement corrective action as required.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
8. Concrete Elevator Shaft and Tunnel • The portion of the tunnel and elevator shaft protruding above grade will be demolished and the remainder filled in with demolition concrete and gravel/rock/soil. • The top 6 m to grade surface will be filled with large diameter concrete pieces to create interstitial spaces for small mammals and snakes	• Adverse impact to wildlife residing adjacent to elevator shaft and tunnel. • Potential adverse impact to surface and ground water drainage.	• Only fill and top cover material approved for use by Parks Canada may be used. • All heavy equipment and vehicles (except for cars and light trucks) entering the site must be thoroughly cleaned and inspected. • Careful consideration will be taken to ensure that demolition activities do not impact subsurface hydrological resources (i.e. hot springs) or cause excessive noise or vibration. • Low impact (i.e. low noise and ground vibration) equipment will be used for demolition activities in proximity to sensitive areas, including the Superintendants house, the bus shelter and the elevator shaft. • The top 6 m (subject to final engineering drawings) of the remaining elevator shaft to grade height will be carefully filled with clean concrete waste material in the size range of 250 mm to 500 mm to create artificial denning habitat with interstitial spaces. The material is not to be capped other than with a coarse mulch material.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. • Implement corrective action as required.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
9. Landscaping and Restoration		• Ensure small cover features are installed in any areas currently used for foraging, gestation and other life cycle needs. • Parks Canada Environmental Surveillance Officer will identify and flag protected areas for the contractor prior to work activities commencing on-site. • Disturbance to existing native vegetation will be minimized through controlled vehicle and equipment access – areas to be protected will be clearly flagged or delineated with temporary fencing. • Trees identified to be left in place will be clearly flagged and delineated. No construction shall occur around these trees' drip-line, including filling, scarifying, stripping, etc. • Obvious non-native shrubs, such as Lilac, will be removed (unless otherwise specified by Parks Canada) and disposed of off-site by excavating the root ball and replacing the void with soil. • All disturbed areas (unless otherwise specified by Parks Canada) will be rehabilitated with a minimum of 100mm of soil (may be a combination of on-site soil and imported soil/topsoil). Imported soil will be checked to ensure it is free of invasive weeds. • Topsoil will be seeded as specified by Parks Canada and applied by hydro seeding. • Disturbed areas (unless otherwise directed by Parks Canada) will be hydro seeded via hydro mulch complete with a tackifier and fertilizer in lieu of an erosion control matting. • All parked equipment and vehicles, as well as stockpiles of construction and building materials will be inspected prior to movement.	• Parks Canada on site during key phases and activities with potential for effects to the environment • EA follow-up monitoring of reclamation and restoration. Implement corrective action as required.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
9. Waste and Chemical Management • Existing waste debris and containers/bins. • Septic tank. • Propane tank. • Demolition generated debris.	• Adverse impact to wildlife residing in the area from existing waste debris or contractor chemicals or generated wastes. • Potential for soil and groundwater contamination from contractor equipment spills. • Propane tank poses an explosive risk. • Potential for fires to be caused by unsafe storage of flammable substances. • Historic land use practices and potential to uncover historic contaminated soils, fuel tanks could cause contamination to spread in the environment.	• Hazardous chemicals and waste will need to be stored and handled using industry best practices and applicable regulations with systems to prevent accidental release into the environment or contact with wildlife. • All incidents and spills must be reported immediately to the Parks Canada on-site representative. • Fuel, chemicals, wastes and other hazardous materials will be stored and secured in a manner consistent with relevant regulations and guidelines, including Banff National Park Directive #17. • Construction wastes to be collected and disposed of at approved facilities. Use portable toilets during demolition work. • Household type waste materials and garbage must be removed daily and stored in bear proof containers. • Old building materials shall be re-used and recycled where practical. • Material not recycled will be removed for disposal at a licensed landfill out of the park. • Clean concrete can be disposed of on-site. • Develop removal and contaminant handling protocol. • Conduct investigative ground-truthing of the 3 anomalies found from the 2012 magnetometer survey (appendix 3) after asphalt & gravel base removal using small equipment or hand excavation to avoid damage to potential buried tanks. • Any contamination found during demolition will be tested, removed and disposed of in accordance with regulatory requirements including being hauled to a licensed landfill facility outside the park. Contaminated sites must be cleaned up to meet the standards established by the CCME Environmental Quality Guidelines for Soil and Water 2007 (with updates to 2012) and CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil 2008 for Residential/Parkland use. • Septic tanks to be pumped out. Expected concrete tanks can be filled and covered. • Propane tank to be removed from site. Supports to be excavated and disposed of. • Metal waste bin(s) to be removed from site and recycled.	• Parks Canada on site during key phases and activities with potential for effects to the environment

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
10. General and Miscellaneous	• Fire started by contractor activities and subsequent damage to surrounding environment. • Impact to unknown cultural or heritage resources. • Wildlife injuries or fatalities caused by demolition work.	• All trucks and heavy equipment will be outfitted with a spill response kit and shovel, and if in fire season, fire fighting tools. • During fire hazard season, the contractor must implement additional fire prevention measures that meet Parks Canada standards. • Equipment must be well maintained and inspected daily for leaks. • All spills will be immediately reported to the designated Parks Canada representative and in the case of a major spill, will be immediately reported to Banff Dispatch (403) 762-4506. • All incidents and spills must be reported immediately to the Parks Canada on-site representative. • On-site refueling must be done with well maintained equipment and must be actively monitored to prevent spills. • On-site fuel storage must meet Parks Canada standards and industry best practices. • The contractor will develop an Environmental Protection Plan and Incident Management and Response Plan and provide an environmental and incident management orientation to all workers prior to start of works. Plan will also include fire response and management procedures subject to typical potential fire hazard conditions for the time of the year. • Demolition and restoration activities should be completed in as short a time frame as possible. • In the event the contractor uncovers or discovers any cultural or heritage resources during their on-site activities, they will stop work in that particular area and notify the Parks Canada on-site representative. The area in question will be assessed for cultural/historical significance before any work will be allowed to continue in that particular area. • Fill should be compacted as per engineer specifications to avoid the effects of settling.	• Parks Canada representative will provide an environmental orientation/briefing to crews outlining Parks Canada regulations, relevant regulations, key mitigation measures, environmental protection plans, emergency protocols/contacts, contingency plans, etc. • Parks Canada Surveillance Officer will be the contractor's key Parks Canada contact during demolition work.

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
11. General and Miscellaneous (continued)		• Demolition work will be halted during periods of heavy rainfall if it is deemed to be potentially dangerous by the Parks Canada Surveillance Officer to cause slides or erosion that could adversely impact Highway 93 or the surrounding environment. • Stripped topsoil and subsoil will be securely stored in separate piles that will prevent mixing or erosion of the material. • Material sources for re-establishing contours can include clean stone and concrete, clean fill, and natural earth materials approved for use by Parks Canada. • Topsoil will have to be brought in or soil amendments used, subject to the amount available on-site and approved for use by Parks Canada. • Crews are not permitted to have firearms on-site or feed the wildlife. • Cigarette smoking permitted only in designated smoking areas which have waste receptacles as permitted by Parks Canada.	• Parks Canada on site during key phases and activities with potential for effects to the environment

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
11. General and Miscellaneous (continued)	Excessive noise can cause disruption to the visitor experience as well as wildlife.	• Noise levels from demolition in combination with other anthropogenic sound sources (i.e. highway sounds) are not to exceed 66 dBA leq(h) daytime levels at the main pool in the hot springs. • Low noise equipment will be use on the project and all equipment must be fitted with working maintained silencers. • High impact equipment known to cause higher noise levels and potential for higher ground vibrations will not be used. Blasting, portable rock crushers and large jackhammers are not permitted. • Construction and demolition activities will be restricted to daylight hours to minimize noise pollution issues for visitors and surrounding wildlife. • Construction noise must not occur on weekends, public holidays (including Friday afternoons prior to holiday weekends) or daily after 5 pm. • Combine noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately. • The contractor is to take care when dropping materials from a height, for example, when dumping concrete material into the Superintendent's basement and elevator shaft. • Shut or throttle down equipment (such as backhoes, loaders, generators, bobcats) whenever they are not in actual use. • In the case that there is excessive noise, the contractor will adopt alternative equipment or processes that lessen resulting noise.	• Parks Canada on site during key phases and activities with potential for effects to the environment

Demolition or Reclamation Activity	Potential Impact and Environmental Effect	Demolition Mitigation	Monitoring and Follow-up
11. General and Miscellaneous (continued)	Excessive dust can cause disruption vegetation and wildlife habitat as well as blow into visitor areas.	• All activities generating dust or with the potential to generate dust must use dust control techniques to reduce and contain dust to the work site. Excessive dust buildup must be regularly removed. • Ensure work minimizes dust generation. Prevent or control blowing of dust and debris. • An appropriate dust control program will be developed by the contractor and implemented for all construction areas. • Dust suppression/collection equipment should be attached when using sanding and cutting machinery, for example, a wet suppression system or to a vacuum system. • Enclosures, curtains or shrouds surround the work area may also be used. In this case, the surface dust created should be promptly cleaned from the surface using a wet sweeping process. • Reduce activities that create fugitive dust during windy conditions. • Manage storage piles (e.g. by shaping them, installing enclosures or coverings around piles, conducting storage pile activities downwind of sensitive receptors such as the Hot Pools); • As necessary, use environmentally acceptable dust suppressants or water to control dust on access roads, lay-down areas, work areas, and disposal areas. • Minimize drop height at material transfer locations (e.g. when loading soil onto haul trucks).	• Parks Canada on site during key phases and activities with potential for effects to the environment

9 APPENDIX 2: PARKS ENVIRONMENTAL GUIDELINES FOR DEVELOPMENT PROJECTS

BANFF NATIONAL PARK DIRECTIVE
PARKS CANADA - CANADIAN HERITAGE

DATE: 17-MAR-88 as amended 03-JUN-98	**NUMBER: BNP-93/17** (originally BNP/32)
SUBJECT: Environmental Guidelines for Development Projects	

PURPOSE:

To provide guidelines for development projects within Banff National Park (BNP), in order to protect natural and cultural resources by minimizing adverse environmental effects resulting from these projects.

SCOPE:

This directive will apply to all development which may impact the natural and cultural environments in BNP (including Banff Townsite), and/or development which may be affected by these environments. This directive will also apply to development which alters the function and appearance of existing structures.

DEFINITION:

Project Manager - that person responsible for coordination and completion of a project.

Banff Park Project Officer - appointed by the Superintendent as the coordinator for both park projects and private development projects within the park. This project officer will be the park contact person for a specific project.

BACKGROUND:

Parks Canada, through the Government of Canada and on behalf of the people of Canada, has been entrusted with the task of responsibly managing the land and resources within our national parks. Within BNP, Heritage Resource Conservation (HRC) has the responsibility for the management and protection of natural and cultural resources, and the promotion of the philosophy of environmental stewardship. Environmental stewardship is not only the special awareness of the importance and benefit of natural and cultural resources; it is also the incorporation of such awareness into all day to day activities and practices, such that impacts to these resources are minimized.

BANFF NATIONAL PARK DIRECTIVE
PARKS CANADA - CANADIAN HERITAGE

DATE: 17-MAR-88 as amended 03-JUN-98	**NUMBER: BNP-93/17** (originally BNP/32)
SUBJECT: Environmental Guidelines for Development Projects	

National Parks are special places. Development projects within National Parks boundaries will require special attention. Individuals carrying out such projects will require a heightened awareness of environmental stewardship. While some projects will provide the needed services to the park resident and visitor; other projects, without care or consideration for the environment, may do serious harm.

For each project, the Canadian Environmental Assessment Act (C.E.A.A.) will be applied to the required level to identify concerns and provide mitigating measures. Further direction in the form of specific guidelines for development will be provided below to assist in ensuring environmentally sound practices on the development sites.

POLICY:

1. Project Coordination

After project approval and contract awards, and prior to the start of development activities, a pre-construction meeting will be scheduled by the project manager and will include:

- the Superintendent or his delegate (major projects);
- the Park Project Manager;
- the Project Manager;
- the CEEA or Environmental Surveillance Officer;
- the monitoring Park Warden (where required);
- the Contractor;
- the Engineer (where required);
- other personnel who have concerns involving the project (ie: Archaeology, etc.).

Periodic on-site meetings with the Environmental Surveillance Officer (ESO) and the Project Manager may be required during the development phase to discuss environmental concerns. Outstanding problems or significant deviations from approved plans which cannot be resolved at the field level will be presented to the park Superintendent, or his delegate, for final decision.

NOTE: A PARK WARDEN IS RESPONSIBLE FOR THE PROTECTION OF NATURAL AND CULTURAL RESOURCES WITHIN NATIONAL PARKS AND HAS AUTHORITY AS A PEACE OFFICER, TO ENFORCE THE NATIONAL PARKS ACT, ITS REGULATIONS AND RELATED GUIDELINES AND DIRECTIVES. A PARK WARDEN MAY STOP WORK AT ANY TIME, IF NECESSARY, TO PREVENT UNDUE ENVIRONMENTAL DAMAGE.

2. Specific Direction for Project Managers

For each project, specific instructions will be prepared by HRC for issue to the project manager. These will include environmental concerns and permit/license requirements. The following guidelines shall apply.

GUIDELINES:

1. **Site Access** - Access to the work site should be identified in the contract documents, especially if access is going to be a problem, so that contractors can estimate costs in their bids. Access to the construction site will be clarified in detail at the initial pre-construction meeting. The contractor will ensure that:

   1.1. Only designated access routes are used.

   1.2. Vehicle parking is restricted to established roads or identified parking area(s).

   1.3. Load restrictions (when necessary) on access routes are implemented, to prevent damage to structures or road surfaces. Overweight permits may not be issued during certain periods of the year.

   1.4. Construction equipment is operated and parked only within the confines of the construction site. Construction site boundaries will be delineated by flagging or fencing materials and maintained throughout the duration of the project.

   1.5. Roads, sidewalks and other public accesses are maintained with minimal interference.

2. **Employee Briefing** - The contractor will conduct briefing sessions for all employees and sub-contractor employees and will cover the following topics:

   2.1. Care of the environment in the area where the work is being performed.

   2.2. Harassment or attraction of wildlife.

   2.3. Pollution and garbage management.

   2.4. Relevant Park Regulations, and the authority and responsibilities of the Park Warden.

   2.5. Relations between workers, tourists and residents.

2.6 Specific vehicle access to the work site, and requirement for National Park Vehicle Entry Permits.

3. Sanitary and Garbage Facilities

3.1. The contractor shall be required to provide regularly serviced sanitary (toilet) facilities to adequately provide for the number of employees anticipated on-site.

3.2. All garbage must be stored and handled in conformance with the *National Park Garbage Regulations.*

3.3. The contractor shall be required to provide approved bear-proof storage for any edible garbage or food containers that may be disposed of on-site. No littering will be tolerated.

4. Wildlife - The contractor shall ensure that there is no harassment of wildlife as a result of his operation and that no action is permitted which will attract wildlife to the site. The contractor will notify HRC in BNP of wildlife encounters on or around the work site or crew accommodation, as soon as the problem arises or within 24 hours at the latest.

5. Cultural Resources - The contractor will immediately inform the ESO and/or the Project Manager of any items of historic interest or evidence of archaeological finds that are discovered on the development site (ie: old garbage dump sites, cabin sites, etc.). The ESO monitoring the project will inspect the site immediately and provide written direction to the Project Manager as to the method in which to proceed with the work after consultation with Alberta Regional Archaeologists. All historical and prehistorical finds must be protected and will remain the property of Parks Canada. (See also "12. Excavating".)

6. Site Investigation and Surveys - Any site investigation work involving disturbances to the natural environment requires prior approval from the Superintendent. Some site disturbance is necessary at the planning stage for most projects. The impacts of such disturbances will be minimized, especially if the disturbed area is likely to be outside the eventual construction site.

6.1 Wildfire Considerations (from *"Wildland-Urban Interface Forest Fire Potential and Fuel Reduction Plan for Banff Townsite and Surrounding Area"*). Within the past several decades, fire suppression has resulted in relatively few large fires in the park. During the same period, considerable development has taken place within the park. Not only have the communities of Banff and Lake Louise grown into the surrounding forest areas, but a number of recreational and service centres have been constructed throughout the forest. These structural values are now increasingly at risk from potential high intensity forest fires, and protection of people and property within the zone, referred to as the wildland-urban interface, is becoming more urgent.

6.2 Site specific investigations and considerations should focus on an assessment of forest fuels build-up at the periphery of the development site. A number of factors are of concern for each specific location. These include:

- fuel type
- slope
- nature and position of threatened values
- degree of safety to be attained by the fuel modification treatment
- appearance, aesthetics of the treated area
- economics of the project
- capabilities of the organization to conduct the project.

6.3 An urban-wildland interface fire assessment that provides information concerning values at risk with respect to facility development in a forested environment is available from HRC in BNP.

7. Site Preparation - The area to be cleared will be delineated using biodegradable flagging tape. Prior to tree or vegetation removal, the site will be inspected by HRC to ensure compliance with Section 16(1)(2)(3) of the *National Parks Building Regulations* concerning preservation of trees and vegetation in general. Trees are to be cut so that they fall inside the cleared perimeters. Tree removal will be detailed on approved site plan or landscaping plan.

8. Disposal of Trees

8.1 Trees larger than 15 cm (DBH) shall be:

- cut into blocks not to exceed 35 cm. and stockpiled at a designated location for use as firewood; or if deemed necessary by the department;
- marked, felled, and piled at a designated location for use as sawlogs.

8.2 Trees under 15 cm (DBH) and other woody materials such as stumps, tops, and limbs can be disposed of in the following manner:

- the materials may be processed by chipper and deposited at a designated site; or
- depending on fire hazard and weather conditions, on-site burning may be permitted. A burning permit is required from HRC. As part of the conditions for granting a burning permit, the contractor may be required to provide the following:

8.2.1 For the period Nov.1 to April 14:

- slash pile must be surrounded by 10 meters of mineral soil;
- slash pile must be a minimum of 20 meters from standing timber;
- 24 hour supervision when fire is active; a smoldering fire may be left unguarded if above safeguards are met;
- a front-end loader, cat and / or water truck must be readily available;
- information of the maximum size of the fire and number of fires going at one time;
- burning must be done on road right-of-way unless a cleared area has been given prior approval.

8.2.2. In addition to the above, for the period of April 15 to October 31:

- fire weather index (FWI) readings must be less than 10. Note: under certain conditions and with special precautions, a fire permit may be issued when the FWI is greater than 10.

8.3. The following are the conditions that may be imposed on the burning permit to minimize smoke pollution:

- a hot continuous hot fire produces minimum amounts of smoke; a continuous burning operation may be required to ensure minimum smoke pollution;
- the number of fires;
- burning permits may not be issued until upper level winds are forecast which will help dissipate the smoke.

9. Construction Materials

9.1 Materials Storage - Construction material shall normally be stored within the confines of the development site. Under no circumstances may construction materials be stockpiled in the trees along the perimeter of the site or upon any area designated for protection within the site. Off-site storage of materials in undisturbed areas may be allowed only if permission is obtained from the lessee of the land involved in concurrence with HRC, or in another location designated by the ESO assigned to the project.

9.2 Trade Waste - Trade waste (construction waste) materials will be disposed of at the designated trade waste area only. The designated Trade Waste area for Banff National Park is the Castle Junction Tradewaste Site. This facility is located on Highway # 93 South, near Castle Junction, and is administered by the Town of Banff, as an Alberta Class III, Industrial landfill restricted to inert solid wastes only. A permit is required and can be obtained from the Town of Banff Administration Office between 0900 and 1630 hrs., Monday through Friday.

9.3 No food, domestic garbage, recyclable materials, or hazardous wastes may be deposited in the trade waste area.

NOTE: *National Park Garbage Regulations* Sec.6(1): "No person shall convey or cause to be conveyed any garbage in a vehicle that is not properly constructed and covered so as to prevent the contents thereof from escaping".

10. Soil Materials

10.1 Clean Fill - Clean fill (stripping or excavated materials) will be deposited in an area designated for this purpose, and in accordance with Banff National Park Directive # 22, *"Guidelines for Management of Excavated Materials".*

10.2 Stripping - The topsoil layer in the BNP area is frequently very thin. Successful site rehabilitation depends on either careful saving of the limited topsoil resource, or undertaking the expensive alternative of hauling topsoil from outside the Park.

- Measures required to conserve the valuable topsoil resource must be identified. This may include stockpiling on-site for immediate rehabilitation, or disposal at an area designated by the Superintendent.
- Care must be taken during both grubbing and stripping operations to ensure that the trees and roots on the edge of the clearing limits are not disturbed or damaged. This phase will be closely monitored by HRC.
- In some instances where steep backslopes are involved, grubbing and stripping may not be permitted. Stumps would be cut flush with the ground, and the ground cover left undisturbed to promote slope stability. This will be determined by an on-site inspection by the ESO.
- Material encountered below the topsoil layer, which is not suitable for construction purposes may be disposed of at designated locations in accordance with Park Directive # 22,*"Guidelines for Management of Excavated Materials".* Arrangements to dispose of the surplus material must be made with theESO responsible for monitoring the project.
- Depending on the type and volume of material encountered, special conditions may be imposed regarding compaction and rehabilitation at the disposal area.

10.3 Contaminated Soil - The issue of contaminated soils and disposal practices will normally be identified through CEAA. However, where past and present land use practices have led to soil contamination, certain actions will be required. These include:

- Soil testing at the expense of the proponent. Level of contamination will be in accordance with the Canadian Council of Ministers of the Environment guidelines, and acceptable levels will be decided by the park. Minimum acceptable standards for in-park soil contamination and remediation will be to the "Parkland" level.
- Soil disposal at the expense of the proponent. All contaminated soils will be removed from the park. No treatment of contaminated soils (ie. bio-remediation, land-farming, etc.) will be allowed within the park. Disposal of contaminated soil material will be at provincially certified disposal sites. Written proof of disposal of contaminated soils will be required.

11. Control of Toxic/Hazardous Materials, Fuels.

11.1 Toxic/Hazardous Materials - All toxic/hazardous materials will be stored and used in accordance with relevant federal and provincial legislation pertaining to these materials. Spill contingency plans and equipment will be on-site, and employees will be aware of such emergency procedures as required. The ESO will be made immediately aware of any and all spills of toxic or hazardous materials. All hazardous wastes will be disposed outside BNP. This material will be disposed of in conformance with all relevant Federal and Provincial legislation and regulations pertaining to the transport and disposition of

hazardous wastes.

11.2 **Fuels** - Permits for on-site storage of fuel or other inflammable liquids must be obtained from the ESO monitoring the project. Depending on the volume and location of the storage site, the following conditions may apply.

- Fuel storage and refuelling areas will be designated.
- The designated storage area will be bermed to enclose 125 % of anticipated storage tank volume. The bermed storage area will be underlain with an impermeable liner. All contaminated rainwater, contained within the berm, will be collected and removed from the park. Other special protection measures may be required to prevent mechanical damage of the tank.
- All soil material contaminated during refuelling operations will be collected and disposed of outside BNP at an appropriate facility. Written verification of such disposal will be provided to theESO.
- Spill contingency plans will be developed and appropriate equipment to implement such plans will be in place, in the event of accidental spillage or tank malfunction. Fire protection equipment will be available on-site. The ESO will be made immediately aware of any spills.

12. **Excavating** - Disposal of surplus excavation material shall be handled in a similar manner to the disposal of surplus stripping material.

- It is extremely important in all excavations to ensure that excavated material is not permitted to sluff into the surrounding tree cover, or to bury any plant material that is to be retained. Trees and shrubs on the perimeter of the site can be severely damaged by burial or damage involved in retrieving this material at a later date.
- Rocks rolling down steep slopes during excavation or dumping of fill material can severely damage vegetation below. Special attention by equipment operators and extensive downslope protection work may be required.
- Careful equipment operation is required to ensure that mechanical damage to trees and surrounding vegetation does not occur. If damage does occur, an approved horticultural sealant will be applied to the tree damage as soon as possible.
- All equipment operators should be instructed that the operation of construction equipment off-site is not permitted. This applies both to the perimeter of the site, and to any areas within the site that are protected in a natural state.
- Alberta Region archaeologists must be informed of any projects in the park that require excavation. This will be scheduled at the preliminary/design phase of the project. Archaeological/Historical concerns will be cleared by Alberta Region Archaeological Division prior to initiation of excavation.
- Material sources, material storage areas and width of excavation ditches will be identified and recognized as part of the cost estimate of the project (trucking requirements, etc.).
- All open excavations will be signed and fenced appropriately in order to minimize hazards to both the general public and to wildlife.

13. Foundation and Concrete Work - Indiscriminate disposal of concrete or concrete residues around the site perimeter is not permitted. A concrete truck cleanout area will be identified for each project. Concrete residues will be disposed of at the Castle Junction Trade Waste Pit, or outside the Park at the proponents expense.

14. Pollution of Rivers or Streams

14.1 No rock, silt, cement, grout, asphalt, petroleum product, lumber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into any stream, river, pond, storm or sanitary sewer, or other water course.

14.2 All fuels, oils, lubricants and other petrochemical products will not be stored within 100 meters of any waterbody (including wetlands).

14.3 The crossing of any waterbody (including wetlands) by construction equipment, or the use of such equipment within waterbodies is strictly prohibited unless prior approval has been confirmed through CEAA.

14.4 Only approved chemically treated wood will be allowed near water courses. Sawdust and wood scraps will not be allowed to enter waterbodies.

14.5 Erosion control measures will be implemented on all development sites in order to ensure that off-site run-off is minimized and sediments contained within site perimeters. All pumping of water will be subject to approval of the ESO.

14.6 Site rehabilitation will be an urgent priority. For construction areas adjacent to watercourses, special protection and / or reclamation measures may be required.

14.7 River or streambeds will not be used for borrow materials

14.8 Excavated fill or debris will not be dumped into waterways.

15. Pollution Control

15.1 Equipment and generator plants will operate in accordance with the Alberta Clean Air Act, and Federal Environmental Protection Service emission control regulations/guidelines.

15.2 Work schedules and equipment use may be controlled to prevent excessive noise and disturbance to park visitors. Any such control measures should be specified in the contract documents.

15.3 Materials and work site areas will be wetted down as necessary, to prevent blowing dust and debris. Measures will be taken to contain and control and collect windblown debris.

15.4 All hazardous and potentially toxic materials used in development projects will be securely stored in a responsible manner during development activities.

16. Site Rehabilitation

16.1 Site rehabilitation will receive the highest level of attention. A well conceived landscape plan that identifies rehabilitation goals and identifies physical limitations (ie. water, soil nutrients, suitable species, etc.) to rehabilitation success, will not only serve the best interest of the national park, but also result in the least cost approach in the long term.

16.2 Any deviation from the park approved landscape plan will require permission from the Superintendent.

16.3 All survey stakes, flagging tape, etc. is to be removed at the conclusion of the project.

16.4 The Project Manager will inspect the construction site for the following:

- a thorough site cleanup including general litter.
- any required topsoil is clean and weed free. Sources of topsoil introduced into the park will be approved by the project manager before being allowed into the park. The proponent will ensure numbers and species of approved plant material as per the landscape plan.
- the application of appropriate types and amounts of fertilizers

17. Blasting (see Park Directive #14 *"Control of Explosives"*)

17.1 All blasting must conform with existing regulations and be accomplished under the supervision of a licensed blaster.

17.2 No blasting will be allowed under water or within 100 meters of spawning beds.

17.3 Storage of explosives will be subject to National Parks Regulations.

17.4 Fly rock shall not be permitted to damage surrounding vegetation. Use of blasting mats may be required.

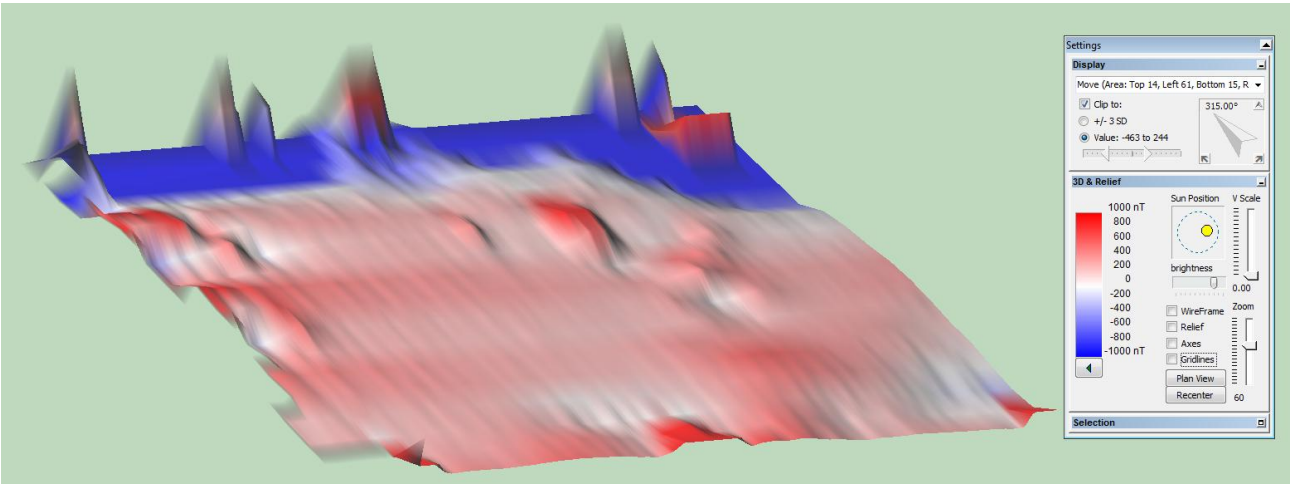
18. Development in Backcountry Areas - Special conditions apply to development in backcountry areas. The more sensitive nature of backcountry wilderness areas and the high value placed upon wilderness experience by park visitors, will often necessitate more rigorous standards for approved development projects. (See Park Directives #19 *"Redevelopment of Commercial Backcountry Lodges"* and #20 *"Redevelopment of Existing Alpine Huts and Backcountry Shelters"*).

(original signed by)
C. Zinkan
Superintendent
Banff National Park

10 APPENDIX 3: GEOPHYSICAL ASSESSMENT OF THE RADIUM LODGE DEMOLITION

Parks Canada Parcs Canada

Geophysical Assessment of the Radium Lodge Demolition, Kootenay National Park Letter Report



William Perry
Terrestrial Archaeology
Cultural Sciences Branch
Parks Canada

July 2012.

Canada

Geophysical Assessment of the Radium Lodge Demolition, Kootenay National Park Letter Report

Introduction

At the invitation of Public Works Calgary, personnel from Terrestrial Archaeology, Cultural Sciences Branch Parks Canada investigated an area located adjacent to the former Radium Lodge in Kootenay National Park (figure 1) for the presence of unknown buried fuel tanks. This abandoned asphalt-covered parking area is located immediately north and west of the former Radium Lodge. Through on-site consultation with project managers, a 352m^2 rectangular area was selected for geophysical survey.

The project area lies on a bench landform overlooking the Radium Hot Springs resort (figure 1). The area has seen much in the way of historical development over the years as the Hot Springs were a focus for early tourism. Thus, bungalow camps and associated utilities are known for the project area. In addition, a nearby structure and associated features located north of the lodge was used by the park as a superintendent's house and later office space for parks employees. This structure, along with the Radium Lodge, is also slated for demolition. Given the level of historic use of the area, a high degree of subsurface disturbance was expected within the geophysical data.

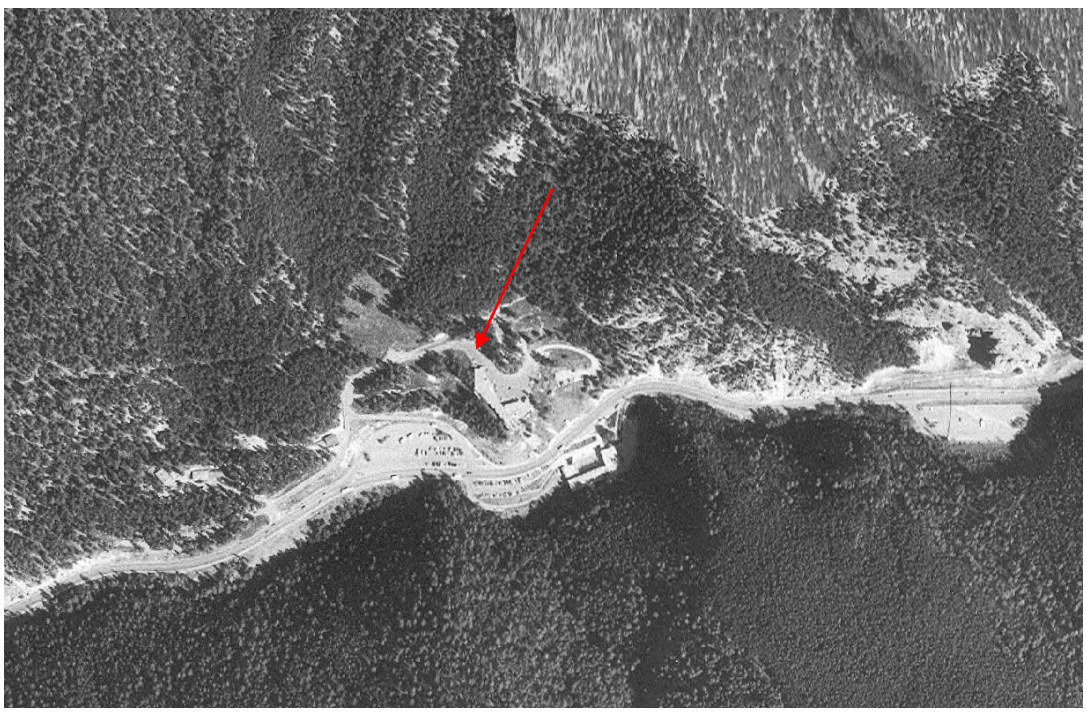


Figure 1 Project location (at arrow), Radium Hot Springs, Kootenay National Park (Parks Canada Air photo 82k070).

Methods

A 16m (east-west) by 22m (north-south) grid was established within the asphalt parking lot comprising a 352m^2 area (figure 2). The grid was oriented with the long axis of the parking lot at an angle of 135 degrees from magnetic north. As the grid was not oriented on the north axis, all directions in this report

will be given as grid directions, e.g. “grid north”. A Bartington Grad 601-2 Magnetic fluxgate Gradiometer (magnetometer) was used to collect magnetic data within the grid. Given the expected high level of historic disturbance and likely presence of metal within the grid, a magnetometer survey was chosen as the geophysical technique to be employed at this site as it is able to discriminate on size and signal response, the magnetic signature that a buried fuel tank would emit.

The magnetic survey was conducted by traversing grid lines spaced 1m apart with a 0.125m distance between measurement points. Since the expected size of the fuel tanks was approximately 3-6m or greater, this provided adequate spatial resolution. The data was collected by walking the grid in a zigzag fashion collecting 8 data samples per metre. The grid’s origin was in the northwest corner. To minimize the effect of a large retaining wall and associated utilities (electrical receptacles were noted) on the magnetic data, a distance of 5m was kept between the wall and the grid’s north edge. With similar reasoning, a distance of 3m was kept between the grid’s south edge and the lodge. The grid’s western edge, delineated by a wooden fence, was kept as near to the edge of the landform possible. The possibility of a buried fuel tank was suspected along this edge (figure 2).

Figure 2 Portion of development plans showing location of geophysical grid outlined in red (Public Works Canada, Real Property Services, Parks Canada Agency 2012).

Surface disturbances for the project area included the retaining wall located 5m away; the lodge structure located 3m away; and a grouping of a standpipe-water valve-hose reel and metal grid corner survey pin in the grid’s southwest corner. Three additional metal spikes were hammered into the asphalt to anchor the grid in the other corners as well. A wooden fence was located along the western edge of the landform. These sources of potential magnetic interference were all expected to register magnetic responses in the data set.

The collected data was uploaded into a geophysical analysis and presentation software, ArchaeoSurveyor 2.0, where the raw data was smoothed and interpolated to enhance patterning. The magnetic values were transformed into a grid format which was plotted into contours. These plots were visualized as plan-views and 3D views (for example figures 3 and 4).

The software allows the user to clip the data to a focused subset where finer detail can be extracted. Thus, the data when analyzed through the use of a histogram was clipped to visualizing the values based on the frequency of value ranges.

Results

For the purposes of this report, a magnetic anomaly is defined as an area in the magnetic data that shows a distinct patterning as separate from surrounding values. Interpretation of magnetic data lies in the differences between adjacent values, not whether they are positive or negative. Thus, a magnetic anomaly can be represented by positive or negative data contours. An anomaly would normally be ground truthed or investigated.

When the known surface features are accounted for, five main magnetic anomalies remain (see figures 3 and 4). Thus, the four metal grid corner spikes, the grouping of the standpipe, hose reel and valve in the southwest corner and the fence line visible on the surface all show a presence in the magnetic data and can be ruled out as features of interest (figures 3 and 4).

In general, the northern two-thirds of the grid showed higher magnetic values than the southernmost portion towards the fence and the edge of the landform. The magnetic interface between these two areas likely reflects the edge of the landform. The lower magnetic values (0 to -1000nT) near the southern edge of the grid likely reflect fill material. Within this, anomalies of high magnetic value certainly stand out (see figures 3 and 4). The higher magnetic values (0 to +1000nT) observed in the rest of the grid likely represent the historic fill overlying natural parent material.

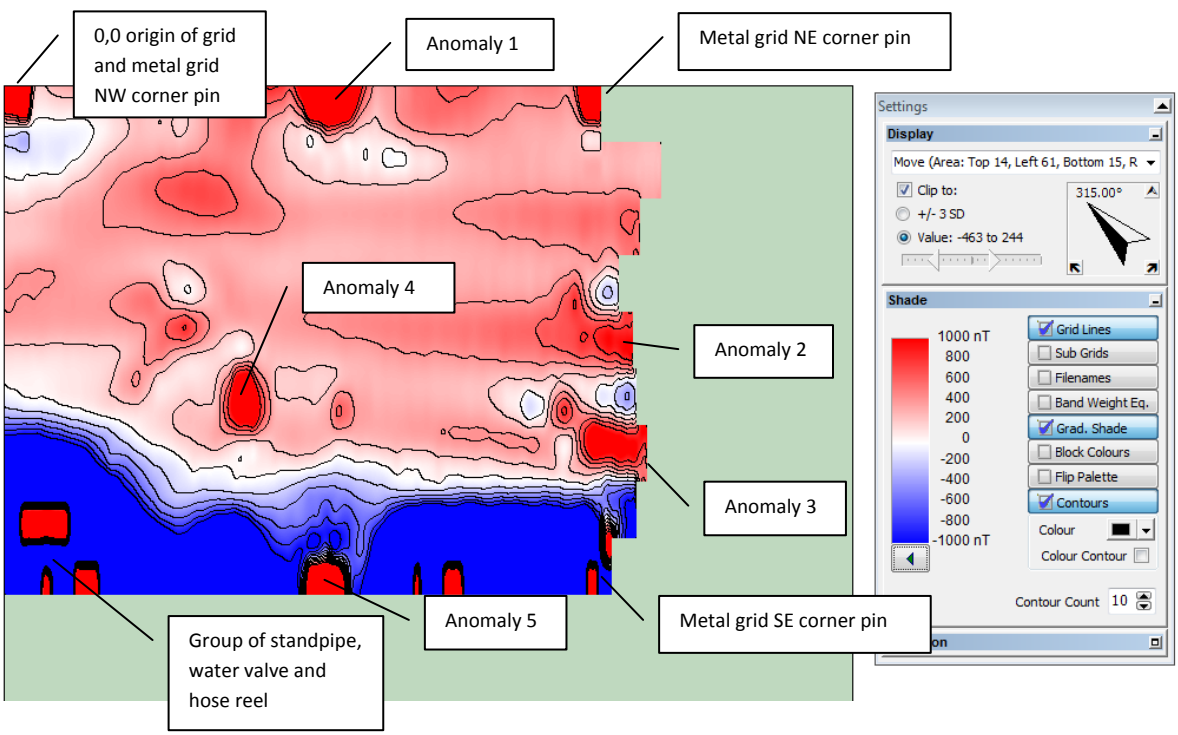


Figure 3. Planview of geophysical grid. Values have been clipped to represent details within the dataset. Grid north is up, grid origin in top left.

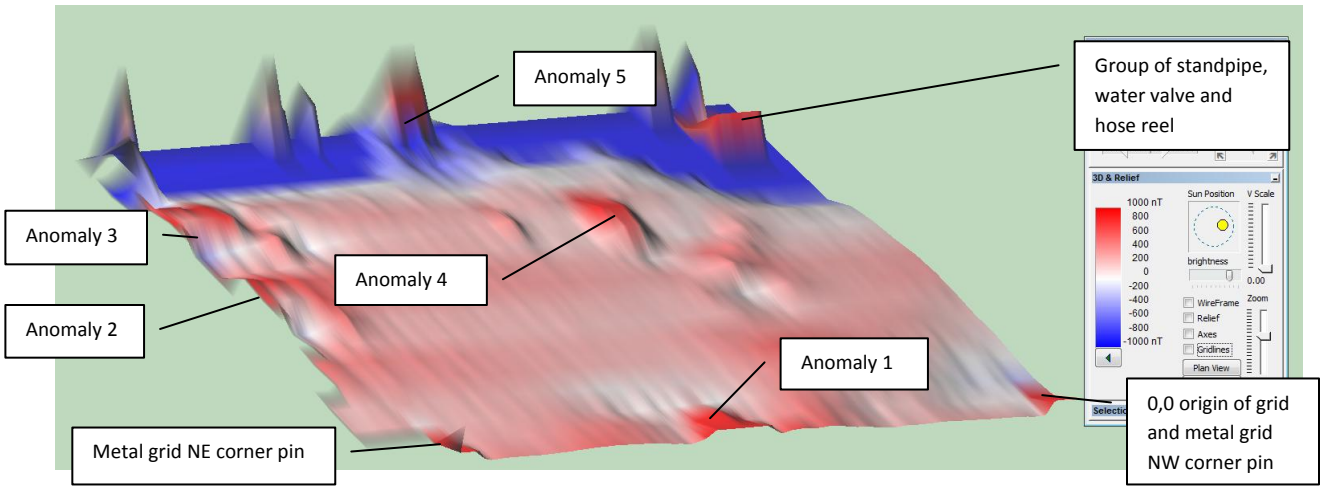


Figure 4. 3-D view of geophysical grid. Values have been clipped to represent details within the dataset. Grid north is up, grid origin in bottom right.

Anomaly 1 has a high magnetic value (700-1000nT) and is located along the north edge of the grid (figure 3 and 4). The area measures approximately 2.75m east-west by at least 1.8m north-south extending northward. It is unknown how big this anomaly is and whether it is related to the retaining wall located some 5m distance to the north. The unknown size of this anomaly may indicate its function to be a buried tank, although its location away from the Lodge may precludes this.

Anomalies 2 and 3 are two parallel partial anomalies along the eastern edge of the grid extending eastward towards the lodge building located 3m away (figure 3 and 4). Both anomalies have high magnetic values (700-1000nT). Anomaly 2 measures 1.9m north-south by an unknown distance east-west. Likewise, Anomaly 3 measures 2.2m north-south by an unknown distance east-west. These two anomalies are located approximately 2m apart. The proximity to the lodge may indicate a utility or structural function for these anomalies. As the actual size of these anomalies are unknown, it is difficult to rule them out as potential targets as fuel tanks.

Anomaly 4 is located near the centre of the grid (figures 3 and 4). This anomaly also has a high range of magnetic values (700-1000nT). The anomaly measures approximately 2.75m north-south by 1.9m east-west. The size of this anomaly makes it unlikely to be a buried tank and more likely to be a concentration of metal or a magnetic rock.

Finally, Anomaly 5 is located at the midpoint along the southern edge of the grid (figures 3 and 4). This anomaly lies in stark contrast to the low magnetic values around it. The anomaly measures approximately 1.8m east-west and an unknown distance south as it extends outside the grid. The size of this anomaly makes it unlikely to be a buried tank and is likely related to either metal buried in the ground or metal on the nearby fence.

Summary and Recommendations

Based on the magnetometer data, it seems clear that the original landform (represented by higher magnetic values) has been extended to southward using fill material (represented by low magnetic values). The two anomalies represented by Anomaly 2 and 3 are both likely related to the nearby Lodge building and are potentially of sufficient size to warrant investigation. Anomaly 1 is likewise potentially large and extends northward towards the retaining wall. Further investigation of this anomaly is likewise recommended. The remaining anomalies are all relatively small and likely represent either buried metal debris or magnetic rock or soils. Targeted ground truthing is recommended for Anomalies 1, 2 and 3.

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DW Consulting

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